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A Usage-based Approach to Verb Classes in English and German

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A Usage-based Approach to Verb Classes in English and German

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Dissertation

Presented to the Faculty of the Graduate School of

The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

Doctor of Philosophy

The University of Texas at Austin

May 2016

A Usage-based Approach to Verb Classes in English and German

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The University of Texas at Austin, 2016

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Drawing on data from verbs of Change (*alter, transform*) and Theft (*steal, shoplift*), my dissertation investigates and compares verb classes along a variety of dimensions. A common assumption in research on verbal syntax and semantics states that verbs with similar meanings exhibit similar syntactic behavior (Fillmore 1967, Levin 1993). For example, many Change verbs can occur in transitive constructions with *into* PPs (*The witch {changed/turned/transformed} the prince into a frog*). This systematicity has led scholars to propose verb classes, such as Change verbs, which are predictive of a verb's syntactic behavior. However, recent research (Boas 2008, Faulhaber 2011) has challenged this assumption on the basis of data in which semantically similar verbs differ in their grammatical behavior (*The prince {turned/??changed/*transformed} red*).

The introductory chapters review research on verb classification and argument realization, revealing that cognitive and usage-based theories such as Frame Semantics, Construction Grammar, and Valency Grammar are most useful for addressing the three major goals of the dissertation. The first goal is to account for both regularity and differences in verb classes. After assessing the precise meanings and valency behavior of individual Change verbs, I develop a method for formulating verb classes and lexical entries at various levels of granularity to account for both shared and unpredictable

behavior of individual verbs. The next major goal is to determine whether verb classes exhibit similar meanings and constructional behavior across languages, which I address by comparing the semantics and valency constructions found for English Change verbs with those of German Change verbs. Finally, I compare the Change verb analysis to a similar analysis of Theft verbs in order to determine whether the semantic domain and relative semantic richness of verb classes influences the degree of language-specific and cross-linguistic uniformity of verb classes.

Table of Contents

Chapter 1: Introduction 1
1.1. Overview 1
1.2. Research questions 5
1.3. Outline of the dissertation 8

Chapter 2: Approaches to Verb Classification 11
2.1. Lexical semantics and the syntax-semantics interface 11
2.2. Levin's (1993) alternation-based classification of English verbs 22
2.3. Role-based approaches to argument realization 28
2.4. Event-structural approaches to argument realization and verb classification 41
2.5. Summary and conclusion 64

Chapter 3: Frame Semantics, Construction Grammar, and Valency Grammar 67
3.1. Frame Semantics 67
3.2. Construction Grammar 88
3.3. Valency Grammar 119
3.4. Conclusion 135

Chapter 4: Methodology 142
4.1. Introduction 142
4.2. Primary analysis 142
4.3. Capturing generalizations and idiosyncrasies in verb classes: valency frames, sub-classes, and frame-based verb entries 157
4.4. Comparing verb classes across languages and semantic domains 165
4.5. Conclusion 168

Chapter 5: English Change verbs 169
5.1. Introduction 169
5.2. Meaning components of English Change verbs 186
5.3. Valency of English Change verbs 203
5.4. The English Change valency frame and frame-based verb entries 231

5.5. The predictive power of valency frames and sub-classes: the case of *metamorphose* 264
5.6. Conclusion 272

Chapter 6: Comparing German and English Change verbs 274
6.1. Contrastive and German-specific verb class research 274
6.2. Research questions, methodology, and outline 291
6.3. Comparing the meanings of German and English Change verbs 296
6.4. Comparing the syntax of German and English Change verbs: valency constructions and grammatically relevant meaning components 309
6.5. Conclusion 352

Chapter 7: Comparing Theft Verbs to Change Verbs 355
7.1. Introduction 355
7.2. Comparing Theft and Change in English 363
7.3. Comparing Change and Theft verbs from a contrastive perspective 396

Chapter 8: Conclusion 417
8.1. Summary of dissertation 417
8.2. Research Questions 422
8.3. Limitations and outlook 428

Appendix A: Full dictionary definitions for meaning analysis 432

Appendix B: Meaning analysis of English and German Theft verbs 449

Appendix C: Peripheral Frame Elements 462

Appendix D: Detailed Valency Distribution and VC Phrase Types 469

Appendix E: German Change valency frame and FBVEs 475

Glossary 489

Bibliography 492

Chapter 1: Introduction

1.1. OVERVIEW

In this dissertation, I compare sets of semantically related verbs (i.e. verb classes) in English and German in order to determine whether (and if so, how) verb classes can fully account for the relationship between verb meaning and argument realization both within and across languages. A major goal of linguistic research is to determine the relationship between the meanings and forms of linguistic items. Since Fillmore's (1967) seminal article, this form-meaning relation has been investigated in great detail with respect to verbs and the grammatical expression of their arguments (i.e. valency, argument realization). As stated by Levin (1993: 1), "the behavior of a verb, particularly with respect to the expression and interpretation of its arguments, is to a large extent determined by its meaning." Based on these observations, scholars have developed numerous methods and frameworks to capture precisely what aspects of verb meaning influence argument realization, and in what ways. The formulation of verb classes that capture similarities in verbal semantics and syntax is central to this research. Verb class research was originally motivated by the desideratum to minimize the amount of information required in lexical entries: by identifying verb classes that accurately map a verb's meaning to its syntactic behavior, one only needs to list the class a verb belongs to in order to predict the syntactic structures it may appear in, rather than specifying this information in each verb's lexical entry.[1]

Verb classes have been proposed using very different criteria. A rudimentary classification of (English) verbs is according to transitivity, which results very large and semantically diverse classes of transitive, intransitive, and ditransitive verbs. However, this classification is overly simplistic, as some but not all transitive verbs can also be used intransitively with the transitive subject as intransitive object (*He broke/hit it – It broke/*hit*). These types of data led scholars to investigate whether this type of grammatical behavior can be traced to specific verb meanings (Fillmore 1968, Dowty 1979, Van Valin and LaPolla 1997, Levin and Rappaport-Hovav 2005, Croft 2012). The identification of such "grammatically relevant meaning components" is a major goal of verb classification studies.

[1] "[T]he ideal lexical entry for a word should minimize the information provided for that word. This goal can be achieved by factoring predictable information out of the lexical entries, leaving only idiosyncratic information." (Levin 1993: 11)

Fillmore (1967, 1968), for instance, ties the ability of a transitive verb to appear in intransitive constructions to the structure of the event encoded by such verbs. Namely, transitive verbs whose meanings involve a "cause change" meaning component (like *break, change, close,* or *increase*) may appear intransitively, but those without this component may not (like *hit* or *kick*). These insights gave rise to a major strand of research which analyzes verb meanings according to their event structure, building on Vendler's (1957) original coarse-grained aspectual classes of verbs such as State verbs, Activity verbs, Accomplishment verbs, and Achievement verbs (Dowty 1979, Tenny 1994, Van Valin 1993, Rappaport Hovav and Levin 1998, Croft 2012). Current research in this area draws on techniques such as predicate decomposition, which abstracts away from the specific rich meanings of verbs (i.e. the meanings that differentiate *break, change, close,* and *increase*) and identifies only the core grammatically relevant meaning components (i.e. "cause change").[2] These components then serve as criteria for classifying verbs. A notable classification in this respect is that between Manner and Result verbs, which has been shown to account for a wide range of verbal argument realization behavior within and across languages (Rappaport Hovav and Levin 2010, Beavers and Koontz-Garboden 2012, Levin fc.).

Levin (1993) offers a much finer-grained, large-scale classification of English verbs that has become a cornerstone of verb classification studies.[3] Her classification groups 3,024 English verbs into 193 distinct verb classes. Levin (1993) posits a verb class when a group of verbs undergo the same set of argument structure alternations. For example, Levin (1993: 177-178) posits a class of *Turn* verbs, listed in (1.1), based on their ability to occur in argument structure alternations such as the Causative/Inchoative Alternation (Levin 1993: 27f.) or the Total Transformation alternation (1993: 57f.)

(1.1) **Levin's *Turn* verbs**: *alter, change, convert, metamorphose, transform, transmute, turn*

FrameNet (Fillmore and Baker 2010, Ruppenhofer et al. 2010) also offers a large-scale and fine-grained classification of English verbs (and other parts of speech) according to semantic

[2] The reason for abstracting away from encyclopedic meanings to identify only those which are grammatically relevant is summarized in this quote from Tenny (1994: 2): "The universal principles of mapping between thematic structure and syntactic argument structure are governed by aspectual properties. […] Only the aspectual part of thematic structure is visible to the universal linking principles."

[3] As of 1 March 2016, Google scholar shows that Levin (1993) has been cited in 4647 other publications.

similarity, rather than using syntactic criteria like Levin (1993).[4] FrameNet draws on the theory of Frame Semantics, in which word meanings are understood in terms of more complex structures of experiential knowledge, or semantic frames. Verbs are grouped together in the same FrameNet class when they evoke the same semantic frame, that is, when they describe the same types of situations involving the same number and types of participants (Fillmore 1977, 1982, 1985, Fillmore and Baker 2010, Ruppenhofer et al. 2010). One such FrameNet class is the `Cause_change` frame, which includes words describing situations in which an agent causes something to change from one state to another.[5] The verbs in this FrameNet class are listed (1.2). Observe that many of the verbs classified together using FrameNet's semantics-based method are also listed in Levin's alternation-based *Turn* class (see 1.1 above), as noted by underlining these verbs.

(1.2) **Verbs in `Cause_change` frame**: *alter, change, convert, deform, make, modify, reshape, shift, transform, turn, vary*

Given that the coarse-grained verb classes such as Manner vs. Result verbs can account for a wide range of argument realization behavior based on fairly abstract meaning components, one would expect that the fine-grained verb classes of Levin (1993) and FrameNet would enable an even more accurate prediction of a verb's grammatical behavior. However, a cursory analysis of the distribution of Change verbs (i.e. Levin's *Turn* verbs, FrameNet's `Cause_change` verbs[6]) demonstrates that this is not the case. (1.3) shows the acceptability of Change verbs in four grammatical contexts (i.e. alternation variants) that Levin uses to characterize her *Turn* class.

(1.3) a. Pat {changed/turned/transformed/?altered/??modified} Sam into a frog.
b. Pat {changed/transformed/altered/?modified/*turned} Sam.
c. Sam {changed/transformed/?altered/*modified/*turned}.
d. Sam {turned/??changed/*transformed/*altered/*modified} red.

[4] As of February 2016, FrameNet has documented 13,465 lexical units (a word in one of its senses) in 1,216 semantic frames. FrameNet can be accessed at this URL: https://framenet.icsi.berkeley.edu/fndrupal/.
[5] See Sections 3.1 and 5.1 for the official FrameNet definition of Change verbs.
[6] It must be emphasized that FrameNet does not claim that verbs of the same semantic frame exhibit similar argument realization behavior. Its purpose is solely to document how the semantics of a frame are mapped on to syntax in order to provide the necessary data to make such claims.

The data in (1.3) show that Change verbs are not equally acceptable in any of the constructions Levin uses to define them. For instance, while *change, turn,* and *transform* can be used transitively with an *into* PP, the verbs *alter* and *modify* are questionable in this construction (1.3a). In (1.3b), it is clear that *change* and *transform* can appear in simple intransitive constructions (with no prepositional phrases), while *modify* and *turn* cannot, and *alter* is questionable at best in this context. Thus, even this fine-grained verb class exhibits drastic variation with respect to their argument realization behavior.

A semantic analysis of the similarity of these verbs also reveals differences. In (1.4), I describe three different situations involving a change and specify whether each of these situation may be used to describe the situations.

(1.4) a. Witch changing a prince into a frog: **alter, change, *modify, transform, turn*
b. Autumn changing the color of leaves: *alter, change, ??modify, ??transform, turn*
c. A tailor changing the fit of a garment: *alter, ??change, modify, *transform, *turn*

These data show that Change verbs are not entirely semantically uniform. For instance, while *change, transform,* and *turn* may be used to describe a situation in which a witch changes a prince into a frog, *alter* and *modify* may not (1.4a). Similarly, (1.4b) shows that *alter, change,* and *turn* are entirely felicitous when used to describe the change in foliage color associated with the seasons, but the verbs *modify* and *transform* seem unusual in this context. These data thus show that verbs within relatively fine-grained verb classes differ in both their specific meanings (perhaps due to different polysemy networks, see Fillmore and Atkins (2000)) and their argument realization behavior.

This brief discussion of verb classification research and cursory look at one verb class reveals strikingly contradictory findings. On the one hand, very coarse-grained semantic distinctions of verb classes, such as that between Result verbs and Manner verbs, are claimed to predict a wide range of syntactic behavior. Similarly, verb classifications developed using well-defined syntactic (Levin 1993) or semantic (FrameNet) criteria appear to offer fine-grained verb classes that capture a close fit between verb meaning and syntax. On the other hand, data such as that in (1.3) and (1.4) demonstrate that even such fine-grained classes are unable to account for the precise range of semantic and syntactic contexts in which a verb may appear. These

contradictory findings give rise to numerous questions about the nature and status of verb classes. I now discuss the major research questions that motivate the analyses in my dissertation.

1.2. RESEARCH QUESTIONS

In this section, I present the four research questions pursued in the remainder of the dissertation and briefly discuss how each research question relates and contributes to other research on verb classification.

> **Research Question 1:** What types of methods and theoretical constructs are most useful for defining verb classes and capturing the semantic and argument realization properties of individual verbs within such classes?

As briefly outlined above, verb classification studies differ greatly in the methods and theories they employ and the goals they pursue. Given the complex nature of verb meaning and argument realization, numerous theoretical tools have been developed to assess their relationship. Verb meanings can be defined according to the aspectual and causal features of their event structures (Vendler 1957, Dowty 1979, Rappaport Hovav and Levin 2010), according to the semantic types of the arguments they occur with (Fillmore 1968, Dowty 1991, Van Valin 1999), or according to rich semantic frames (Fillmore 1982, 1985, Fillmore and Baker 2010). Similarly, the grammatical constructions associated with argument realization have been characterized in terms of alternation pairs (Levin 1993) or as independently existing argument structure constructions (Goldberg 1995, 2006). The interaction between verb meaning and argument realization has also been viewed in different ways, with more or less emphasis being placed on the verb or on the construction (Herbst and Stefanowitsch 2011, Müller and Wechsler 2014). It is thus necessary to review and assess these widely varying views in order to determine which methods and theoretical constructs are most useful for capturing both the shared behavior assumed by verb classification studies as well as the data in (1.3)-(1.4) above which demonstrate the diversity of verbs within verb classes.

> **Research Question 2:** To what degree are verbs within existing classes (e.g. Levin 1993, FrameNet) similar or different with respect to their meaning and argument realization, and how can we account for regularities and variation within verb classes?

The discussion above showed that, while even coarse-grained verb classes have been successfully used to account for syntactic behavior, verbs with closely related meanings differ in their precise meanings and valency behavior. Traditionally, argument realization has been assumed to be predictable from verb meaning, as evidenced by the following quotations.

> "Syntactic argument structures of verbs are predictable from their semantic structures, via the application of linking rules." (Pinker 1989: 62)

> "[O]nce a learner knows the meaning and grammatical behavior of most words in a language, then from the meaning of a new word he can infer its likely grammatical possibilities." (Dixon 1991: 6)

While these scholars are surely aware that semantically similar verbs do not always exhibit the exact same syntactic distribution, divergences within verb classes are often viewed as minor peripheral exceptions. However, recent findings have suggested that verbal valency is in fact much less predictable than previously assumed. Most notably, Faulhaber (2011) demonstrates that the majority of syntactic (i.e. valency) differences among near-synonymous verbs cannot be traced to any meaning components and are thus by no means peripheral.

> "[T]he number of restrictions [to the expected argument realization behavior based on verb meaning] found is, by far, too high for these to be regarded as a peripheral phenomenon." (Faulhaber 2011: 325)

In order to reconcile these opposing viewpoints, it is necessary to first determine how much of argument realization behavior is predictable from verb meaning. Once this is established, we may then determine how verb classes must be structured in order to accurately capture both the shared behavior of related verbs as well as the idiosyncratic behavior that is not predictable from their class membership.

> **Research Question 3:** Are verb classes specific to individual languages or can they be applied to multiple languages? Are the meanings and constructions associated with an English verb class comparable to translation equivalents in another language?

Most cross-linguistic studies on verb meaning and argument realization have focused on coarse-grained classes and/or meaning components (Levin fc., see also Croft 2001: Ch. 5) or on a single

grammatical construction across numerous verb classes (Michaelis and Ruppenhofer 2001, Iwata 2008). At present, there exist few studies which use corpus and frequency data to compare the detailed meanings and precise valency distribution of fine-grained verb classes across languages.[7] Furthermore, traditional contrastive and typological studies have been critiqued for imposing English-specific categories onto unrelated languages (Croft 2001). However, recent advances, particularly in the fields of Frame Semantics and Construction Grammar, offer promising methodologies for comprehensive and empirically adequate cross-linguistic comparisons of verb classes (Croft 2001, Boas 2010a, 2010b).

In addressing this research question, I determine the extent to which specific verb classes are comparable across languages, thereby shedding light onto the potentially universal nature of verb classes. Contrastive verb class comparisons are also necessary to identify mismatches in the meaning and syntax of verbs and constructions across languages, which is essential for language learning, translation, and intercultural communication. The comparison may also reveals potential reasons for specific translation problems, which may be purely idiosyncratic, related to differences in cultural knowledge, or determined by systematic structural properties of individual languages. Finally, comparing different classes cross-linguistically may reveal that certain semantic domains may exhibit more uniformity and/or translation problems than others.

> **Research Question 4:** To what extent do verb classes of different semantic domains differ with respect to their semantic and syntactic properties? Do different semantic domains exhibit different degrees of cross-linguistic variation?

This research question also addresses a significant gap in the literature, as very few (if any) existing studies explicitly compare and contrast the types of meanings and syntactic properties of semantically distinct verb classes. Such comparisons are necessary, however, as they may reveal that classes of different semantic domains exhibit different degrees of semantic and/or syntactic

[7] Indeed, contrastive and typological research on verb meaning and valency has been a mainstay of linguistic research, as seen, for instance, in the work of scholars such as Leonard Talmy and Joseph Greenberg, in the dedication of an entire issue of *Cognitive Linguistics* (2007: 18(2)) to cross-linguistic analyses of verbs such as *cut* and *break* (https://www.eva.mpg.de/lingua/valency/index.php), and in the work of the Leipzig Valency Classes Project. However, most of this research typically seeks to identify broad-scale generalizations over numerous languages, rather the investigating in detail the richness and cross-linguistic diversity of lexical items and constructions used to express a given specific real-world scenarios (i.e. semantic frames).

uniformity, or different degrees of cross-linguistic similarity. Such findings are necessary for a complete understanding of the nature and structure of verb classes and for an adequate picture of the organization of the verbal lexicon.

1.3. OUTLINE OF THE DISSERTATION

To address these research questions, I investigate in detail the meanings and argument realization behavior of two verb classes, namely Change verbs (*alter, change, transform,* etc.) and Theft verbs (*steal, embezzle, pilfer,* etc.). Not only do I compare the individual verbs in these classes against one another, but I also compare the entire classes against each other and each of the classes against the corresponding verb classes in German. In this section, I briefly preview each of the following chapters.

I begin Chapter 2 by introducing the goals, methods, and historical development of the general study of lexical semantics, argument realization, and verb classification (Section 2.1). I then review several prominent approaches to these topics and discuss their shortcomings. In Section 2.2, I present Levin's (1993) classification of English verbs and the argument structure alternations used to formulate such classes. Section 2.3 presents research on semantic roles (Fillmore 1967, 1968, Dowty 1991, Van Valin 1999) and its approach to characterizing verbal arguments and their syntactic realization. The chapter concludes by discussing of event-structural approaches that decompose a verb's meaning into primitive predicate structures (Pinker 1989, Jackendoff 1990, Rappaport Hovav and Levin 1998) and presenting Croft's (2012) causal and aspectual-based approach to verb meaning and argument realization. .

In Chapter 3, I introduce three prominent theories that employ concepts introduced in Chapter 2 with the goal of accurately and comprehensively accounting for argument realization and verb classification. In Section 3.1, I present Frame Semantics (Fillmore 1983, Fillmore and Baker 2010) and its implementation in FrameNet (Ruppenhofer et al. 2010), showing how its rich frame-semantic characterization of word (including verb) classes and case roles facilitates empirical investigations into the relation between verb meaning and syntactic form within and across languages and semantic domains. In Section 3.2, I discuss the cognitively-oriented and usage-based approach of Construction Grammar in general, and I show how Goldberg (1995, 2006) applies this approach to the study of verb meaning and syntax. Particularly relevant for the present analysis are Construction Grammar's assumption that argument structure patterns (and all

aspects of language) are meaningful and its detailed investigations of such argument structure constructions and their interaction with verbs and verb classes. I then present Valency Grammar (Helbig 1992, Herbst 2014) and its implementation in *The Valency Dictionary of English* (Herbst et. al 2004), as its long-standing investigations into the valency properties of lexical items has emphasized the idiosyncratic nature of argument realization (Faulhaber 2011) and led to fruitful collaborations with researchers in Construction Grammar and related usage-based linguistic theories (Herbst et al. 2014, Engelberg et al. 2015). I conclude this chapter suggesting how the three approaches complement one another.

In Chapter 4, I present the basic methodology for assessing a verb's meaning and argument realization behavior, which is employed for each of the verb classes but demonstrated in most detail for the English Change verbs in Chapter 5. Specifically, I draw primarily on dictionary definitions and, to a lesser extent, on corpus data to determine both the "general meaning" that is shared among all verbs of a class as well as "additional meaning components" that apply only to some verbs of the class. For instance, all Change verbs have the general meaning of "(cause to) become different," but only some verbs (e.g. *alter, modify*) have an additional meaning component specifying that the change is subtle and not categorical (e.g. **She modified the prince into a frog*). To determine the verb's argument realization behavior, I document the "valency construction" of numerous (typically between 80 and 120) corpus examples including the verb,[8] where valency construction is defined as a pairing of verb-class-specific semantic roles with its phrase type and grammatical function. I then describe my approach to capturing both the shared and idiosyncratic behavior of verbs within verb classes. At the end of this chapter, I briefly discuss the methods employed in the cross-linguistic and cross-class analyses of Chapter 6 and Chapter 7, respectively.

In Chapter 5, I investigate the meanings and valency behavior of English Change verbs in order to address Research Question 2, listed above. In Section 5.1, I describe Change verbs and their treatment in Levin (1993) and FrameNet. In Section 5.2, I identify the specific meanings of each verb using dictionary definitions. In Section 5.3, the valency behavior of the verbs is assessed on the basis of a corpus analysis. The data from these sections are employed in Section

[8] To avoid blurring the analysis of argument structure constructions (more precisely, valency constructions) and other syntactic categories/constructions, I do not annotate sentences in non-canonical sentence types such as passives and certain relative and infinitival clauses.

5.4, where I develop a method for adequately capturing both the shared meaning and valency behavior of all verbs in the class, as well as their idiosyncratic properties. In Section 5.5, I test the predictive power of this method by applying it to a previously unanalyzed verb, before concluding the chapter.

Chapter 6 concerns itself primarily with Research Question 3, addressing the cross-linguistic applicability of verb classes. In Section 6.1, I first review existing contrastive and/or German-specific research on verb classification and argument realization and then outline the methodology of the chapter. In Section 6.2, I compare the semantics of Change verbs across German and English in order to determine whether verbs of both languages are characterized by the same meaning components and to identify any potential translation gaps. In Section 6.3, I assess the valency behavior of the German Change verb class and compare it against the English findings. Specifically, I determine whether the specific valency constructions are formally equivalent and/or semantically equivalent across the languages, as well as whether the grammatically relevant meaning components identified for English Change verbs also apply to German.

In Chapter 7, I compare the Change verb class and the Theft verb class from both a language-specific and cross-linguistic perspective in order to answer Research Question 4. After outlining the method and motivation for the chapter in Section 7.1, I describe how Theft verbs are characterized by Levin (1993) and FrameNet. In Section 7.2, I compare the two classes from an English-specific perspective, first determining the number and nature of the meaning components that differentiate individual verbs within the class. At the end of this section, I also investigate the number and types of valency constructions for each class and discuss how certain formally identical syntactic structures receive different interpretations when combining with verbs of one class or the other. Section 7.3 compares the classes from a cross-linguistic (German-English) perspective. Specifically, I determine whether one class exhibits greater semantic and/or syntactic differences across the two languages. I conclude this chapter in Section 7.4 by discussing the implications for the formulation of verb classes.

In the concluding Chapter 8, I first recap the findings of each of the preceding chapters. I then return to the research questions introduced at the beginning of this chapter and state how my analyses answer each of them and thereby contribute to future studies on verb classification and argument realization. I conclude the chapter by addressing avenues for future research.

Chapter 2: Approaches to Verb Classification

This chapter introduces the fields of verb classification and argument realization. Section 2.1 provides a general overview of the field and its central methods and research questions. Section 2.2 introduces Levin's (1993) classification of English verbs, which was the first and remains one of the most prominent verb classification resources in the literature. The remainder of the chapter discusses two major approaches to argument realization that underlie Levin's verb classes: those associating verbal arguments with grammatically relevant semantic roles (Section 2.3) and those identifying arguments in terms of predicate decomposition of verb meanings into event structures (Section 2.4). The following chapter then discusses more recently developed cognitive and usage-based frameworks for the study of verb classification and argument realization.

2.1. LEXICAL SEMANTICS AND THE SYNTAX-SEMANTICS INTERFACE

In this section, I briefly outline the various fields of research to which the dissertation project contributes. The major area of research is on the *syntax-semantics interface*, which seeks to link phenomena from *lexical semantics*, the study of word meaning, with *argument realization*, syntactic behavior related to word meaning. Research on the syntax-semantics interface has resulted in numerous proposals for *verb classification*, in which verbs are grouped together according to shared properties pertaining to the syntax-semantics interface. My goal here is to review briefly the types of phenomena these fields describe and the issues which give rise to differences among varying approaches.

2.1.1. Lexical semantics

Lexical semantics refers to the study of word meaning, in its broadest sense. As word meanings are often very complex and depend on a number of factors, linguists have developed a plethora of approaches for analyzing the meanings of words. As a complete summary of every approach is not possible here, I summarize the main concepts shared by many approaches and highlight approaches that are most relevant to the present study.[9] I begin by describing two distinctions in aspects of word meaning, which individual approaches account for with more or less detail. I then provide a brief review of the several approaches to lexical semantics that have

[9] Geeraerts (2010) provides a detailed and comprehensive account of numerous approaches to lexical semantics.

enjoyed popularity in the past century, describing their philosophical underpinnings, their view of word meaning, and the tools each offers to analyze word meaning.

One major distinction in aspects of word meaning and its analysis is that between semasiology and onomasiology (Baldinger 1980, Geeraerts 2010: 23f.). It is obvious that there is a relation between words and events, situations, or objects in the real world (or mental concepts of these), and these two aspects of word meaning pertain to different starting points of the analysis of this relationship. Semasiological research begins with the word (or linguistic material) and asks about the range of real-world situations it may be used to describe, while onomasiological begins with real-world situations and asks what (range of) linguistic expressions may be used to describe it. For instance, a semasiological analysis of the verb *steal* would show that it may be used to describe typical criminal stealing events, non-criminal borrowing events (e.g. *Can I steal a pen from you?*), and events of stealthy movement (e.g. *He stole across the room*.), among others. An onomasiological analysis of typical stealing events would show that they can be described by various verbs such as *steal, pilfer, embezzle,* or *take*, depending on the exact situation type and other contextual factors. In this dissertation, I describe both aspects of verb meaning, asking both which expressions may be used to describe events in a particular domain (onomasiology) and what range of specific event types individual verbs may denote (semasiology).

A second important distinction in lexical semantic research is that between the syntagmatic and paradigmatic properties of linguistic units (de Saussure 1916; cf. Geeraerts 2010: 57). Syntagmatic properties refer to the types of linguistic material a given word may appear with. For instance, a syntagmatic property of a noun such as *cup*, and of nouns in general, is that they may be preceded by a determiner (*the cup*). The same is not true for verbs or adjectives (*the steal, the green*). Syntagmatic properties are particular interesting for verbs and other predicative words. For instance, the verb *steal* appears with a nominal subject (a thief), a nominal object (the stolen goods), and an optional prepositional phrase (original location of the goods). This behavior is discussed in more detail in the following subsection. Paradigmatic properties, on the other hand, involve the types of words with which a given linguistic unit may be substituted in a given context. For instance, given a context *the [cup]*, one may replace the word *cup* with a large number of nouns. In this sense, the set of nouns which may be preceded by *the* form a paradigm. Paradigms of varying levels of granularity can be formulated based on a wide range of properties,

ranging from semantic properties (e.g. words preceded by *the* given a dining context: *cup, plate, food, meal,* etc.) to syntactic properties (intransitive verbs with animate subjects: *The woman [cried, laughed, sang*, etc.]. In this dissertation, I investigate both types of lexical properties, studying both the arguments that surround particular verbs (syntagma) and the range of verbs which may be used for the same linguistic and real-world contexts (paradigma).

The study of lexical semantics became popular during the first half of the 20th century during the structuralist boom in linguistics and the humanities in general. As the name suggests, structuralists such as Leonard Bloomfield (1933) viewed language as a system with internal structure and believed that the object of study should be the relations that hold among the parts of this structure. On this view, a word's meaning can only be understood through its position within the system in relation to other, related words. These goals relate to the anthropological roots of structuralism, which focus on such topics as kinship terms and natural objects (e.g. Goodenough 1956, Lounsbury 1956). Structuralist lexical semanticists provided three useful theoretical tools for describing these relationships: lexical fields, semantic relations, and componential analysis. I introduce each of these below.

Lexical fields are sets of lexical units which can be categorized together in some way and are often represented in a visual field organized so similarities and differences may be seen (cf. Trier 1931). Types of lexical fields vary, but can consist of kinship terms (often represented with a family tree), temperature terms, or animal terms. Different types of relations hold among words within a lexical field. These include various types of antonymy (*hot/cold, mother/father*), synonymy (*sofa/couch, hot/steaming*), and hyponymy (a *mare* is a type of *horse*). Structuralist semanticists developed a detailed categorization of the types of relations among words within a semantic field, an achievement equal to the philologists' classification of semantic change.[10]

To describe these relations more precisely and in more detail, structuralists hoped to understand the words in terms of smaller semantic components. They developed componential analysis, in an effort to systematize the study of lexical semantics. In doing so, they tried to emulate phonology, in which sounds could be described using distinctive features which are necessary and sufficient to distinguish sounds within the phonological system (Nida 1951,

[10] Such relations form the basis of the lexical classification found in WordNet (Miller 1995, Fellbaum 2008), in which words are classified according to synonymy, antonymy, and hyponymy, among other relations.

Coseriu 1964, Bierwisch 1970). Although meaning components are much more complex and harder to classify than phonological features, early proponents of componential analysis succeeded in describing some sets of words in this way. For instance, *man* is defined as [+ Human, + Male], *woman* as [+ Human, - Male]. When new words such as *boy* and *girl* are added to the comparison, an additional feature [+/- Adult] is added to distinguish them. Although componential analysis was a great step for systematizing the description of meaning, it also encountered a number of problems (Reichling 1935, Weinreich 1966, Nogle 1974). It is often difficult to determine what should be counted as a distinctive feature, and it is difficult to say whether features should be seen as primitive concepts. Also, it is often an arbitrary decision what the "default" status for a feature should be; what makes Male more basic than Female, or why should we prefer [+ Adult] to [- Young]? Furthermore, componential analysis is obviously problematic for words with rich cultural or subjective meanings, such as *marriage, shoplifting,* or *cinnamon*.

Although the structuralist assumption that words can be described solely through their relations to others within the linguistic system has been largely abandoned, the tools they provided for semantic analysis still play a role in many modern approaches. While I recognize that there is more to word meaning than features and lexical relations, I use these types of analyses to support my comprehensive investigation of verb meaning, in particular the types of meaning which set near-synonymous verbs apart from one another.

The structuralist era of linguistics was succeeded by transformational and generative grammar, whose birth arrived with the publication of Chomsky's (1957) *Syntactic Structures*. Generative Grammar is marked by the assumption of a Universal Grammar, which is both generative, in that it produces infinite sentences using a finite set of rules and categories, and universal, because all humans possess it. Lexical semantics was largely ignored by early generativists, because effects of this Universal Grammar were assumed to be located in syntax and not in meaning. One exception is Katz and Fodor's (1963) attempt to integrate semantics into a generative grammar through the use of decompositional features reminiscent of those in Structuralism to describe semantic ambiguities of sentences. While this approach met with limited success, other scholars noted the importance of word meaning for syntactic behavior. In particular, Fillmore (1967, 1968) found that syntactic behavior is in part determined by the semantic properties of a predicate and its arguments and proposed Case Grammar to account for

this phenomenon. While his original formulation of Case Grammar was not lexical semantic per se, it was one of the first to recognize the relation between syntax and semantics, and its concepts are still used in many current theories which are relevant for the current study, such as Frame Semantics (Fillmore 1985, Fillmore and Baker 2010), Role and Reference Grammar (Van Valin and LaPolla 1997), and Dowty's (1991) account of proto-roles. These approaches are discussed in more detail in Section 2.3.

Beginning in the mid-1970s, some scholars began to reject the syntax-oriented approach characteristic of Generative Grammar and sought a broader account of word meaning, and language in general. Individual approaches are very diverse, but can be subsumed under the label of Cognitive Linguistics. One of the first major studies in this field was Rosch's (1979) experiments on concept prototypes, which refuted the structuralist notion that word meanings can be decomposed into necessary and sufficient features, and proposed that speakers judge a word's appropriateness with respect to prototype concepts. For instance, the word *bird* is prototypically associated with robins or finches, but not with penguins or ostriches, which are less prototypical instances of this category. A richer example is seen in the word *bachelor*. In Structuralism, it is decomposed according to the features of humanness, gender, and marital status, as described above. However, Prototype Theory shows such an approach does not account for contexts in which a person fulfills these three criteria but would not be considered a *bachelor* (e.g. the Pope, a 20-year-old college student) and argues that there is more to meaning to necessary and sufficient features.

Rosch's studies have shown the importance of experiential and encyclopedic knowledge for word meaning, which has also been corroborated by other research on diverse topics such as metaphor and metonymy (Lakoff and Johnson 1980) and the interactional nature of word meaning (Levinson 1995, Traugott and Dasher 2005). Other scholars have tried to determine how to represent and describe the encyclopedic knowledge relevant for language production and comprehension. These include idealized cognitive models (ICMs; Lakoff 1987), which are idealized prototypes for entities or scenarios (e.g. a 40 year-old male professor living alone for a *bachelor*) and semantic frames (Fillmore 1985), which are schematic scenario types defined by the types of participants involved (e.g. a Theft event involves a Perpetrator taking Goods from a Source or Victim).

Before concluding, I discuss one more aspect of word meaning relevant in the lexical semantic literature, namely event structure. Vendler (1957) proposed that predicates can be grouped into four aspectual categories, according to how the event they describe unfolds in time. These categories include states (*be German*), activities (*sleep*), achievements (*reach the summit*), and accomplishments (*write a letter*), and are distinguished by the event's duration, boundedness, and dynamicness. These categories affect a predicate's grammatical behavior and combinatorial properties. For instance, activities but not accomplishments may appear in the progressive tense (*I am sleeping/*reaching the summit*). Vendler's original classification has been further developed by scholars such as Dowty (1979), Dahl (1985), and Bach (1986). Recent studies have connected aspectual research to findings about argument realization properties of verb classes (Pinker 1989, Jackendoff 1990, Rappaport Hovav and Levin 1998). These approaches seek to account for argument realization properties by decomposing verb meaning into event-structures that capture temporal and causal characteristics of events and their participants. More recently, Croft (2012) has proposed a reclassification of aspectual types and integrated them into a cognitive linguistics framework. These approaches are discussed in greater detail in Section 2.4.

This section has demonstrated how word meaning can be studied along many dimensions and how this has led to a wide variety of lexical semantic theories. In this dissertation, I strive to account for as many aspects of meaning as possible in my investigation of German and English verbs, including onomasiological and semasiological analyses of the verbs' syntagmatic and paradigmatic behavior. I also attempt to integrate and build on the various approaches to lexical semantics introduced here. Despite abandoning most structuralist assumptions, I use some aspects of their methodology, including componential analysis and the analysis of lexical relations (e.g. hyponymy, synonymy). While I primarily take the perspective of Cognitive Linguistics by recognizing that encyclopedic knowledge in the form of prototypes or frames is important for using and understanding language, I also account for research which has shown that perhaps not all of this encyclopedic information is relevant for a verb's syntactic properties. This research is presented in the following sub-section.

2.1.2. Argument realization: case roles, alternations, constructions

In this section, I first introduce the concept of argument realization. Then I describe various theoretical constructs, including case roles and argument structure alternations, and how they are analyzed and interpreted for individual approaches to the syntax-semantics interface.

Finally, I discuss verb classification, the attempt to classify verbs according to similarities in their syntactic and semantic behavior.

Argument realization refers to the syntactic properties of arguments which are dependent on a predicating word, including the argument's phrase type (noun phrase, prepositional phrase, clause) and grammatical function (subject, object, oblique). Verbs play a major role in this field, because they are the most prototypical argument-taking predicators.[11] Tesnière (1959) describes verbs as evoking a *petit drame (*'little drama'): they describe an event or scenario which involves a specific set of participants (*actants*) and may take place under certain circumstances (*circonstants*). The *actants* of a verb often equate to the nominal phrases it appears with, while *circonstants* include (normally optional) adverbial modifiers which specify, among other things, the place or time of the scenario. Within research on argument realization, verbs are associated with a certain valency, or a set of arguments that must fill empty slots given by the verb. For instance, the verb *change*, in its transitive form, requires two arguments to fulfill its valency: a subject NP (the causer of the change) and an object NP (the entity undergoing change). It may also optionally realize the final state of the changed entity in a PP headed by *(in)to*, and, given the presence of this argument, the initial state may be realized in a PP headed by *from*, as illustrated in (2.1).

(2.1) The witch changed the man ((from a prince) into a frog).

Such an analysis reveals the valence of the verb *change,* or the sets of arguments with which it may appear. Specifically, transitive *change* requires at least a subject causing the change and an object which undergoes the change. Optional arguments include the final and initial states of the changed entity.

One important concept in argument realization research is that of case roles (a.k.a. thematic roles, theta roles), which are coarsely defined argument types which occur with a wide range of different verbs. For instance, in (2.2a) above, the subject argument can be identified as an Agent (it actively brings about the state of affairs denoted by the verb), and the direct object is

[11] Note that argument realization and valency do not only apply to verbs, but also other predicative words such as nouns (e.g. *a change in his appearance*) and adjectives (e.g. *be tired of something*).

identified as a Theme (it undergoes a change).[12] Case roles were important in work on Valency Grammar in Europe (Tesnière 1959, Helbig and Schenkel 1969),[13] but were popularized in American linguistics by Charles Fillmore (1967, 1968), building on work by Gruber (1965) as discussed in Section 2.3.

Early work with case roles revealed that similar argument types (roles) tend to appear in the same syntactic position. For instance, Agents in active sentences are consistently realized as subjects in English. Such findings led to the formulation of linking rules which predict an argument's grammatical function based on its semantics. One such rule is Baker's (1988: 46) Uniformity of Theta Assignment Hypothesis (UTAH), which claims that the same case role will occur in the same syntactic position regardless of the verb (e.g. Agents appear as subjects). Since its formulation, however, scholars have noticed that the mapping from roles to grammatical functions is many-to-many (Fillmore 2003; Levin 1993, Ch. 3), and reformulated the notion of case roles accordingly. For instance, Dowty (1991) proposes that just two roles with prototype agent or patient features can predict assignment of subject and direct object, respectively. Frame Semantics (Fillmore 1985) and the FrameNet project (Ruppenhofer et al. 2010) posit hundreds of verb-class specific roles (called Frame Elements) without making claims about the linking of roles and grammatical functions. Approaches which make use of thematic roles are discussed in more detail in Section 2.4, and Frame Semantics is presented in Chapter 3.

A major challenge for role-based approaches which strictly adhere to UTAH is the existence of argument structure alternations.[14] A verb is said to undergo an alternation when it may appear in different syntactic contexts (i.e. its arguments can be realized with different grammatical functions). The verb *change*, for instance, undergoes the so-called Causative/Inchoative Alternation, as in (2.2).

(2.2) a. The witch changed the man.
b. The man changed.

[12] The case roles Theme and Patient are problematic because scholars differ in their definitions of the roles and the distinctions between them (see Fillmore 2003 and Levin and Rappaport-Hovav 2005: Ch. 2). This problem is discussed in more detail in Section 2.3.2.

[13] In Section 3.3, I discuss more recent formulations and applications of Valency Grammar and compare it with Construction Grammar.

[14] Sections 2.3 and 2.4 discuss popular solutions to these problems with UTAH.

The example sentences show that, in addition to the transitive pattern in (2.1) and (2.2a), *change* may appear intransitively. In this case, the subject argument is no longer the agent causing the change, but the entity undergoing the change. The problem for UTAH here is that an argument with the same thematic role (i.e. Theme) appears as a direct object in one context, (2.2a) but subject in another (2.2b).

While alternations play a major role in many approaches to the syntax-semantics interface, and particularly in Levin (1993), who classifies English verbs according to the number and types of alternations they undergo (see Section 2.2), the exact nature and status of argument alternations is still debated. The earliest analyses of alternations account for the two variants by positing lexical rules which perform syntactic transformations on the verb's valence (Pinker 1989). Such scholars seek to establish one sense of a verb (i.e. the verb in one of the variants) as basic and the other sense as derived through more general syntactic processes, and they tend to deemphasize the semantic and pragmatic differences between alternation variants.

However, closer analyses of alternations reveals that some alternation variants exhibit (sometimes significant) semantic and pragmatic differences which restrict the types of verbs and arguments that may occur in them. For instance, the ditransitive alternation involves one variant in which a Recipient is realized in a prepositional phrase (2.3a) and one in which it is realized as a first (dative) object (2.3b). However, while an inanimate location may be realized in the prepositional phrase variant, it is infelicitous in the double-object variant (2.4)

(2.3) a. She sent a package to the man.
b. She sent the man a package.

(2.4) a. She sent a package to Texas.
b. ??She sent Texas a package.

Another issue arises because verbs with very similar semantics may behave differently with respect to alternations. The examples in (2.5) show that some verbs for cooking may undergo the ditransitive alternation, while other related verbs may not.

(2.5) a. John baked/cooked Mary some food.
b. ??John simmered/braised Mary some food.

Findings such as these have led researchers to take a different view of alternations: rather than viewing two alternation variants as related (e.g. through some syntactic transformation), the syntactic patterns are accounted for on their own terms. One influential approach that takes this view is Construction Grammar (Goldberg 1995, 2006, Croft 2001, Boas and Sag 2012), which rejects the verb-centric analyses characteristic of earlier approaches and instead attempts to describe the properties and restrictions associated with individual constructions (i.e. alternation variants) in order to account for their fusion with verbs (or verb classes). The field of Construction Grammar (discussed in Section 3.2) attempts to describe all aspects of language using a unified format in the form of form-meaning pairings, and it rejects the modularization of language into distinct components (syntax vs. semantics, or core vs. periphery) that characterizes much traditional work in generative paradigms.

2.1.3. The syntax-semantics interface and verb classification

Researchers investigating the above-mentioned phenomena have become increasingly aware that a word's syntactic behavior is at least partially determined by its meaning. This relationship is at the heart of research on the syntax-semantics interface. With respect to verbs, a major assumption of the field is that the syntactic realization of verbal arguments may be predicted based on the verb's semantics. However, not all aspects of verb meaning affect its argument realization behavior, so scholars attempt to isolate and identify grammatically relevant meaning components. The relation between verbal syntax and argument realization was demonstrated as early as Fillmore (1968) on the basis of the differing behavior between verbs such as *hit* and those such as *break*, an analysis which was further expanded by others (Guerssel et al. 1985, Hale and Keyser 1986, 1987). While both *hit* and *break* can appear transitively with an Agent subject and Patient object (2.6), only *break* may appear intransitively with a Patient subject (2.7).

(2.6) Pat {broke/hit} the window.
(2.7) The window {broke/*hit}.

While it is at first glance unclear why these verbs behave as they do, a comparison with other verbs reveals the syntactically relevant meaning component: verbs that entail a change of state may pattern like *break*, while those without this entailment behave like *hit*.

(2.8) a. *The window hit/pounded/kicked/etc.
b. The window broke/shattered/cracked/etc.

A more detailed description of the relation between verb meaning and alternating behavior is given in the discussion of Levin (1993) in Section 2.2, but here it should suffice to say that these data suggest that certain aspects of verbal meaning influence argument realization. A major goal of research on the syntax-semantics interface is the discovery of precisely which meaning components can account for varying syntactic behavior across verbs.

An important outcome of syntax-semantics interface research is the proposition of verb classes and verb classification approaches, which attempt to group words together based on shared syntactic and semantic properties. For instance, the patterns in (2.6)-(2.7) demonstrate a major division within the English verbal lexicon, known as the manner/result distinction (Fillmore 1970, Rapaport Hovav and Levin 1998). Manner verbs describe the manner in which an event takes place and do not specify an end state for the patient argument, and these verbs may not appear intransitively. Result verbs, on the other hand, specify a change in state in the patient, but not necessarily how the change was brought about. These verbs more frequently undergo the Causative/Inchoative alternation (2.2), as they appear transitively with an Agent subject or intransitively with a Patient subject.

Verb classes are useful for a number of reasons. First, they provide a structure to the lexicon of a language which captures shared properties among groups of verbs. They also facilitate the identification of meaning components which are relevant for syntactic behavior, ideally enabling the linguist to predict a verb's meaning from its syntactic behavior, and vice versa. Verb classes also have applications in the fields of lexicography and natural language processing. Many verb classification approaches exist and have been mentioned throughout this chapter, and although they mostly share the above-mentioned goals, they differ greatly in their criteria for classification and consequently in their proposed groupings of verbs (Baker and Ruppenhofer 2002, Boas 2005, 2006).

In summary, this section has provided an overview of the data and questions that have defined research into argument realization and verb classification, which is the main topic of this dissertation. In the remainder of this chapter, I describe in more detail specific theories, concepts, and methods employed in the fields, including those emphasizing alternating behavior (Levin 1993; 2.2), case roles (Fillmore 1968, Dowty 1991; 2.3), and aspectual and causal information

(Vendler 1957, Croft 2012; 2.4). For each of these approaches, I first introduce their general assumptions and principles and their specific methods for verb classification, before describing in detail how they classify and characterize verbs of Change in order to weigh their advantages and disadvantages. In Chapter 3, I present Frame Semantics, Construction Grammar, and Valency Grammar, and compare them with each of the approaches discussed in this chapter. While the literature review of this and the following chapter deal primarily with English-based or language-neutral approaches, Section 6.1 offers a discussion of cross-linguistic research on the syntax-semantic interface and verb classification, including general contrastive research and approaches developed for the German language.

2.2. LEVIN'S (1993) ALTERNATION-BASED CLASSIFICATION OF ENGLISH VERBS

2.2.1. Overview

Levin (1993) is the seminal work on English verb classification and many later works utilize her classes in order to conduct detailed investigations into specific portions of the English verbal lexicon (Goldberg 2002, Jackendoff 2002, Levin and Rappaport-Hovav 2005, inter alia). As verb classes are the main topic of this dissertation, I introduce Levin's classification in this section and only briefly discuss its assumptions and motivations. The remaining sections of this chapter then discuss other theories and notions that underlie Levin's (1993) classification, including semantic roles (Section 2.3) and event structures (Section 2.4).

The first part of Levin (1993) identifies numerous diathesis alternations, transitivity alternations, and morphological features, which are sensitive to verbal meaning.[15] In the second part, Levin proposes verb classes based on their shared syntactic alternating behavior. Levin then tests the distribution of 3,024 verbs (4,186 verb senses) with respect to (sets of) these patterns, positing a verb class when groups of verbs show identical or near identical distribution. Levin's classification is motivated by the assumption that the "behavior of a verb, particularly with respect to the expression and interpretation of its arguments, is to a large extent determined by its meaning" (Levin 1993:1). I now return to the discussion of verbs such as *break* and *hit*, introduced in 2.1.3, in order to gain a better understanding of the relation between verb meaning and alternating behavior.

[15] Diathesis alternations are alternations which affect the argument realization properties of verbs. Transitivity alternations affect a verb's transitivity. Morphological features include the existence of zero-related nominals for verbs, such as *a bottle/to bottle* or *a cut/to cut*.

Levin's (1993) introduction presents an analysis of the verbs *break, hit, cut,* and *touch*, originally proposed by Fillmore (1967) and later refined by others (e.g. Guerssel et al. 1985, Hale and Keyser 1986, 1987). All of these verbs are transitive (2.9), but they differ with respect to their behavior in other alternations.

(2.9) Jan {cut/broke/touched/hit} the bread. (cf. Levin 1993:6)

Of the four verbs, *cut, touch* and *hit*, but not *break* participate in the body part possessor ascension alternation, as shown in (2.10)-(2.11).[16]

(2.10) Jan {cut/touched/hit/broke} John's leg.
(2.11) Jan {cut/touched/hit/*broke} John on the leg. (cf. Levin 1993:7)[17]

Cut and *break,* but not *hit* or *touch* participate in the middle alternation is allowed by (Levin 1993:6), as shown in (2.12).

(2.12) The bread {cuts/breaks/*touches/*hits} easily.

Finally, *cut* and *hit*, but not *break* or *touch*, participate in the conative alternation[18] according to Levin (1993: 6), as shown in (2.13).

(2.13) Jan {hit/cut/*broke/*touched} at the bread.

After establishing each verb's alternating behavior, Levin then compares the semantics of each verb to determine what aspects of meaning constrain the verbs' ability to undergo these alternations. For example, the body part possessor alternation requires that the verb involve some contact between two entities. This meaning component is entailed by *cut, hit,* and *touch*, but *break* is a pure change of state verb and does not require the notion of contact. The middle

[16] "The body-part possessor ascension alternation is characterized by a change in the expression of a possessed body part: either the body part may be expressed as the direct object […] or the possessor may be expressed as the object of the verb, with the possessed body part expressed in a prepositional phrase […]" (Levin 1993:7).
[17] Levin uses intuition to arrive at grammaticality judgments. Actual grammaticality judgments may vary from speaker to speaker, and the judgments listed here are not necessarily those of the author, but cited directly from Levin (1993).
[18] "[I]n the conative construction, the argument corresponding to the object of the transitive variant is expressed in a prepositional phrase headed by *at*" (Levin 1993:6).

alternation, which omits the expression of the agent, requires that the patient of the verb undergo a change of state. The patient of *cut*, like that of *break*, undergoes a change of state by becoming broken or cut. Levin (1993:8-9) points out that this is reflected in the zero-related nouns for these words; a *cut* and a *break* are visible results of the event, while a *touch* and a *hit* refer to the events themselves. Finally, the conative alternation requires that the verb have both a motion and contact component. Levin claims that this is the case for *hit* and *cut*, but neither *break* nor *touch* imply any sort of motion. This alternation requires both motion and contact, since verbs of pure motion which do not have a contact meaning component (e.g. *walk*) do not participate in it either.

These findings are summarized in Table 2.1, which displays the meaning components as they are associated with the four verbs, and in Figure 2.1, which shows the meaning components that allow the verbs to undergo the alternations. For instance, *break* involves a change of state and the middle alternation requires this meaning component, so *break* can undergo the middle alternation.

Verb	**Change of State**	**Motion**	**Contact**
break	+	-	-
cut	+	+	+
hit	-	+	+
touch	-	-	+

Table 2.1: Meaning components for *break, cut, hit* and *touch*

Body part possessor: requires contact (*cut, hit, touch*)
Conative: requires contact and motion (*cut, hit*)
Middle: requires change of state (*break, cut*)

Figure 2.1: Syntactic alternations, relevant meaning components, and applicable verbs

Through this investigation, Levin (1993) shows that the notions of change of state, motion and contact are relevant for a verb's syntactic behavior. In fact, a number of other verbs which exhibit the same alternating behavior as these verbs also share these components of meaning. This leads Levin to postulate verb classes such as those in (2.14).

(2.14) *Break* verbs: break, crack, rip, shatter, snap …
Cut verbs: cut, hack, saw, scratch, slash …
Touch verbs: pat, stroke, tickle, touch …
Hit verbs: bash, hit, kick, pound, tap, whack … (Levin 1993: 7)

A major motivation for Levin's work is the idea that "the ideal lexical entry for a word should minimize the information provided for that word" (Levin 1993: 11).[19] The identification of grammatically relevant meaning components and classes of verbs which share these components contributes to an adequate theory of argument realization. By determining what aspects of meaning the verbs in a syntactically coherent class share, one should be able to determine what aspect of meaning is relevant for the given syntactic patterns. This would allow lexical entries for verbs to be less redundant, because "some properties that might have been included in lexical entries because they were thought to be idiosyncratic could turn out on further examination to be predictable from verb meaning and could be eliminated from a verb's lexical entry" (Levin 1993:12).

2.2.2. Change verbs in Levin (1993)

I now describe how Levin (1993: 177f.) classifies a certain set of verbs, namely verbs of Change. Levin's class is labeled "*Turn* verbs" and is a sub-class in her broader category of Verbs of Creation and Transformation (172-178), which also includes *Build* verbs, *Grow* verbs, Verbs of Preparing (e.g. *bake*), and Performance verbs (e.g. *paint a picture*), among others. The verbs in Levin's *Turn* class are listed in Figure 2.2, and example sentences demonstrating their alternating behavior are given in (2.15)-(2.21) (from Levin 1993: 177-178).

alter, change, convert, metamorphose, transform, transmute, turn

Figure 2.2: Levin's *Turn* verbs

(2.15) The witch turned him from a prince into a frog.

(2.16) **Total Transformation Alternation (transitive)**
a. The witch turned him into a frog.
b. The witch turned him from a prince into a frog.

(2.17) **Total Transformation Alternation (intransitive; most verbs)**
a. He turned into a frog.
b. He turned from a prince into a frog.

[19] This assumption is in line with other research, such as Chomsky (1986) and Pinker (1989), and can be traced back to Bloomfield (1933), who recognizes that many aspects of meaning are irrelevant for grammatical behavior.

(2.18) **Causative/Inchoative Alternation (most verbs)**
a. The witch turned him into a frog.
He turned into a frog.
b. The witch turned him from a prince into a frog.
He turned from a prince into a frog.

(2.19) ***Material/Product Alternation (transitive)**
a. *The witch turned him from a prince.
b. The witch turned him into a frog.

(2.20) ***Material/Product Alternation (intransitive)**
a. *He turned from a prince.
b. He turned into a frog.

(2.21) *The witch turned him.

After listing the alternation behavior characterizing this verb class, Levin offers a brief prose description of the verbs' characteristics. Levin dedicates only one phrase to the semantic characterization of the verbs, noting that they "describe a complete transformation" (1993: 178). The remainder of the description focuses on syntactic properties such as alternating behavior, transitivity, and realization of case roles, as seen in the following:

-"most [*Turn* verbs] participate in the causative/inchoative alternation and, therefore, are found in transitive and intransitive forms" (178)

-"these verbs take the following three arguments [...]: the entity undergoing the transformation, as well as the initial ("source") and final ("goal") forms of this entity. When transitive, these verbs also take an agent." (178)

-"The final state always must be expressed, while the initial sate can only be expressed if the final state is expressed." (178)

2.2.3. Evaluation of Levin (1993)

Levin's classification of English verbs is a highly important and useful tool which has been utilized by many researchers since its publication. Its popularity is supported by it being the first large-scale classification in published form. Levin succeeds in identifying numerous English alternations and proposing classes which behave similarly with respect to (a chosen subset of)

these alternations. In most cases, verbs in her classes are also semantically quite similar. This supports the assumption that shared syntactic behavior is reflective of shared meaning components and has triggered further investigations into this relationship.

Despite the effectiveness and popularity of Levin's verb classes, scholars such as Baker and Ruppenhofer (2002), Boas (2006, 2011a), and Iwata (2008) have pointed out a number of problems with Levin's approach. For one, the verbs in Levin's classes are often semantically heterogeneous, partly because the semantic descriptions she provides are vague. While the verbs in Levin's *Turn* class are quite similar in meaning (albeit vaguely and briefly defined), other classes contain verbs with drastically different meanings. For instance, Levin's (1993: 244f.) class of Other Alternating Verbs of Change of State includes such semantically diverse verbs as *collapse, char, quadruple,* and *westernize*. This type of semantic diversity among syntactically identical verbs (with respect to Levin's alternations) call into question Levin's (1993) assumption that shared alternating behavior is always reflective of shared meaning.

In other cases, verbs within the same class differ in their behavior with respect to the class-defining alternations. This is the case with her *Turn* verbs: only some verbs may appear in the simple transitive pattern (2.22) or the Total Transformation alternation (2.23).

(2.22) The witch {changed/*turned/altered} the man.[20]
(2.23) He {changed/turned/?converted/*altered} into a frog.

Furthermore, some syntactic patterns in which the relevant verbs occur are not mentioned by Levin. Often, the verbs differ with respect to their participation in these patterns, as is the case with *Turn* verbs in bare intransitive patterns (2.24) and in resultative patterns (2.25), syntactic patterns which Levin leaves out of her classification criteria.[21]

(2.24) The man {changed/*turned/*altered}.
(2.25) The man {turned/*changed/*altered} red.

[20] The verb *turn* is acceptable in this context, but exhibits a meaning of 'cause to change sides [e.g. in a war or conflict]' rather than the Change meaning relevant here. This is a case of polysemy, in which the lexeme *turn* corresponds to (at least) two different lexical units, one for the 'change' meaning and one for the 'cause to change sides' meaning.
[21] See Boas (2011a) for similar findings among Levin's *Build* verbs.

That Levin's classes exhibit both semantic and syntactic heterogeneity leaves her approach open to critique. In particular, it is unclear why Levin chooses the specific set of alternations that she does for defining a specific class, and to what extent classes are defined by shared semantics rather than shared alternating behavior.

Scholars have also raised questions relating to the status of Levin's alternations for verb classification. For example, Baker and Ruppenhofer (2002) observe that the meanings Levin ascribes to certain alternations are not always correct. In particular, alternations claimed by Levin to reflect reciprocal actions of social engagement are undergone by verbs without these meaning components.[22] Boas (2006, 2011a) shows that verbs in a single Levin class may behave identically with respect to the alternations she uses to define the class, but diverge in their distribution in other syntactic patterns. This is also the case with Change verbs, as in the differing behavior of *change* and *turn* shown in (2.24)-(2.25). In sum, these arguments question why some alternations but not others (or the whole spectrum of alternations) are used to define Levin classes.

Finally, two other methodological problems have been observed with Levin's classes. First, Levin does not use corpus evidence to support her classifications, leading to inaccurate descriptions of alternating behavior and inaccurate classifications for some verbs (compare Levin's example in (2.21) with the data in (2.22)). Second, Levin does not discuss the relationships between her classes, providing no structure in her classification of English verbs. Further complications with Levin's classes are discussed in Dowty (2000), Boas (2006, 2008, 2011b), and Iwata (2008).

2.3. ROLE-BASED APPROACHES TO ARGUMENT REALIZATION

In this section, I review approaches to the syntax-semantics interface which focus on the characterization of a verb's arguments. As mentioned in Section 2.1, traditional valency-based approaches to grammar (Tesnière 1959, Fillmore 1967, 1968) view sentences as being governed

[22] The reciprocal subject alternation occurs with *meet*, a Verb of Social Interaction. However, it also occurs with *jog*, which does not have 'social interaction' semantics:

Jim met with Sue. ~ Jim and Sue met

Jim jogged with Sue. ~ Jim and Sue jogged.

by a verb, which in turn requires a certain number and type of arguments.[23] Of the various distinctions among arguments, the most important is probably that between complements and modifiers. Complements refer to participants that are required by the verb and are essential for its understanding, while modifiers are less essential for verb meaning and often merely supply background or setting information such as time or place. Modifiers are grammatically optional, while complements are generally obligatory. While many arguments clearly fall into one of these categories, the data often suggest that the complement-modifier distinction is not black or white, but that there is a continuum between optional modifiers and obligatory complements.[24]

A more detailed analysis of argument properties is found in research on semantic roles (case roles, thematic roles, theta roles). Semantic roles were introduced as early as the 1960s (Gruber 1965, Fillmore 1968) in order to account for similar behavior of the same argument type across numerous individual predicates. Their origin is often associated with Case Grammar (Fillmore 1968), which sought to define arguments semantically to account for their mapping to syntactic positions. For instance, arguments in which an 'Agent' exerts active force upon another, thus instigating an event, almost always occur as the subject in active sentences. These scholars sought to account for the syntactic behavior of a verb in terms of these abstract semantic roles, and conversely to predict the semantic type of an argument based on its syntactic behavior. Research on case roles has contributed various theoretical tools to the study of argument realization, including semantic role lists, role hierarchies, and linking rules (Fillmore 1971, Jackendoff 1990, Dowty 1991, inter alia).

Semantic role lists are predetermined sets of labels that identify arguments according to the semantic relation they bear to their verb. These limited lists of roles should be applicable to any argument of any verb.[25] Table 2.2 provides a list of some common semantic roles.

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[23] This section focuses primarily on Case Grammar as popularized by Fillmore (1967, 1968) and further developed primarily by American linguists as outlined here. Section 3.3 discusses Valency Grammar (Helbig and Schenkel 1969, Herbst et al. 2004), which also focuses on the relation between verbs and their arguments but has until recently been more limited to European scholarship.

[24] Complements and modifiers are referred to as arguments and adjuncts in Valency Grammar (Herbst et al 2004) and as core and non-core Frame Elements in Frame Semantics (Fillmore 1983, Fillmore and Baker 2010).

[25] The desire for a small set of roles applicable to all arguments that characterized early research on semantic roles was inspired by developments in phonology, particularly the identification of phonological features that capture a highly diverse range of phonemes in many languages (i.e. Levin and Rappaport Hovav 2005: 36).

Agent (A)	the instigator of the event
Counter-Agent (C)	the force of resistance against which the action is carried out
Object (O)	the entity that moves or changes or whose position or existence is in consideration
Instrument (I)	the stimulus or immediate physical cause of an event
Source (S)	the place from which something moves
Goal (G)	the place to which something moves
Experiencer (E)	the entity which receives or accepts or undergoes the effect of an action

Table 2.2: Common semantic roles and their definitions (Fillmore 1971: 376)

Semantic roles are meant to bring out similarities and differences in verb meaning that are reflected in argument expression.[26] Example (2.26) shows how the actual arguments of a sentence are mapped to the abstract semantic roles: *John* is the Agent because he instigates the breaking, *the window* is the Counter-Agent because it resists the breaking, and *the rock* is the Instrument because it is used by the Agent to undertake the breaking action. The Agent is realized as a subject NP, the Counter-Agent as a direct object NP, and the Instrument occurs in a PP headed by *with*.

(2.26) *John* broke *the window* *with a rock*.
Agent Counter-Agent Instrument

Semantic roles proved useful because they account for the ability for certain argument types to occupy different syntactic positions. For some verbs, the Agent may be left unexpressed, and an Instrument or Patient may take the subject position.

(2.27) a. John broke the window with a rock.
b. A rock broke the window.
c. The window broke.

Data such as that in (2.27) gives rise to semantic role hierarchies, which aid in the mapping of semantic roles to grammatical functions. For example, a hierarchy that determines the subject of sentences such as those in (2.27) is given in (2.28).

(2.28) Agent > Instrument > Patient/Theme (LRH: 156, cf. Fillmore 1968: 33)

[26] The insights discussed here are identified already in Fillmore (1968).

This hierarchy states that the Agent is subject if it is realized, the Instrument is subject if no Agent is realized, and so forth.[27] Various hierarchies have been proposed to account for various types of behavior. For instance, Van Valin (2005: 61) proposes a hierarchy based on an argument's position in a decomposition of the verb's event structure and Croft (2012) formulates hierarchies based on force-dynamic notions of causation.[28] Levin and Rappaport Hovav (2005: 162f.) discuss numerous formulations of semantic role hierarchies and emphasize that different hierarchies are required for different aspects of grammatical behavior.

While various scholars have used semantic roles in different ways, these individual approaches often share a number of properties and assumptions, which are critically discussed by Fillmore (2003), Levin and Rappaport Hovav (2005; henceforth LRH), and Croft (2012: Ch. 5). First, semantic roles are to be defined independently of the meaning of a verb, and are thus unanalyzable. Second, semantic role lists should contain only a small number of semantic roles, in order to facilitate broad-scale and cross-linguistic generalizations. Finally, traditional approaches to semantic roles, especially those associated with Government and Binding Theory (Chomsky 1981), assume a one-to-one correspondence between semantic roles and grammatical functions: within a given sentence, a single syntactic argument may bear only one semantic role, and a single semantic role may only be realized by one argument. The following-subsection addresses issues with traditional approaches to semantic roles, and the remainder of this chapter discusses subsequent research that addresses these problems.

Fillmore (2003) and LRH identify major problems for early semantic role list approaches to argument realization. The most prevalent problem for role-based approaches involves the number and granularity of traditional SRs. The identification of the semantic role of an argument is not always as straightforward as in (2.26) above. Unfortunately, semantic role list approaches do not provide diagnostic tests to determine which role an argument has (LRH: 38). It is not possible to use grammatical properties of an argument to determine its semantic role, because different roles may appear in the same syntactic form. For instance, the noun occurring in the *with*

[27] Patient/Theme corresponds roughly to Counter-agent in Table 2.2.

[28] In Section 2.4, I discuss how role hierarchies are reformulated according to event-structural decompositions of verb meaning, and I describe how Croft (2012) proposes a similar hierarchy that does not rely on semantic roles, but on notions from Cognitive Linguistics such as force-dynamics and causal chains.

prepositional phrase is an Instrument in (2.29a) but a Comitative in (2.29b). Conversely, a single semantic role may appear in various grammatical forms, as in (2.30), where the Location may be realized as a noun phrase (2.30a) or as a prepositional phrase (2.30b).

(2.29) a. I ate with a fork
b. I ate with a friend.

(2.30) a. She hit his leg.
b. She hit him on the leg.

Another critique is that certain semantic roles are defined too coarsely and thus apply to a wide variety of arguably unrelated argument types. The most notorious of these are Theme and Patient, which has led some scholars to call them "wastebasket" categories (LRH: 48). While some prefer to use Patient to refer to entities which change state and Theme for those which change location (cf. Gruber 1965, Jackendoff 1972), even this further specification leaves some questions open. Various sentences with arguments commonly labeled Patient or Theme are given in (2.31).

(2.31) a. I ate the food.
b. I broke the window.
c. I facilitated the discussion.
d. I honored his wishes.

The objects in (2.31a) and (2.31b) are traditional patients, because they undergo change due to the event. However, the objects in (2.31c) and (2.31d) are less patient-like, so would they then be called themes, despite not being in motion? One could further argue that the discussion in (2.31c) undergoes a change from non-existent to existent (i.e. facilitated). Fillmore (2003) identifies similar problems with the combinations of Theme and Instrument, Goal and Recipient, and several more. These examples show that distinguishing between the various types of arguments requires a much more detailed typology of SRs.[29]

A related challenge for SR list approaches involves what Dowty (1991: 553 ff.) terms "role fragmentation." Many SRs can be further subdivided into multiple finer-grained roles. For instance, in (2.31a) and (2.32a), *the gadget* and *the fork* are both clear instances of Instruments

[29] Accounting for this diversity of verbal meaning is a main motivation for Frame Semantics, which is discussed in more detail in Chapter 3.

and occur in *with* prepositional phrases. However, the acceptability of these Instruments as subjects (2.31b) and (2.32b) shows that there is some difference between the two types of instruments. In fact, Nilsen (1972) found four sub-classes of Instruments, and Cruse (1973) found four sub-classes of Agents.

(2.31) a. The cook opened the jar with the new gadget.
b. The new gadget opened the jar.

(2.32) a. Shelley ate the sliced banana with a fork.
b. *The fork ate the sliced banana. (LRH: 39)

These examples show that it is necessary to define semantic roles at varying levels of specificity. Such an approach would be able to account both for the similarity of the arguments in the (a) sentences and for their differences in the (b) sentences.[30]

While the aforementioned shortcomings result from SRs being too coarse-grained, scholars also identify problems resulting from SRs being too specific and unanalyzable, which hinders generalizations across roles. In particular, LRH mention that generalizations across various semantic roles exist, but cannot be accounted for by approaches which insist on the unanalyzability of roles. In (2.27) above, we saw that both Comitatives (e.g. *friend*) and Instruments (e.g. *fork*) may occur in *with* prepositional phrases. They are also semantically similar, because their action coincides with that of the Agent. Indeed, these SR types occur in the same syntactic forms across a number of languages (LRH: 41). This evidence suggests that there is some commonality between the roles and thus some internal organization within the list of SRs. However, traditional SR approaches are unable to describe these relations, as each SR is supposed to be primitive and unanalyzable.

Another issue for traditional SR list approaches are assumptions of one-to-one correspondence, which state jointly that each argument of a sentence should have only one SR and that a single SR may only occur one time within a sentence. However, this assumption does not stand up to close scrutiny. In (2.33), we find a single syntactic argument that can be construed

[30] As will be described in Section 3.1, Frame Semantics addresses this problem with reference to a hierarchy of frames and a set of relations between prominent roles in various frames.

as exemplifying two distinct roles.[31] The subject, *Pat*, can be regarded as an Agent, because they are the active instigator of the rolling event, or as a Theme, since they change location throughout the rolling event.

(2.33) Pat rolled down the hill.

In (2.34), the problem is reversed: a single semantic role can be applied to two different syntactic arguments. Here, *Pat* and *Lee* are compared to each other. Because changing the order of the two arguments does not affect the (truth-conditional) meaning of the utterance, we may assume that the two arguments do not bear different semantic roles.

(2.34) a. Pat resembles Lee.
b. Lee resembles Pat.

These examples give only a first glimpse of the degree to the influence of perspective and construal on argument realization.

Finally, LRH (43-44) criticize traditional SR approaches' lack of explanatory power. While the approaches can describe possible combinations of SRs and their syntactic realization, they fail to explain why certain combinations are possible, while others are not. First, there is no constraint on how many SRs may occur with a single verb, although verbs rarely occur with more than four SRs cross-linguistically. Second, SR list approaches do not account for common SR combinations (e.g. Agent, Theme, Path) nor for combinations which are extremely rare (e.g. Theme, Experiencer, Source). Finally, these approaches do not explain why SRs are linked to syntactic categories in the way that they are.

LRH repeatedly emphasize that various flawed assumptions prevent such approaches from adequately accounting for argument realization phenomena. These include the desire for a small set of SRs, the assumptions that SRs are unanalyzable and described independently of verb meaning, and the claim of a one-to-one correspondence between SRs and arguments. LRH demonstrate that these assumptions cannot be maintained in an appropriate theory of argument realization. Various approaches have been developed to address the problems with traditional

[31] Many role-based approaches distinguish between thematic relations, which characterize roles semantically, and theta roles, which are associated with positions in the syntax (Carnie 2006).

semantic role lists. In the remainder of this section, I discuss approaches that maintain the assumption of semantic roles, but seek to define them more rigorously by means of semantic entailments. The following section discusses approaches that define semantic roles according to their position within event structures, arrived at through a predicate decomposition of verb meaning. In Chapter 3, I describe how Frame Semantics and Construction Grammar take a different view of semantic roles which abandons many of these problematic assumptions by positing numerous verb-class-specific roles which are hierarchically organized according to various types of relations.

I now discuss approaches developed to overcome these issues, but which maintain the assumption that the meaning of semantic roles determines their syntactic realization, specifically Dowty's (1991) proto-roles and the macroroles used in Role and Reference Grammar (Van Valin 1990, Van Valin and LaPolla 1997). Building on Dowty's (1989) observation that semantic roles can be defined in terms of truth-conditional entailments, Dowty (1991) proposes proto-roles in order to account for generalizations in the mapping of arguments to subject and object position.[32] He proposes two proto-roles, Proto-Agent and Proto-Patient, which are not defined with necessary and sufficient conditions, but with lists of prototypical features, shown in Table 2.3. Individual arguments need not possess all features associated with a proto-role and may in fact possess features associated with both roles. Dowty's *Argument Selection Principle* accounts for subject and object selection with transitive verbs by stating that the argument with more Proto-Agent features will be realized as a subject and the one with more Proto-Patient features as object.

Proto-Agent	**Proto-Patient**
-volitional involvement in the event or state -sentience (and/or perception) -causing an event or change of state -movement (relative to the position of another participant) -(exists independently of the event named by the verb)	-undergoes change of state -incremental theme -causally affected by another participant -stationary relative to movement of another participant -(does not exist independently of the event, or not at all)

Table 2.3: Properties of Proto-Agent and Proto-Patient (Dowty 1991: 572)

[32] As suggested by the name, Dowty's approach is influenced by prototype theory, as developed by Rosch (1973).

Because some arguments may exhibit features of both proto-roles, it is possible for them to be realized as either subject or object, depending on the verb. This is the case with verb pairs such as *fear* and *frighten*. The "experiencer" is agent-like because it is sentient, but patient-like because it changes state. The "feared entity" is agent-like because it causes another entity to change state, but patient-like because it is not agentive and need not be sentient. While it was observed that role types may need to be specified for each individual verb, Dowty does the opposite by positing only two highly abstract roles. He justifies this lack of attention to semantic detail by claiming that only those features which define his proto-roles (causation, sentience, change, etc.) affect argument realization, and all other semantic detail may be neglected.

Dowty's approach has been criticized for its lack of coverage and for the lack of structure in the proto-role features (LRH: 59-65). First, Dowty's proto-roles and his Argument Selection Principle only account for subject and object selection with transitive verbs, but not pure intransitives, intransitives with prepositional objects, or intransitives. Furthermore, while the generalized role approach works well for English and other well-studied languages, its initial formulation does not account for the full range of cross-linguistic differences in subject and object selection. It may turn out that richer semantic information and additional proto-roles may be needed to improve this approach. Other objections to proto-roles stem from observations that some proto-role features are more important for argument realization than others (e.g. causation is more important than other proto-Agent features) and that certain features of proto-Agent and Proto-Patient are paired, in that they depend on each other (e.g. the features "cause change" and "undergoes change").[33]

Another attempt to improve semantic role lists is found in the generalized macro-roles used in Role and Reference Grammar (Van Valin 1990, Van Valin and LaPolla 1997). In this frame-work, the two macro-roles, Actor and Undergoer, are coarse-grained roles that encompass a number of more specific roles. Actor, for instance, is a generalization over Agents and Experiencers. These mid-grained roles are, in turn, generalizations over more specific roles specified by individual verbs (e.g. the Agent role is an abstraction over the verb-specific 'giver,' 'runner,' or 'speaker' roles). Verb-specific arguments (e.g. Giver) are mapped to more abstract roles higher up in the hierarchy (e.g. Actor). As with Dowty's Proto-Agent and Proto-Patient, the

[33] These issues have been addressed in various ways by Primus (1999), Ackerman and Moore (2001), and Beavers (2010).

macro-roles predict the mapping to grammatical functions: The argument which maps to Actor is subject, and the argument mapping to Undergoer is object. While the macrorole characterization of arguments does not directly define semantic roles in terms of their entailments, as is the case with Dowty (1991), the process for mapping verb-specific arguments to the two macroroles relies on determining the (verb-independent) entailments of the roles (LRH: 67).[34]

I now discuss various properties of Change verbs which relate to the identification of case roles and their syntactic realization. The discussion here does not go into theoretical detail and only shows how focuses arguments of Change verbs can be characterized according to traditional semantic role lists, hierarchies capturing their realization properties, and features associated with Dowty's (1991) proto-roles. Most Change verbs can be realized with up to four different core (non-modifier) arguments. These arguments (and their verb-class-specific role labels) include the cause of the change (Cause_change),[35] the entity undergoing change (Undergo_change), the state of this entity before the change (Original_state) and after the change (Final_state).

Assigning general role labels (associated with traditional SR list approaches) to the first two of these verb-class-specific roles is fairly straightforward: the causer is an Agent because it instigates the event, and the changed entity is a Patient (or Theme, depending on one's interpretation), because it is directly affected by the agent and undergoes a change. However, even this definition is problematic, because Agents are assumed to be sentient entities that intentionally initiate the event, but in some cases the Cause_change entity is inanimate and thus not associated with intention. Labeling the initial and final states at a coarse-grained level is even more challenging. One approach would be to label them Source and Goal, respectively, because the Patient begins in one state and ends in another. Evidence for this is that the prepositions associated with these arguments also apply to prototypical Sources (*from*) and Goals (*(in)to*). However, such labels are not intuitive, because they are more clearly associated with spatial

[34] While much recent work on argument realization maintains many assumptions associated with semantic role lists (see Section 2.4), another branch of research, particularly embedded within the umbrella of Cognitive Linguistics, has emphasized the need for bottom-up analyses of semantic roles and their mapping to syntax. One of the pioneers of SR lists, Charles Fillmore, abandoned these pre-theoretical assumptions by the 1980s and developed a richer and more empirically testable approach to semantic roles in the form of Frame Semantics (Fillmore 1985, Fillmore and Baker 2010). In Chapter 3, I discuss the frame-semantic equivalent of SRs, Frame Elements, which are analyzable with respect to their verb and its semantic frame, far more numerous and semantically specific than SRs, and are not assumed to correspond one-to-one with syntactic argument slots.

[35] The role labels employed here are my own and defined in more detail in Chapter 5.

relations and do not have the same entailments as similar roles with spatial predicates (i.e. if you walk from the bank to the store, the bank still exists as such; if you change from a prince into a frog, the prince does not exist anymore as such). These findings demonstrate the difficulty of assigning verb-class-specific roles to a limited set of abstract coarse-grained roles.[36] Table 2.4 shows both coarse-grained and verb-class-specific roles for a sentence with a Change verb.

Sentence	the witch	the man	a prince	a frog
Verb-class-specific	Cause_change	Undergo_change	Original_state	Final_state
Coarse-grained	Agent	Patient/Theme	Source (?)	Goal (?)

Table 2.4: Verb-class-specific and coarse-grained role labels for a Change sentence

Another possible case-role analysis is the identification of which roles are (obligatory) complements and which are (optional) modifiers. This analysis also yields questionable results, as the participants exhibit varying degrees of optionality. The only argument which is present in every instance of a Change verb is the Undergo_change (2.35a). The Cause_change role appears in transitive sentences, but is not required for Change predicates per se, as it is omitted in intransitive uses (2.35b). Finally, the Original_state and Final_state arguments are both optional, but the Original_state argument can only be realized if the Final_state is also realized, as in (2.35c). Furthermore, Change predicates can also appear with prototypical modifiers such as time, place, manner, and instrument (2.35d).

(2.35) a. *The witch changed. (where witch is cause of change)
b. The man changed.
c. *The witch changed the man from a frog.
d. At the park yesterday, the witch changed the man completely with a wand.

These data give rise to a continuum between complements and modifiers for the arguments appearing with Change predicates, presented in (2.36).

(2.36) Undergo_change > Cause_change > Final_State > Original_state > time/place/etc.
< --- Complement ---------- Modifier ---->

[36] In my analysis, I will use the verb-class-specific roles in order to capture finer-grained semantic properties and avoid ambiguities associated with abstract role labels.

The continuum shows that Undergo_change is obligatory in all uses of Change verbs and thus clearly has the status of a complement, and that Cause_change is also quite like a complement as it is required in all transitive/causative uses. It also shows that Final_state and Original_state are less prototypical complements, as they are not required but still do not only provide peripheral and/or setting information, like traditional modifiers (at the far right of the continuum). Finally, the relative ordering of the State arguments captures data like (2.35c), namely that Original_state may only occur if Final_state is also present. Such a continuum challenges the notion of a strict distinction between modifiers and complements and that of a verb's basic valence. Some arguments are not required but are essential for understanding, and a single verb may be equally associated with multiple valence patterns.

Case role research also proposes role hierarchies which predict the syntactic realization of participants within a sentence (cf. (2.28) above; see LRH: Ch. 5). It seems that at least two different hierarchies are necessary for Change predicates, in order to account for both transitive and intransitive variants. Intransitive variants do not realize the Cause_change role, the Undergo_change is realized as subject, and the optional Original_state is only felicitous when the optional Final_state is also realized. Data on intransitive uses of Change verbs suggest the hierarchy in (2.37), which states that Undergo_change is required, Final_state is optional, and Original_state is also optional but requires Final_state to be realized.

(2.37) **Hierarchy of Change roles in intransitive uses**
Undergo_change (> Final _state (> Original_state))
The man changed ((from a prince) into a frog).

For transitive sentences, the hierarchy is largely identical to that above, but the Cause_change argument must be added to the hierarchy in (2.38). Because it is realized as a subject when it appears, this argument precedes Undergo_change in the hierarchy. Again, Original_state and Final_state exhibit the same behavior as with intransitive variants.

(2.38) **Hierarchy of Change roles in transitive uses**
Cause Change > Undergo_change (> Final _state (> Original_state))
The witch changed the man ((from a prince) into a frog).

I now test how Change predicates and their arguments are treated in Dowty's (1991) Proto-role approach. To classify participants according to Dowty's Proto-roles, we must identify the semantic entailments of the Cause_change and Undergo_change arguments. (The prepositional arguments cannot be analyzed because Dowty only seeks to account for realization of subject and object.) The Cause_change argument, by default, always entails at least one Proto-Agent property identified in Table 2.3 above, namely "causing an event or change of state." Specific instantiations of this role typically, but not necessarily, exhibit more Proto-Agent entailments: the witch in our examples is often associated with "volitional involvement," "sentience," and "movement," but less prototypical Cause_change arguments do not always entail these meaning components (e.g. *The weather turned the paper yellow*). The Undergo_change argument, on the other hand, primarily exhibits Proto-Patient properties such as "undergoes change of state" and "causally affected by another participant." While some instances of this argument involve at least one Proto-Agent property (i.e. "sentience" with *the man* in our example), this is not a necessary entailment and thus does not qualify the argument as a Proto-Agent.

Comparing the entailments of these arguments with Dowty's (1991) proposed Proto-role properties shows that Dowty's approach accurately predicts the arguments' syntactic behavior in transitive sentences: Cause_change is subject, and Undergo_change is object. However, the problems mentioned above seem to apply to this data as well. This approach only assists in the mapping to subject and object, but says nothing about the realization of oblique arguments. Second, it appears that some proto-role features carry greater weight than others: a sentient Undergo_change argument is still realized as a direct object, even when the subject is non-sentient (e.g. *This long winter has turned me into a grouch.*). This suggests that other features, such as "cause change," play a greater role in determining subject and object. Furthermore, the data reveal that features are not independent but paired. The Cause_change features of "cause change" is complementary to the Undergo_change feature of "undergo change."

In summary, the role-based analysis of English Change verbs and their arguments has shown that semantic roles are useful for the description of argument realization properties. However, many of the proposed distinctions and principles could not clearly be applied to the English Change verb data, as shown in this sub-section. Specifically, it is unclear what traditional role label to assign to certain arguments, especially Original_state and Final_state, and the distinction between modifier and complement was shown to be more of continuum than a strict

division. While Dowty's proto-role approach accurately accounted for subject and object selection, it did not aid in mapping the other roles of Change verbs to their syntactic realizations. The issues identified here parallel those documented in previous research, as outlined above. I resume the discussion of semantic roles in Chapter 3, which discusses how Frame Semantics employs a much richer and numerous set of semantic roles that are defined according to semantic frames (i.e. structures of world knowledge; see Fillmore 1985, Section 3.1).

2.4. EVENT-STRUCTURAL APPROACHES TO ARGUMENT REALIZATION AND VERB CLASSIFICATION

2.4.1 The relation between event structure, verb meaning, and argument realization

While approaches such as Dowty's (1991) proto-roles and Van Valin and LaPolla's (1997) generalized macro-roles seek to overcome the shortcomings of traditional semantic role list approaches by defining semantic roles according to their entailments, another significant branch of research takes a rather different view of verb meanings, arguments, and their mapping to syntax. These approaches fall under the umbrella term of "event structure"[37] and assume that verb meanings can be decomposed into smaller (primitive) units that predict a wide range of the verb's (and its associated roles') argument realization behavior (Jackendoff 1990, Rappaport Hovav and Levin 1998, Van Vallin and LaPolla 1997, Beavers 2006, 2010). This sub-section introduces the main tenets of these approaches, drawing especially on Rappaport Hovav and Levin (1998), and introduces Croft's (2012) theory of the aspectual and causal structure of verbs and their influence on argument realization.

As discussed in Section 2.2, Fillmore's (1968, 1970) observations about verbs like *hit* and *break* gave rise to a research program focused on the identification of grammatically relevant meaning components and the classification of verbs according to these components. An important result of this research is the recognition of two broad classes of verbs: manner verbs and result verbs (Aske 1989, Gropen et al. 1991, Slobin 2000, Beavers et al. 2010, Rappaport Hovav and Levin 2010). These verbs differ from one another in that manner verbs like *sweep* may occur in a much wider range of syntactic patterns than result verbs like *break*.

[37] The approach(es) presented here are also called "lexicalist" or "projectionist" approaches, as they view argument realization behavior to be projected from the verbal lexical item. These labels are generally used to differentiate them from a "constructional" approach (Goldberg 1995, 1996; see Section 3.2), in which argument realization arises from the syntactic constructions themselves.

(2.39) a. Terry swept.
b. Terry swept the floor.
c. Terry swept the crumbs into the corner.
d. Terry swept the leaves off the sidewalk.
e. Terry swept the floor clean.
f. Terry swept the leaves into a pile. (Rappaport Hovav and Levin 1998: 97-98)

(2.40) a. *Terry broke.[38]
b. Terry broke the vase.
c. *Terry broke the vase onto the floor.
d. *Terry broke the vase off the table.
e. *Terry broke the vase shattered.
f. *Terry broke the vase into a pile of shards. (cf. Rappaport Hovav and Levin 1998)

Originally, the difference between these two verb types was attributed solely to the observation that the meaning of *break*, as well as other result verbs such as *open, dry,* or *shatter*, entail some type of causation, whereas the meanings of manner verbs (*sweep, whistle, run*) do not (Fillmore 1968, 1970). However, the data in (2.39)-(2.40) are problematic for theories assuming a direct mapping from a verb's meaning (or its "lexical semantic representation" (Rappaport Hovav and Levin 1998: 98)) to the expression of its arguments. Namely, such an approach must posit (at least) six separate entries for *sweep*, which seems counterintuitive given the semantic similarity of the verb (i.e. the scenario it describes) in the various contexts in (2.39). A more suitable solution to this problem of *multiple argument realization* is to identify general principles that predict the range of argument realization patterns (i.e. "meanings," according to Rappaport Hovav and Levin 1998: 99) for a given verb. Ideally, these general principles will not apply to individual verbs, but to classes of semantically related verbs.

Within event-structural approaches, these general principles governing argument realization involve the decomposition of a verb's meaning such that the structural (i.e. grammatically relevant) parts of meaning are factored out and separated from idiosyncratic meaning aspects that are purportedly "not relevant for argument realization" (Rappaport Hovav

[38] While this sentence is acceptable under the interpretation of Terry being the entity which broke, it is unacceptable under the interpretation that Terry is the agent who broke something (parallel to (2.39a) with *sweep*).

and Levin 1998: 106).[39] The structural portion of verb meaning is assumed to be the basis for the formulation of grammatically relevant ("semantic") verb classes such as those of Levin (1993) and is typically defined in terms of an "event structure" which represents the temporal and/or causal[40] structure of an event.

Event structures correspond closely to the aspectual classes popularized by Vendler (1957) and subsequently refined by various scholars (Dowty 1979, Mourelatos 1981, Dahl 1985, Croft 2012). Vendler (1957) distinguishes four different event types based on their aspectual properties: states, activities, accomplishments, and achievements. These aspectual types contrast with each other along three dimensions: stative vs. dynamic, durative vs. punctual, and bounded vs. unbounded (Mourelatos 1981: 201-202). For instance, activities such as *sing* or *sweep* involve action of the subject (dynamic), which is continuous (*durative*) and does not have a clear culmination or endpoint (unbounded; as opposed to a bounded accomplishment, e.g. *sing Ode to Joy*). The Mourelatos features associated with each aspectual type and examples demonstrating them are given in Table 2.5.

Aspectual Type				**Examples**
State	stative	durative	unbounded	*be Polish, be polite, love*
Activity	dynamic	durative	unbounded	*sing, dance, sweep*
Achievement	dynamic	punctual	bounded	*shatter, reach (the summit)*
Accomplishment	dynamic	durative	bounded	*cross (street), read (book), break* (tr.)

Table 2.5: Vendler's aspectual types and Mourelatos features (cf. Croft 2012: 33-34)

While these aspectual classes were originally employed to explain how verbs behave with respect to tense, aspect, and modality,[41] they have more recently been applied to account for argument realization behavior.[42] Two important assumptions guide such accounts: For one, the lexical-aspectual classification of a verb, or its event structure, determines the grammatical properties of

[39] Rappaport Hovav and Levin (1998: 106) claim that the division of a verb's meaning into grammatically relevant and idiosyncratic portions is widely accepted in the literature, citing Grimshaw (1993) and Hale and Keyser (1993). This approach also motivates Levin's (1993) verb classes and dates back to Bloomfield's (1933) statement that the lexicon is merely an appendix of the grammar. However, in Chapter 3, I discuss several studies showing that such a division does not always stand up to comprehensive empirical anlayis.

[40] See Levin and Rappaport Hovav (2005: Ch. 4) for a discussion and comparison of localist, causal, and aspectual characterizations of events.

[41] See Croft (2012: 33f.) for a critical discussion of Vendler's aspectual classes and the diagnostics for determining them.

[42] For an overview of such accounts, see Levin and Rappaport Hovav (2005: Chs. 5-7).

the verb, whereas the idiosyncratic portion of meaning (its "root" or "constant") does not influence grammatical behavior, but only serves to differentiate individual verbs with the same event structure. Secondly, verbs are associated with a single "basic" event structure and can only occur in argument realization patterns not associated with its basic event structure by means of "template augmentation" (Rappaport Hovav and Levin 1998: 111f.), as described presently.

A verb's "basic" event structure and can be represented in terms of a predicate decomposition. The event structure templates proposed by Rappaport Hovav and Levin (1998: 108) are provided in (2.41).

(2.41) a. [x ACT $_{<MANNER>}$] (activity)
b. [x <*STATE*>] (state)
c. [BECOME [x < *STATE* >]] (achievement)
d. [[x ACT $_{<MANNER>}$] CAUSE [BECOME [y < *STATE* >]]] (accomplishment)
e. [x CAUSE [BECOME [y < *STATE* >]]] (accomplishment)

Manner verbs such as *sweep*, *whistle*, or *run* have a basic event structure of activities (2.41a): they involve some participant (*x*) that acts (ACT)[43] in some manner ($_{<MANNER>}$).[44] In contrast, result verbs such as *break* or *open* are associated with the accomplishment event structure in (2.41d): they involve a participant (*x*) that acts in some manner, and as a result of this action, some other participant (*y*) changes into (i.e. *becomes*) a new state.

To demonstrate how actual attestations of verbs and their arguments are represented in decomposed event structures, the basic meaning of *sweep* in the intransitive (2.39a) has the "activity" event structure template shown in (2.42): the *x* of the template represents the subject *Terry* and the <*MANNER*> of the template is specified by the root *sweep* realized by the verb.

[43] The capitalized portions of the event structure representations (e.g. ACT, BECOME, CAUSE) are typically assumed to be primitive (and/or universal) predicates. However, Levin and Rappaport Hovav (2005: 74) discuss how different approaches arrive at different numbers and types of primitives.

[44] The representation of manner as a subscript in italics captures two features of these verb types. That it is in sub-script represents that the manner is not overtly expressed (as opposed to the non-sub-script <*STATE*> of the state, achievement, and accomplishment templates, which must be overtly expressed). That it is in italics represents that the name of the verb corresponds to the manner of the activity (e.g. the verb *sweep* refers to a participant acting in a sweeping manner).

(2.42) Example: *Terry swept.*
Template**:** [x ACT <*MANNER*>][45]
Representation**:** [x ACT <*SWEEP*>] (x = Terry)

In contrast, the basic meaning of *break* has the accomplishment template (more precisely, the *externally caused change of state* template (Rappaport Hovav and Levin 1998: 116f.)) shown in (2.43): the *x* of the template corresponds to *Terry*, who acts in some manner and thereby causes the *y* (*the vase*) to enter into a new *STATE* (namely, being broken).

(2.43) Example: *Terry broke the vase*.
Template**:** [[x ACT <*MANNER*>] CAUSE [BECOME [y < *STATE* >]]]
Representation: [[x ACT <*MANNER*>] CAUSE [BECOME [y < *BROKEN* >]]]
(x = Terry, y = vase)

However, *sweep* was shown above (2.39c-f) to occur in argument structures that do not correspond to those of activities. To account for such cases, Rappaport Hovav and Levin (1998: 111) introduce the construct of *template augmentation*.

(2.44) **Template Augmentation** Event structure templates may be freely augmented up to other possible templates in the basic inventory of event structure templates. (1998: 111)

Template augmentation allows an activity verb like *sweep* to occur with event structures associated with accomplishments involving a change of state in (2.39c, d) above, a change of location (2.39e), or the creation of an object (2.39f). Specifically, the event structure template of an activity repeated in (a) corresponds to a subpart (specifically the causing act) of another template in the basic inventory, namely that of accomplishments. The identity of the activity template with the subpart of the accomplishment template is set off by bold font in (2.45).

(2.45) a. [x ACT <*MANNER*>] (activity)
b. [**[x ACT <*MANNER*>]** CAUSE [BECOME [y < *STATE* >]]] (accomplishment)

[45] The official basic event structure of *sweep* actually reads as follows: [x ACT <*MANNER*> y], because sweeping events involve both a sweeper (x) and a swept surface, typically a floor (y). However, the surface need not be expressed (as indicated by underlining the *y*) because it is embedded in the root *sweep* due to the prototypical association of sweeping events with floors as surface. (Rappaport Hovav and Levin 1998: 113, 115)

Given the identity of *sweep*'s basic event structure with the causing sub-part of the accomplishment event structure, *sweep* may be used in contexts associated with (externally caused) accomplishments, as shown in (2.46).

(2.46) [[x ACT $_{<SWEEP>}$] CAUSE [BECOME [y <*CLEAN*>]]] (x = Terry; y = floor)
Terry swept the floor clean.

In this way, the meanings of verbs with simpler basic event structures can be built up through template augmentation to appear in contexts (i.e. with "meanings") associated with verbs of more complex event structures.

Rappaport Hovav and Levin (1998: 112-113) also posit two well-formedness conditions on template augmentation that determine the relation between event templates and argument realization, as well as constraining certain verb types (i.e. verbs with certain basic event structures) from occurring in unattested contexts. Their Argument Realization Condition is given in (2.47).

(2.47) **Argument Realization Condition**:
a. There must be an argument XP in the syntax for each structure participant in the event structure.
b. Each argument XP in the syntax must be associated with an identified subevent in the event structure. (Rappaport Hovav and Levin 1998: 113)

The Argument Realization Condition accounts for the varying behavior of manner and result verbs shown in (2.39) and (2.40) above. Specifically, manner verbs like *sweep* are licensed in intransitive contexts, because the subject argument corresponds to the *x* argument of the activity template in (2.41a), thereby fulfilling the first part of the condition, and because the subject argument is identified with the entire [x ACT $_{<MANNER>}$] subevent of the event structure, thereby fulfilling the second part. In contrast, result verbs like *break* cannot occur in intransitive sentences like *Terry broke* (where the *Terry* is the 'breaker'). Specifically, there is only one argument XP in the syntax (*Terry*), but the basic event structure includes two structure participants (cause of breaking, broken entity) thus violating the first part of the Argument Realization Condition, and it includes two subevents (CAUSE, BECOME) and thereby violates the condition's second part. Based on these observations, Rappaport Hovav and Levin conclude that "the sharp difference

between *break* and *sweep* with respect to the obligatoriness of the direct object arises from the difference in their event structures." (1998: 117).

The Subevent Identification Condition on template augmentation is given in (2.48).

(2.48) **Subevent Identification Condition**: Each subevent in the event structure must be identified by a lexical head (e.g., a V, an A, or a P) in the syntax. (R H and L 1998: 112)

Although discussed in less detail than the Argument Realization Condition, Rappaport Hovav and Levin (1998) point out how the Subevent Identification Condition is formulated in such a way that it allows accomplishment verbs like *break* to occur in non-causative, intransitive sentences (*the vase broke*) while maintaining its basic classification as an accomplishment (more precisely, an externally caused change) verb. Specifically, because of *break*'s basic classification as an externally caused change, the verb's meaning itself incorporates both the CAUSE sub-event and the BECOME sub-event. Therefore, each of the two subevents of the accomplishment event structure in (2.41d) above is identified by the verbal lexical head *break* ("a V"), thereby fulfilling the Subevent Identification Condition.[46]

Event-structural approaches to argument realization overcome several issues (described in Section 2.3) associated with role-based approaches, including reformulations of traditional semantic role list approaches such as Dowty (1991) and Van Valin and LaPolla (1997). For one, it is easier to identify the status of an argument when drawing on the limited set of event structure templates (i.e. the five templates shown in (2.41)) than on a potentially unlimited set of thematic roles.[47] Furthermore, the discussion in Section 2.3 emphasized that argument roles are better defined with respect to specific verb meanings rather than as independent entities, and event-structural approaches define arguments according to their position within the decomposition of a

[46] The intransitive (inchoative) use of *break* appears to violate the Argument Realization Condition, as the syntax contains one argument but the event structure contains two sub-events and two participants. Rappaport Hovav and Levin (1998: 117-118) address this problem with data from other languages, in which intransitive uses of accomplishment verbs are morphologically marked (e.h. with reflexive pronouns). They claim that these morphological markers serve to satisfy the condition and that English is unique in that it does not morphologically mark these intransitive uses. This strategy likely draws skepticism from linguists in usage-based frameworks (see Section 3.2) which deny the existence of unexpressed elements, because it appears that Rappaport Hovav and Levin (1998) claim that there is an invisible morpheme in English.

[47] However, the precise number of event structures or primitive predicates is not agreed on. For instance, Jackendoff (1972) proposes five primitive predicates, but Jackendoff (1990) proposes 12 primitive predicates. See also Levin and Rappaport Hovav (2005: 74).

verb's meaning and the types of primitive predicates it occurs with (Pinker 1989: 166-167, Grimshaw 1993). This approach allows for subevent analyses that identify the internal complexity of events and for the organization of verb meanings and arguments into hierarchical relations, both of which are important in mapping of verbal arguments to syntax (see Levin and Rappaport Hovav 2005: 75).

Before concluding this section, I discuss the treatment of verbal roots ("constants" in Rappaport Hovav and Levin 1998) in event-structural approaches to argument realize. The root refers to the 'idiosyncratic' portion of a verb's meaning that is not relevant for syntax; the grammatically relevant portion of verb meaning is its event structure, while the root only serves to differentiate individual verbs with the same event structure.[48] In contrast to the limited set of event structures, the number of verbal roots is open-ended (which accounts for the countless differences between verb meanings within and across languages). The discussion here cites evidence, identified primarily by proponents of event-structural approaches, suggesting that certain aspects of the root are in fact relevant for argument realization. These data demonstrate the need for more detailed analyses of the argument realization behavior of verbs with closely related roots, like the analyses in Chapters 5-7 of this dissertation.

In Rappaport Hovav and Levin's (1998) theory, the ontological type of the root (e.g. manner, place, instrument, internally/externally caused state) determines the basic event structure of the verb bearing it. They propose the *canonical realization rules* in Table 2.6 mapping the ontological type of roots to their event structures. Roots are integrated into a verb's event structure either as an argument of a predicate (within the event structure) or as a modifier of a predicate. The position of the root within the event structure is signified by the italicized and angle-bracketed portion of the event structure representations above, with modifier arguments set off in sub-script (as with "manner" and "instrument" roots) and argument modifiers in their appropriate position in the relevant sub-event (as with the other root types).

[48] Rappaport Hovav and Levin (1998: 106) state that the division of verb meanings into structural and idiosyncratic components is widely accepted and "a major achievement of recent lexical semantic research," citing Grimshaw (1993) and Hale and Keyser (1993), among others.

Constant	Event Structure Template	Verbs
manner	[x ACT <*MANNER*>] (e.g., , …)	*jog, run, creak, whistle*
instrument	[x ACT <*INSTRUMENT*>] (e.g., , …)	*brush, hammer, saw, shovel*
placeable object	[x CAUSE [BECOME [y WITH <*THING*>]]]	*butter, oil, paper, tile, wax*
place	[x CAUSE [BECOME [y <*PLACE*>]]]	*bag, box, cage, crate*
internally caused state	[x <*STATE*>]	*bloom, blossom, decay, flower, rot*
externally caused state	[[x ACT] CAUSE [BECOME [y <*STATE*>]]	*break, dry, harden, melt, open*

Table 2.7: Canonical realization rules (Rappaport Hovav and Levin 1998: 109)

Although Rappaport Hovav and Levin (1998: 106) claim that roots are not grammatically relevant, they also mention several cases in which the root determines properties of argument realization that may be deemed grammatically relevant in other frameworks (see Chapter 3). For one, as just shown, their canonical realization rules state that the ontological type of the root determines their basic event structure, which in turn determines a great deal of their argument realization behavior. That is, because the root *sweep* lexicalizes the concept of a sweeping activity, it is associated with the activity event structure. Secondly, the root determines the number and types of participants minimally associated with the concept the verb denotes. In this case, verbs with the same event structures may differ in argument realization behavior (i.e. in an aspect of their grammatical behavior) due to the nature of their roots. For example, while *run* and *sweep* are both associated with activity event structures, *run* is only associated with one participant (the runner), but *sweep* is associated with two participants (the sweeper, the swept surface).[49] However, the interpretation of grammatically equivalent sentences (simple transitive patterns) yields an accomplishment reading for *run* but an activity reading for *sweep* (2.49), thus suggesting a grammatical difference in the types of roots associated with a single basic event structure.

[49] However, the substance, e.g. dirt that is swept, is not a necessary participant, as sentences such as *Terry swept the crumbs* are deemed ungrammatical (Rappaport Hovav and Levin 1998: 118-120).

(2.49) a. Terry ran a mile. (Accomplishment)
b. Terry swept the floor. (Activity)

Furthermore, Rappaport Hovav and Levin (1998: 115) also point out a grammatical difference resulting from subtle differences in the roots of two closely related verbs, *sweep* and *wipe*. Specifically, *sweep* may omit the direct object (*Terry swept*) while *wipe* may not (**Terry wiped*), because *sweep* is associated with a prototypical type of surface, namely a floor, while *wipe* (and other verbs such as *rub* or *scrub*) are not. These types of data suggest that the root is responsible for several aspects of argument realization, calling into question Rappaport Hovav and Levin's (1998) claim that verbal roots (i.e. "constants") are grammatically irrelevant.

In fact, much subsequent research has emphasized that the supposedly idiosyncratic portion of verb meaning does in fact play a role in argument realization (i.e. grammatical) behavior. While much research on idiosyncrasies of verb meaning has been embedded in frameworks aligned with Cognitive Grammar (Taylor 1996, Boas 2003, 2006, Iwata 2008), proponents of projectionist approaches to argument realization have also repeatedly encountered problems empirically teasing apart the structural and idiosyncratic portions of verb meaning. Indeed, the postscript of Levin and Rappaport Hovav's (2005) survey of argument realization research emphasizes the need for a better understanding of verbal roots to explain several aspects of verbal grammatical behavior. For one, citing research such as Dowty (1991) and Pinker (1989), they claim that "[t]he distribution of verbs across the alternating and nonalternating classes is not completely idiosyncratic, but is governed by fine-grained semantic properties of the events these verbs describe" (LRH 2005: 239). They also stress the importance of verbal roots contrastive research, such as assessing the relative number of roots per ontological category in different languages and determining how individual languages combine roots with event structures, noting that "[h]ere, too, the fine-grained semantics of the root, comes into play" (240).[50] Indeed, much recent work within projectionist event-structural approaches has focused on idiosyncratic aspects of verb meaning, such as Dowty (2000), Beavers (2006, 2010), Beavers and Koontz-Garboden (2012).[51]

[50] See also Slobin (1987, 1997, 2003), Haspelmath (1993), Croft et al. (2001), and Stringer (2003).
[51] See also the recent work of Maya Arad, Hagit Borer, Artemis Alexiadou, Heidi Harley, Lisa Levinson, and Antje Rossdeutscher.

In sum, while event-structural approaches to argument realization and verb classification appear capable of capturing broad generalizations about the grammatical behavior of large sets of verbs, the top-down orientation characterizing these approaches (i.e. assuming a limited set of event structures and attempting to fit the data into these) must be complemented with bottom-up analyses identifying the precise grammatical behavior of verbs without assuming pre-existing categories. Such bottom-up analyses provide empirical data that guide the formulation of event-structural theories and contribute to the delineation of grammatically relevant from idiosyncratic aspects of verb meaning.[52] The analyses conducted in Chapters 5-7 of this dissertation provide a detailed, corpus-based analysis of verbs with highly similar roots, thereby providing useful data that informs theories of argument realization and verb classification, regardless of their theoretical persuasion.

2.4.2. Croft (2012)

The study of event-structural features of verb meaning has given rise to several approaches for mapping aspectual and causal features of events to syntax (Postal and Perlmutter 1984, Jackendoff 1990, Levin and Rappaport Hovav 1995, Baker 1997). Here, I discuss Croft's (2012) approach to verb meaning and argument realization, as it brings together both aspectual and causal characterizations of event structures and proposes sophisticated linking rules that govern the syntactic realization of verbal arguments. After describing Croft's (2012) reformulation of Vendler's aspectual classes and the representation used to describe these classes, I then present Croft's theory of argument realization and the corresponding linking rules, before applying Croft's approach to English Change verbs.

Croft (2012) presents a more detailed classification of aspectual types which builds on Vendler's (1957) original classes (see Table 2.5 above) and on further developments thereof (e.g.

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[52] The following quotations from the work of Beth Levin and Malka Rappaport Hovav further emphasize the need for bottom-up studies focusing on subtle differences in verbal roots.
--"[T]he major challenge facing any effort to handle verbal polysemy is the delineation of the exact range of meanings available for any individual verb." (Rappaport Hovav and Levin 1998: 129)
--"Research into the nature of the root and the articulation of general principles which govern the integration of the idiosyncratic and event-based facets of meaning is of the utmost importance." (LRH 2005: 193)
--"[D]ifferences among verbs in argument realization options could be traced to differences in the ways that their roots pair up with event structure types." (LRH 2005: 74)
--"Such accounts [of distribution of verbs across alternations] emphasize once again how much can be gained from a better understanding of how roots and event structure are integrated, yet much remains to be done to fully understand how this integration happens." (LRH 2005: 234)

Dowty 1979, Dahl 1985, Bach 1986).[53] Croft (2012: 57f.) posits five overarching classes, relating to Vendler's original four classes plus an additional class of semelfactives. Most of these classes can be further subdivided according to properties such as directedness, incrementality, and permanence. Croft's (2012) aspectual types are given in Table 2.7.

Traditional Aspectual Class	**Croft (2012) Aspectual Classes**
State	Inherent (*be German*) Acquired Permanent (*be cracked*) Transitory (*be ill*) Point (*be 5 o'clock*)
Activity	Directed (*to cool*) Undirected (*to walk*)
Achievement	Reversible (*the door opened*) Irreversible (*the mouse died*)
Accomplishment	Incremental (*write a letter*) Non-incremental (*repair a computer*)
Cyclic Achievements	Cyclic Achievements (*cough*)

Table 2.8: Aspectual Classes in Croft (2012: Ch. 2)

Within Croft's (2012) framework, Vendler's states fall into four categories depending on the permanence of the state. Inherent states (e.g. *be German*) hold from the entire existence of an entity, acquired permanent states (*be cracked*) hold from the acquisition of the state, transitory states (*be ill*) only hold for a limited period of time, and point states (*be 5 o'clock*) only hold for a single point in time (of varying length). Activities are divided into two sub-types: directed activities (*to cool*, a.k.a 'degree achievements') are associated with a scalar direction, while undirected activities (*to walk*) are not. Croft also posits a distinction between two types of achievements: reversible achievements (*the door opened*) can be undone, while irreversible achievements cannot (*the mouse died*). Accomplishments also come in two types: incremental accomplishments (*to write a letter*) are associated with a gradual, directed run-up activity which leads to the final state, while the run-up activity for non-incremental accomplishments does not necessarily entail gradual procession towards the final state (*to repair a computer*). Finally, Croft

[53] A notable feature of Croft's (2012: 34) treatment of verbal aspect is that verbs are not associated with a basic aspectual (i.e. event-structural) type, but rather verbs have the *aspectual potential* to express a certain range of aspectual types.

adds an additional class to Vendler's original four: semelfactives, which are instantaneous, possibly iterated activities (*to cough*).

To describe the aspectual types found (in English/across languages), Croft proposes a representation of event structure that is more fully developed than those discussed in the previous sub-section (e.g. Jackendoff 1989, Rappaport Hovav and Levin 1998). Croft's representation of aspectual structure includes two dimension: the horizontal time dimension represents the span of time over which an event takes place, and the vertical quality dimension represents qualitative changes an entity undergoes throughout this time span. As a simple example, Figure 2.3 shows the aspectual type instantiated by the sentence *The window shattered*, namely an irreversible, directed achievement.

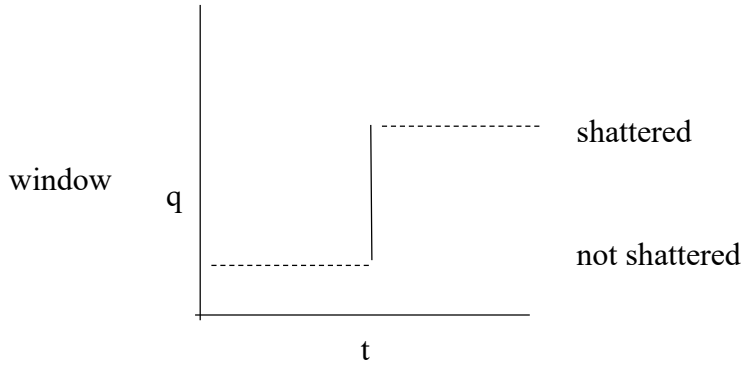


Figure 2.3: Croft's representation of irreversible, directed achievements (*The window shattered*).

The types of lines in the representation are meaningful. The horizontal dimension (*t*) represents the temporal dimension of the event, and the vertical dimension (*q*) represents the qualitative dimension. Solid lines within these dimensions indicate the portion of the event which is profiled by the verb, while dotted (broken) lines indicate unprofiled event phases. In the sentence in question (*The window shattered*), only the change from not shattered to shattered is profiled, and not the preceding (non-shattered) nor following (shattered) states. In contrast, a similar stative predicate (e.g. *The window is broken*) would be represented by making the upper, right-hand, horizontal line solid, and the vertical line dotted, because in such sentences the end state is profiled,[54] and not the change itself. The completely vertical direction of the solid line indicates

[54] Croft (2012:403) defines *profile* as "the concept denoted by a linguistic form in the semantic frame for that form." He further defines *semantic frame* as "a semantic representation in which a concept (the profile)

that the qualitative change occurs suddenly. This is different from incremental events, which are represented by a diagonal line, indicating a gradual change from initial to end state. Also, the arrow at the right end of the figure indicates that the final (unprofiled) state of the window, namely being shattered, holds for the rest of its existence. A directed activity which is reversible and does not hold for the entity's entire existence, as in *The door opened*, lack such an arrow. Finally, the prose words on the left and right side of the figure represent frame-semantic information that is (supposedly) irrelevant for causal-aspectual behavior.

Although Croft (2012) provides a detailed analysis of verbal aspect and its interaction with tense-aspect constructions, he maintains that argument realization behavior depends more on a verb's causal features than its aspectual features. In particular, Croft adopts the causal chain model of event structure from Cognitive Grammar (Talmy 1976, cf. the "billiard ball model" in Langacker 1991: 283), which views multi-participant events as involving a transfer of force from an initiator to a final endpoint. The general assumption of this model is that the participant who initiates the event by providing the first force is realized as subject, the participant at the endpoint of the causal chain profiled by the verb is direct object, and the participants in between are obliques. The sentence in (2.50) describes a situation in which Pat applies force to a rock, which in turn applies force to a window, causing it to break. Pat begins the causal chain and is thus realized as subject, and the force ends with the window (direct object) after passing through the rock (oblique).

(2.50) Pat broke the window with a rock.
Pat → rock → window

This approach differs from those which appeal to semantic roles, because a causal chain does not rely on isolating semantic features to label the argument, but characterizes it only with respect to the other participants within the same scenario.

Croft's approach also accounts for various types of oblique arguments. Croft (2012: 222 f.) identifies two types of obliques: antecedent obliques precede the object in the causal chain, while subsequent obliques appear later in the chain. These two oblique types are associated with different sets of participant types ('semantic roles') and are realized using different sets of

is supplemented by a semantic structure which is presupposed by the concept." (2012: 405; see also Fillmore 1982, 1985).

grammatical markers (e.g. prepositions in English). With the addition of these two argument types, Croft proposes a causal chain hierarchy like that exemplified in (2.51).

(2.51) Subject → Antecedent Oblique → Object → Subsequent Oblique
Sue → hammer → coconut - - - > Greg
'Sue broke the coconut for Greg with a hammer.' (cf. Croft 2012:222)

Croft also provides four linking rules which account for the relation between the causal chain (as shown in 2.51) and argument realization, listed in (2.52)

(2.52) a. The verbal profile is delimited by Subject and Object (if any)
b. Subject is antecedent to Object in the causal chain
SBJ → OBJ
c. An Antecedent Oblique is antecedent to the Object in the causal chain; a Subsequent Oblique is subsequent to the Object in the causal chain
A.OBL → OBJ → S.OBL
d. Incorporated arguments are between Subject and Object in the causal chain
SBJ → INCORP → OBJ

To represent sentences involving a causal chain, Croft adds a third dimension to the existing representation. Each participant in a multi-participant event is associated with its own event structure in the overall scenario. Causal relations between the individual participants (and their events) are represented by lines or arrows connecting individual points on the event structures. The individual event structures should maintain "temporal unity," in that all structures are defined for the same portion of time and thus have identical *t* dimensions. Finally, in his Causal Order Hypothesis (2012: 221f.), Croft claims that the causal chain is construed as directed, acyclic and non-branching for linguistic realization, although the events themselves may be seen otherwise (e.g. reciprocal events such as meeting appear to be acyclic events).

To demonstrate this, consider a transitive variant of the sentence described in the figure above. Figure 2.4 demonstrates that the two participants each have their own event structure and that the profiled portion of the subject's event structure causes the change in the object (i.e. the window shattering).

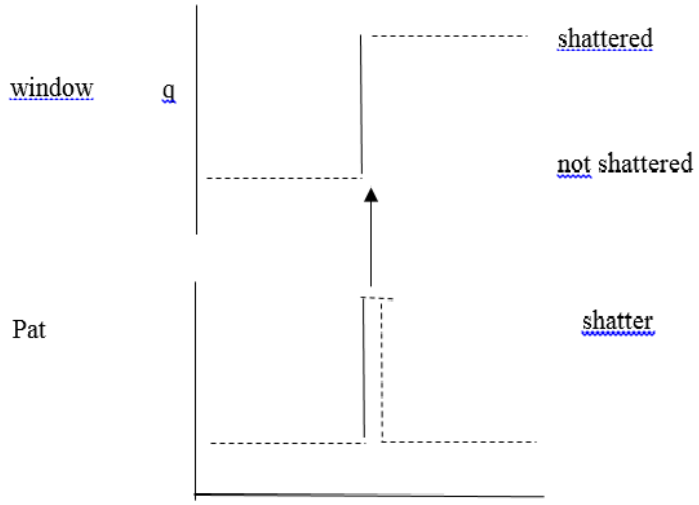


Figure 2.4: Croftian representation of transitive *shatter* (*Pat shattered the window*)

Because the causation related to a shattering event is punctual, it is represented by a single line which connects the culmination of the subject's activity (i.e. the act which brings about the shattering) to the change undergone by the object (the single vertical line in the top half of the figure), representing the window's punctual change from a stable to a shattered state. As opposed to such punctual causation, causation stretching over a length of time is represented with two lines, one at the beginning and one at the end of the causation (see Figure 2.12 below). Because shattering involves direct force-dynamic causation, the line connecting the event structures has an arrow. This is not the case for non-causative relations, such as locational scenarios (e.g. *enter the room*), which only use lines without arrows.

In summary, Croft's approach to verbal event structure and argument realization provides a comprehensive account of many aspects of verb behavior and builds on much recent work from a wide variety of fields and frameworks. Croft succeeds in reformulating Vendler's aspectual classes and providing a more complete taxonomy of attested aspectual types. He also expands on the notion of force-dynamics in Cognitive Grammar by formulating argument realization rules which are directly related to causation within the verbal profile. By accounting for the realization of oblique arguments, Croft goes farther than recent developments on case-role research which only account for the realization of subject and object.

Despite its thoroughness and improvements on several existing approaches to verbs, there are some difficulties with Croft's (2012) methodology and the scope of his work. The first

involves the use of 'frame semantic' labels on the sides of the event structure representations. It is unclear what status these labels have: while the labels in Figures 2.3 and 2.4 are derived from the verb (*shatter*), data from Change verbs below show that they may also come from independent arguments of the verb (see Figure 2.11 below). Croft also does not clarify whether they are to be seen as some sort of semantic primitives: while the abovementioned data do not suggest this, Croft (2012: 302 f.) uses this information to account for manner conflation in simple verbs. In this respect, Croft's approach could benefit from a better understanding of the division between structural and idiosyncratic aspects of verb meaning, as discussed above with respect to verbal roots in event structural approaches. A second issue involves Croft's distinction between Antecedent and Subsequent obliques. While the distinction seems intuitive for the data in (2.51), many events do not have as clear a hierarchy in the causal chain, as shown below. Finally, while Croft recognizes the tension between syntactic similarity of synonymous verbs and subtle differences among such verbs, he does not provide a methodology to account for this behavior.

I now describe how various sentences with Change verbs are analyzed in Croft's (2012) approach. I begin with intransitive sentences, because the analysis of transitive sentences requires the third dimension of causality. In the basic intransitive sentence with no initial or end state specified (e.g. *The man changed*), the aspectual contour is very similar to that of directed, irreversible achievements as in Figure 2.3 above, assuming that the change takes place suddenly. The arrow at the right end of the figure may or may not be included, because the lack of context makes it unclear whether the change is permanent or temporary. Figure 2.5 shows the aspectual contour of this sentence.

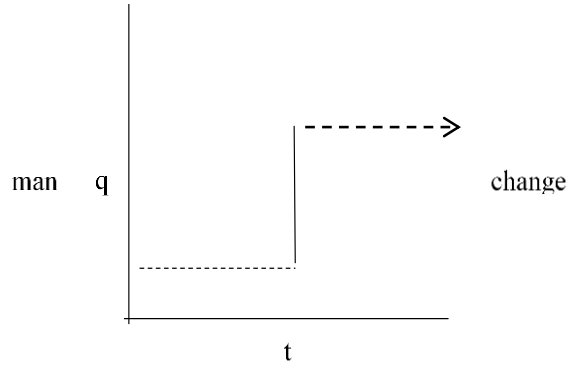


Figure 2.5: ***The man changed***

Similar intransitive sentences with a specified end state (e.g. *The man turned into a frog*) are analyzed in much the same way, albeit with the end state (*frog*) listed on the right side of the upper qualitative dimension. If we assume that the change takes place suddenly and the end state holds permanently, then the profiled line is vertical and an arrow is appended to the right of the end-state dotted line, as in Figure 2.6.

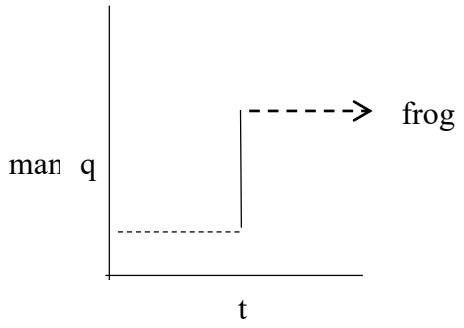


Figure 2.6: The man changed into a frog (suddenly).

If an initial state is also specified in the sentence, the representation remains the same, with only the addition of an initial-state value on the right side of the lower qualitative dimension, as in Figure 2.7.

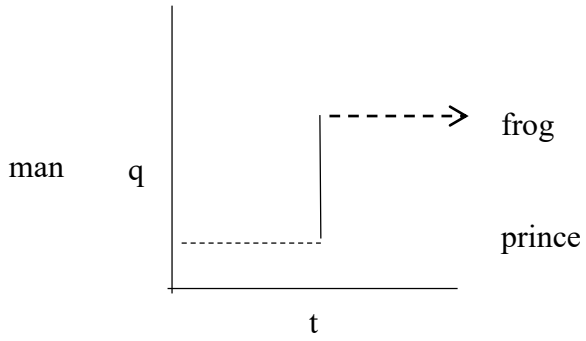


Figure 2.7: The man changed from a prince into a frog (suddenly).

Some Change events occur gradually, and these representations differ from those above in that the profiled rising line is not completely vertical, but sloped. This reflects a gradual change along the qualitative dimension. An intransitive sentence with no end or initial state specified is represented in Figure 2.8.

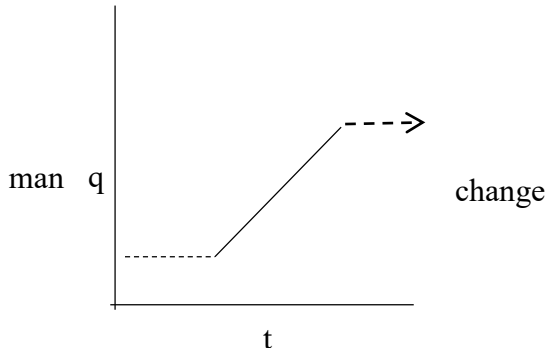


Figure 2.8: The man is changing (gradually).

As with the instantaneous changes above, a mentioned end (or initial) state is represented by specifying the state to the right of the corresponding level of the qualitative dimension, as in Figure 2.9.

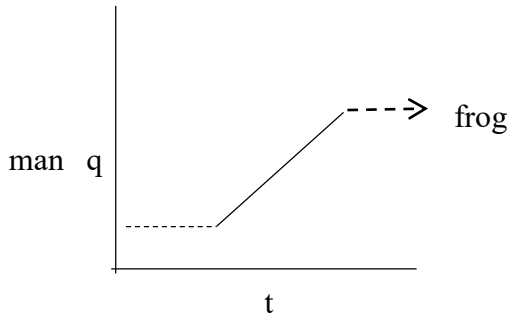


Figure 2.9: The man is changing into a frog (gradually).

To account for transitive sentences which mention the initiator/causer of the change, Croft's 2-D representation must be complemented with a third dimension which shows the relationships between the various actors in the event. In particular, the time dimension remains the same, while multiple qualitative dimensions are included, one for each participant in the event. The initiator of the event is below the participant which is affected by this initiator. Vertical arrows which connect qualitative properties of initiator and affected represent causation.
In simple transitive sentences without specified initial or end states (e.g. *The witch changed the man*), where we assume that the change takes place suddenly, the lower qualitative dimension

represents the initiator (*witch*). This participant's aspectual contour is that of a cyclic achievement (semelfactive): a horizontal dotted line representing initial and post-event rest states, divided by a sharp solid vertical line (rising) directly followed by a dotted vertical line (falling back to end rest state). The sharp rise and fall of these lines signify an instantaneous activity of the initiator. On the upper qualitative dimension, the contour is identical to that of Figure 2.5 above, which represents an instantaneous change of state with no specified initial or end states. The causal relation between the participants is represented by a solid vertical arrow connecting the profiled portions of the two contours (the causer's semelfactive action and the affected participant's change of state). This is shown in Figure 2.10.

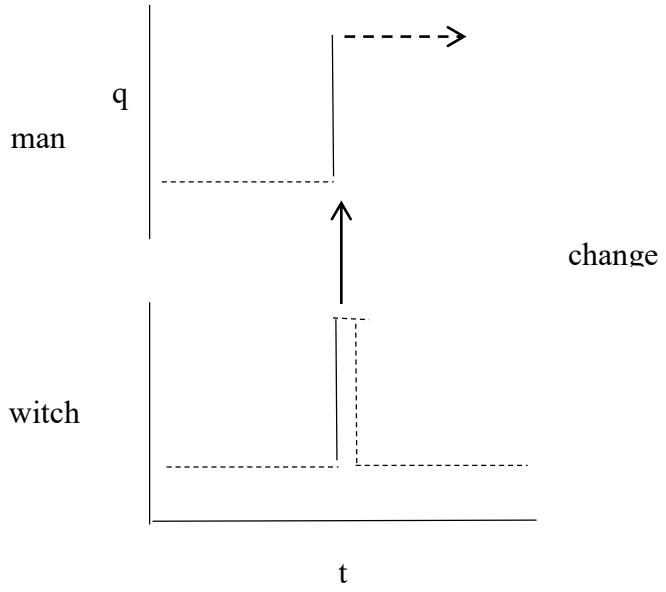


Figure 2.10: ***The witch changed the man.***

If initial and/or end states are mentioned in transitive sentences, they are represented in the same way as in the intransitive uses in Figures 2.4-2.7, by writing the state to the right of its corresponding line on the qualitative dimension.

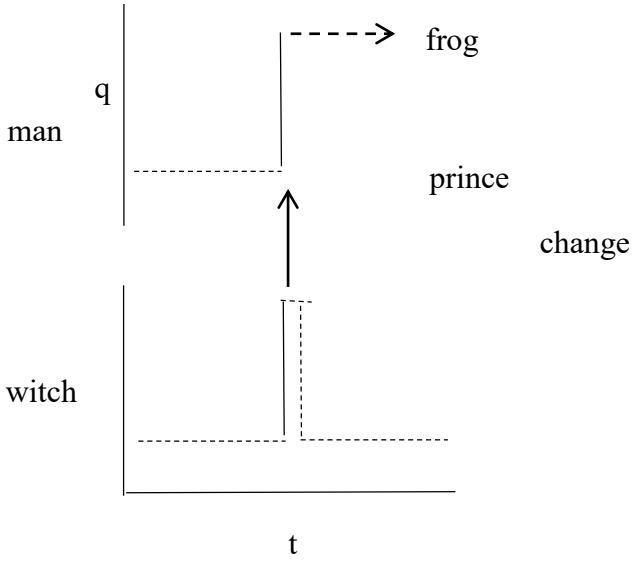


Figure 2.11: ***The witch changed the man from a prince into a frog.***

If a transitive Change event progresses gradually rather than instantaneously, the affected participant's aspectual contour remains similar to that in Figures 2.8 and 2.9, with a vertically sloped line rather than straight vertical line. The aspectual contour of the initiator, however, is not that of a semelfactive, but of an indirected activity. This is represented by a zigzagged line which does not change along the qualitative dimension. That the initiator causes the change throughout this entire activity is represented by vertical lines at both the beginning and end of the activity line, as in Figure 2.12.

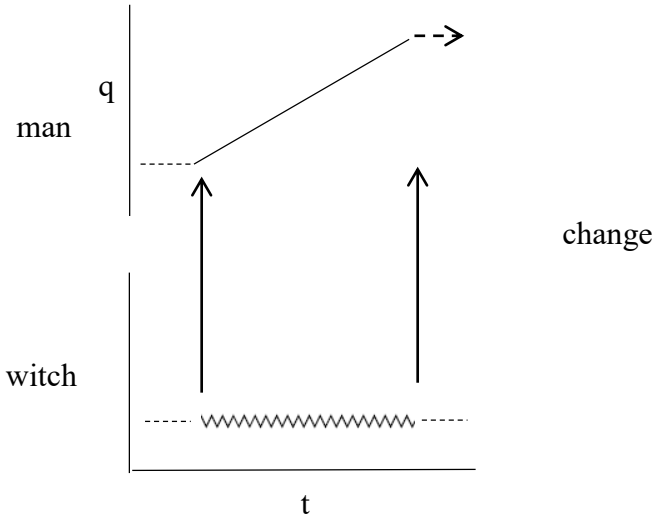


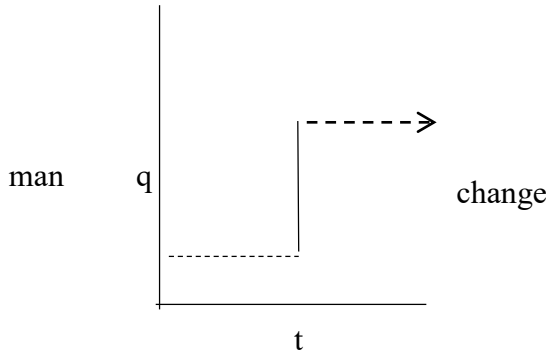
Figure 2.12: ***The witch (gradually) changed the man into a frog.***

It is not entirely how a certain type of Change event, namely those in which the activity of changing things is a habitual property of the initiator, is represented in Croft's framework. Such events are denoted by sentences such as (2.53).

(2.53) The witch (always) changes men into frogs.

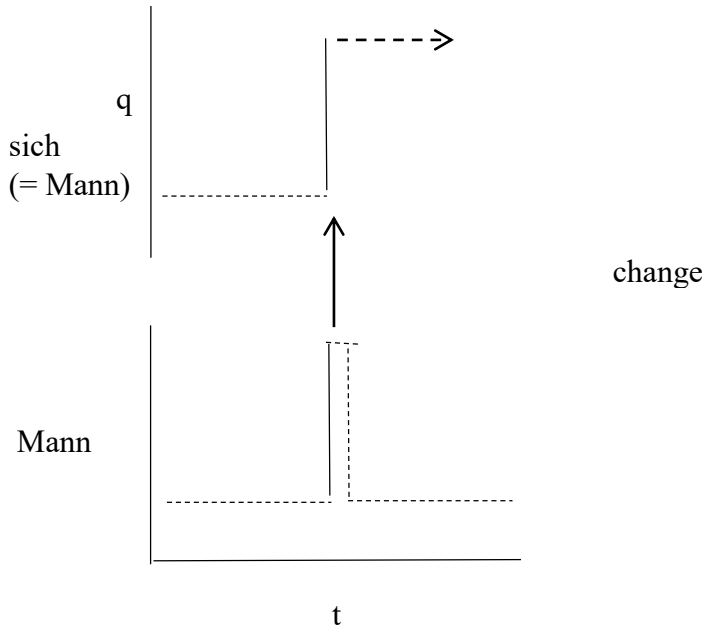
Here, the lower contour of the initiator is again that of an activity, with a zigzagged line. However, there is no one specific affected entity, but multiple generic ones. This makes it difficult to represent the contour of the affected participant(s) straightforwardly.

One notable cross-linguistic difference between German and English involves changes in which no initiator is mentioned. In English, these are simple intransitive events as in Figures 2.5-2.9. With many German change verbs, however, the pattern is transitive: the entity undergoing change is realized both as the subject (as in English) and as an accusative reflexive pronoun. Thus the German expression *Der Mann änderte sich* would be literally translated as *The man changed himself*. This difference may be captured in Croft's approach by positing different representations. For these sentences, with no initial or end state specified, the English variant is identical to that in Figure 2.5, while the German variant involves contours for two participants, similar to the English transitive forms.



The man changed.

Figure 2.13: English intransitive Change events



Der Mann hat sich geändert.

Figure 2.14: German reflexive Change events

This summary of how Change events are represented in Croft (2012) shows that the same verb (*change*) can be used for events with a very wide range of aspectual and causal properties. Croft's system is able to capture a number of properties of Change events, such as the permanence of a change or whether it proceeds gradually or instantly. It also clearly connects the actions/situations of the various participants in transitive event types, and can account for (at least one) difference(s) in argument realization across German and English. One question about Croft's approach arises from the lack of detail given to the qualitative dimension of his representations. For one, the labels used to describe features on the qualitative dimension (e.g. states, manner) are sometimes overtly expressed as sentential arguments but other times are not, and Croft does not offer a clear explanation of this. Furthermore, the contour in Figure 2.5 for *The man changed* (in the permanent change reading) is identical to that found above for *The window broke*, with the semantic difference only specified by writing the verb in prose on the right hand side. This is probably not a problem if the aspectual contour alone can account for relevant aspectual-grammatical properties of these verbs. However, if sets of verbs with this same aspectual contour but different qualitative (frame) semantics behave differently from each other with respect to aspectual-grammatical behavior, then a more detailed representation of the semantics of the

qualitative dimension will be desired. The analyses in Chapters 5-7 engage these questions by comparing the argument realization behavior of sets of verbs with closely related meanings (and thus probably with closely related aspectual/event structures), in order to determine the extent to which the approaches reviewed here capture the full range of behavior within verb classes.

2.5. SUMMARY AND CONCLUSION

In this chapter, I introduced the main concepts and methods of research on argument realization and verb classification. I also reviewed three broad approaches to verb classification and the syntax-semantics interface and showed that existing approaches based on alternations, case roles, and aspect, do not account for the full range of syntactic and semantic behavior of near-synonymous verbs. Here, I summarize the discussions of the previous sections, before presenting three more cognitive and usage-based approaches to verbal syntax and semantics: Frame Semantics, Construction Grammar, and Valency Grammar.

After beginning this chapter with a general overview of the field, Section 2.2 introduced Levin's (1993) alternation-based verb classification approach, which groups verbs together when they participate in the same set of argument structure alternations, such as the causative-inchoative or benefactive alternation. I then exposed several shortcomings of her approach, including semantic and syntactic heterogeneity of verbs within her classes, vague semantic definitions of her classes, and a lack of empirical corpus data. Another problem arises because Levin (1993) does not use some relevant alternations as classification criteria, leading to syntactic differences among verbs of the same class. Finally, there is no clear structure among Levin's numerous classes, making it difficult to say how verbs with slightly overlapping meanings are related to each other.[55]

In Section 2.3, I described how case roles (theta roles, semantic roles) have been used to account for argument realization and verb classification. I showed how traditional case role approaches such as Fillmore's (1967, 1968) Case Grammar, which seek a minimal list of 'primitive' roles cannot adequately account for the full range of verb-argument behavior. The

[55] In the next chapter, I describe how Frame Semantics overcomes these issues by offering a purely semantic classification of verbs and documenting their syntactic (i.e. alternating) behavior based on corpus data. Construction Grammar also takes a different view of alternations and instead posits that each syntactic pattern is independent (i.e. not a member of an alternation pair) and has its own semantic and pragmatic properties. Valency Grammar emphasizes that very few, if any, sets of verbs exhibit the same range of syntactic or valency behavior and thus refutes the existence of uniform verb classes.

desire that case roles be few and completely independent of one another leads to vague or contradictory role definitions which do not capture the rich semantics that individual verbs supply to their arguments. Another problem for traditional case role approaches involves 'context dependence,' which describes how certain role combinations are extremely frequent while others are impossible or implausible, such as the combination of Location, Theme, and Source. Furthermore, Tesnière's (1959) distinction between (required) arguments and (optional) adjuncts, which was important for the establishment of Case Grammar, was shown to be gradient rather than polar. Finally, the assumption in traditional case role theories that a verb (sense) is only associated with one set of case roles is undermined by the existence of argument structure alternations, in which a verb may appear with a different array of semantic roles. I also discussed the limitations of offshoots of Case Grammar principles, specifically Dowty's (1991) proto-roles and Van Valin's and LaPolla's (1997) generalized semantic roles, which only abstractly describe a role's semantics and only deal with the realization of subject and direct object.[56]

Event-structural approaches to verb classification and argument realization were discussed in Section 2.4. These approaches (as exemplified by Rappaport Hovav and Levin 1998) overcome several issues with traditional role-based approaches by defining arguments with respect to their position in a verb's event structure. In this approach, a verb's meaning is decomposed into a grammatically relevant and an idiosyncratic portion. The grammatically relevant portion, the verb's "event structure," is defined in terms primitive predicates describing aspectual and causal facets of the event described by the verb, while the verbal "root" is assumed to not factor into argument realization. This discussion concluded by citing data and research showing that verbal roots may be more grammatically relevant than is frequently assumed. Finally, Croft (2012) was discussed to demonstrate a fully developed theory of verb meaning and argument realization. While this approach is indeed promising for integrating key insights from event-structural and cognitive approaches to the syntax-semantics interface, it also focuses on broad generalizations of argument realization and cannot adequately account for subtle

[56] In Chapter 3, I show how Frame Semantics posits a highly specific set of semantic roles that are specified for individual semantic frames, and thus not restricted by the requirement of a highly general role list that applies to all verbs. Furthermore, research on Construction Grammar has shown that semantic roles are associated not only with verbs, but also that grammatical constructions can be described according to the semantic role fulfilled by their individual arguments.

grammatical differences among verbs within the same verb class. Having shown the complications with these traditional approaches to the syntax-semantics interface, Chapter 3 presents Frame Semantics, Construction Grammar, and Valency Grammar and discusses how they provide more adequate methodologies and frameworks to account for both idiosyncrasies and generalizations among semantically related verbs.

Chapter 3: Frame Semantics, Construction Grammar, and Valency Grammar

3.1. FRAME SEMANTICS

This section introduces Frame Semantics (Fillmore 1985, Fillmore and Baker 2010) and its related online database, FrameNet (Ruppenhofer et al. 2010). After describing the theory's motivations, assumptions, and applications, I discuss its central concepts and their documentation in FrameNet, using data from English Change verbs. I then contrast Fillmore's Frame Semantics with the approaches presented in the previous chapter, namely Levin's (1993) alternation-based approach, Case Grammar, and aspectual approaches such as Croft (2012), in order to elucidate its advantages over these theories. Finally, I point out several shortcomings of Frame Semantics and FrameNet and propose possible solutions to these.

3.1.1. Background and introduction to Frame Semantics

Although Fillmore (1982, 1985) is the most prominent American scholar to apply the concept of frames to linguistic analysis, the theoretical concept was formulated in various ways by earlier scholars (see Busse 2012 for a historical overview). A common theme in each of these scholars' works is that human cognitive processes and mental concepts cannot be analyzed in isolation from social and cultural factors. Instead, humans refer to their previous experiences in order to understand new (linguistic) symbols. These experiences are not viewed as concrete events recalled in their entirety, but rather as schematic representations of commonalities between similar concepts and events. Such representations are referred to as frames, scripts, or schemas, among other terms, but each expression signifies generally the same idea.[57]

While early work on frames was generally limited to the fields of psychology, computer science, and the social sciences, Fillmore (1982, 1985) pioneered the application of frames to linguistic analysis. In particular, Fillmore emphasized that interlocutors can only properly use and understand linguistic items when they have knowledge of the socially-defined characteristics of the frame that these linguistic items evoke:

[57] Busse (2012) provides a detailed description of early formulations of the frame concept and its integration into Fillmore's Frame Semantics.

> A word's meaning can be understood only with reference to a structured background of experience, beliefs, or practices, constituting a kind of conceptual prerequisite for understanding the meaning. Speakers can be said to know the meaning of the word only by first understanding the background frames that motivate the concept that the word encodes. (Fillmore and Atkins 1992: 76-77).

The earliest formulations of Frame Semantics referred to the rich encyclopedic knowledge necessary for understanding culture-specific concepts, and thus corresponded to the contemporaneous explosion of cognitive research on themes such as prototypes (Rosch 1973), mental spaces (Fauconnier 1994), and other cultural aspects of linguistic knowledge (Lakoff 1987). Fillmore (1982) presents a number of conceptually and culturally rich words and describes the detailed background knowledge their understanding requires. The word *weekend*, for instance, requires the understanding of a time division of seven ordered days, in which the final two days are not used for work but leisure. One cannot understand this word without reference to notions such as *week*, *work day*, and the ordering of days.

In the course of its development, Frame Semantics shifted its focus away from representing the rich encyclopedic knowledge required for understanding, and instead increasingly concentrated on how speakers refer to frames and their associated participants in concrete linguistic utterances, particularly with respect to verbal valency.[58] The basic idea behind this is fairly straightforward. Individual senses of words and multiword expressions are said to be lexical units (LUs), which evoke specific frames. Each frame is associated with a certain number and type(s) of participants, called Frame Elements (FEs). When a frame-evoking LU is used in a sentence, the associated FEs often appear as concrete arguments, which are specific instantiations of the FE in question. The `Cause_change` frame, for instance, refers to situations in which an AGENT changes an ENTITY from an INITIAL_CATEGORY to a FINAL_CATEGORY, and these four entities are (some of) the FEs associated with the frame.[59] This frame is evoked by verbs such as

[58] See Ziem (2008) for a more detailed discussion of how Frame Semantics developed from a culture-oriented to a grammar-oriented theory. This increased focus on "grammatically relevant" aspects of meaning is also characteristic of many of the approaches introduced in Chapter 2, such as the division of word meaning into a structural and idiosyncratic component in event-structural argument realization approaches.

[59] In accordance with the standard practice, FrameNet frame names are in Courier New font and FrameNet FE names are in small caps. I do not use these font styles when I refer to verb classes or semantic role labels that differ from those in FrameNet.

alter and *change*, nouns such as *change* and *transformation*, and adjectives such as *modified*. The pairing of a frame-evoking LU with FEs in actual language use is exemplified in (3.1), in which the verb *turn* evokes the `Cause_change` frame to describe a changing event.

(3.1)	The witch	turned	the man	into a frog
	AGENT		ENTITY	FINAL_CATEGORY

One aim of Frame Semantics is the facilitation of claims about how frames interact with argument realization. The data here show that, with the verb *turn*, the AGENT, ENTITY, and FINAL_CATEGORY FEs of a `Cause_change` scenario can be realized as Subject NP, Object NP, and Oblique *into* PP, respectively. Furthermore, frames are hierarchically organized by means of various relations. The `Cause_change` frame, for instance, is inherited by the `Change_event_time` and `Exchange_currency` frames and stands in a Causative_of relation to the `Undergo_change` frame.

FrameNet (Fillmore and Baker 2010, Ruppenhofer et al. 2010)[60] is an online lexical database which documents a wide variety of frame-semantic and syntactic information for the English lexicon. The "Frame Description" page offers a brief description of the frame and its related FEs, a description of the frame relations it has with other frames, and a list of LUs which evoke the frame. Each LU is linked to a "Lexical Entry" page, which includes a brief definition of the LU and a comprehensive description of how individual FEs are realized syntactically, based on annotated sentences from the British National Corpus (BNC) which are found on the "Annotation Report" page. Finally, the Frame Grapher tool provides graphic visualizations of (hierarchical) relations between individual frames.[61] As of February 2016, FrameNet has documented 13,465 LUs in 1,216 frames. In the following sub-section, the aforementioned theoretical concepts (frames, LUs, FEs, and frame relations) are described in more detail with reference to how FrameNet documents English LUs, particularly verbal LUs of the `Cause_change` and `Undergo_change` frames.[62]

[60] http://framenet.icsi.berkeley.edu

[61] The FrameNet Frame Grapher can be viewed at the following URL: https://framenet.icsi.berkeley.edu/fndrupal/FrameGrapher

[62] For more on the workflow of FrameNet, see Baker et al. (2003), Johnson et al. (2003), Petruck et al. (2004), Boas (2005b), and Ruppenhofer et al. (2010).

3.1.2. FrameNet classes, Frame Elements, Lexical Units, and the FrameNet hierarchy

3.1.2.1. Frames and Lexical Units

One of the main contributions of FrameNet is a classification of the English vocabulary according to lexical (frame) semantics. Individual frames are defined on "Frame Description" pages through brief, schematic frame definitions in English prose, which describe the relations that hold among the individual (core) FEs. For example, the definition of the `Undergo_change` frame given in (3.2) serves as an example (Ruppenhofer et al. 2010).[63]

(3.2) An **ENTITY** changes, either in its category membership or in terms of the value of an **ATTRIBUTE**. In the former case, an **INITIAL_CATEGORY** and a **FINAL_CATEGORY** may be expressed, in the latter case an **INITIAL_VALUE** and a **FINAL_VALUE** can be specified.

LUs (i.e. frame-evoking senses of verbs, nouns, adjectives, and phrasal items) are categorized as LUs of the same frame when they meet various requirements, such as involving the same number and types of FEs, profiling the same set of FEs, and entailing the same aspectual properties and presuppositions, among others (Ruppenhofer et al. 2010: 9f.). These requirements lead to relatively fine-grained classes, which often put two verbs in different classes which could also be viewed as being in the same class. For instance, while *steal* involves identical aspectual properties and similar argument types to *take*, it is put into a different class because of semantic differences, such as the inference that the agent is committing a wrongdoing (which is not available to the verb *take*). Furthermore, many lexemes may evoke different frames when used in different grammatical contexts. The practice in FrameNet is to posit multiple lexical entries for these verbs, one for each frame evoked. For instance, the verb *change* is listed as a LU in of several frames, as it evokes the `Cause_change` frame (*She changed him*), the `Undergo_change` frame (*He changed*), and the `Replacing` frame (*She changed diapers*), among others. Finally, FrameNet classes do not rely on alternating behavior as a main criterion for classification, unlike Levin (1993). The dramatically different criteria for verb classification in FrameNet and Levin (1993)

[63] As described below, the Undergo_change frame differs from Cause_change in that it is not associated with an AGENT or CAUSE which brings about the change, thus only covering intransitive uses of Change verbs. The bold-faced words in the frame definition are core Frame Elements, which are essential for the understanding of the frame, as defined below. The FrameNet data discussed in this dissertation correspond to the state of FrameNet in fall 2015. As the FrameNet team continues to add to the database, some FrameNet data may have changed from the state described here.

often lead to (sometimes radically) different classifications in the two approaches, as discussed in more detail in the following subsection.

3.1.2.2. Frame Elements and Frame Element relations

The "Frame Description" page also provides detailed information about each of the FEs associated with the frame. The FEs are also defined in English prose and (often) include an annotated example sentence for demonstration, as shown in (3.3) for the FE INITIAL_CATEGORY in the `Cause_change` frame:

(3.3) **INITIAL_CATEGORY [inic]**
Defintion: The category that the Entity belongs to before it undergoes the change.
Example: The vicar CHANGED **from a professional clergyman** into an anti-ecclesiastical activist.

Certain FEs are also associated with a specific semantic type, such as "Animate" or "Physical_object," which constrains the type of entity that can instantiate this FE in a sentence. This does not apply to any of the Core FEs of the `Undergo_change` frame, suggesting that these FEs are neutral with respect to the ontological type of phrases which instantiate them. In the `Theft` frame, however, the PERPETRATOR FE is of the type "Animate," as only animate entities can commit an act of theft.

There are a number of important distinctions and relations between FEs. One such distinction is that between core and non-core FEs (Ruppenhofer et al. 2010: 19f.). Core FEs are essential for the understanding of the frame, and frames are set apart based on their characterization of core FEs. For instance, the varying presuppositions of *take* and *steal* mentioned above are reflected in the names of the FEs: the more generic AGENT and THEME of the `Taking` frame are defined as PERPETRATOR and GOODS in the `Theft` frame, respectively. Non-core FEs, on the other hand, specify the background or setting for the event described by the frame and are typically adverbial in nature. They do not provide essential information or participants to the scenario denoted by the frame, and they do not set it apart from other frames. Non-core FEs are also further sub-classified into peripheral FEs, such as TIME, PLACE, or MANNER, and extra-thematic FEs, such as ITERATION (e.g. *twice*) or CONTAINING_EVENT (e.g. *while driving*).

A further construct for the characterization of FEs is that of a core(ness) set. Two or more FEs are said to form a core set if they have "an informational and conceptual interdependence" (Ruppenhofer et al. 2010: 21), i.e. if the two FEs can be viewed as specific instantiations of a more broadly defined participant. In many cases, the occurrence of one member of a core set in a given utterance may render the expression of the other member(s) optional or even ungrammatical.[64] Ruppenhofer et al. (2010: 21) describe the FEs SOURCE, PATH, and GOAL with motion predicates as specific instantiations of a more general "Full Path" role. The sentences in (3.4) show that various combinations of the individual members of this core set can be realized in individual sentences.

(3.4) a. He walked [$_{\text{Goal}}$ to the store].
b. He walked [$_{\text{Source}}$ from his house] [$_{\text{Goal}}$ to the store].
c. He walked [$_{\text{Path}}$ on the sidewalk] [$_{\text{Source}}$ from his house] [$_{\text{Goal}}$ to the store].

In the `Undergo_change` frame, ENTITY and ATTRIBUTE form a core set, which accounts for the interchangeability of sentences such as (3.5)-(3.6).

(3.5) [$_{\text{Entity}}$ Her face] turned red.
(3.6) [$_{\text{Attribute}}$ The color of her face] turned red.[65]

Two other relations account for the co-realization of FEs. The Excludes relation precludes the expression of one of its FE members if the other is realized. The Requires relation holds when one FE of a frame requires the realization of another FE. Although this is not documented in the `Undergo_change`, it is conceivable that the INITIAL_CATEGORY FE requires a FINAL_CATEGORY FE, thus prohibiting ungrammatical sentences such as that in (3.7).[66]

(3.7) *[The man $_{\text{Entity}}$] changed [from a frog $_{\text{Initial\_category}}$].

---

[64] In Section 7.2, I discuss how the relations between members of core sets complicate the delineation of valency constructions.

[65] While a native speaker informant questioned the grammaticality of this example, a search of the Corpus of Contemporary American English reveals a parallel example: *and their color will have turned a deep, lustrous scarlet*. (COCA)

[66] The actual FE-relation information on the FrameNet website is somewhat unclear. It not only does not account for this proposed Requires relation, but posits questionable relations as well. See Section 5.2 for more details.

Having discussed how FEs serve to define a semantic frame, I now move on to address how FrameNet documents the valency behavior of English verbs (and other LUs) in terms of the syntactic realization of Frame Elements.

3.1.2.3. Valency data in FrameNet

At present, FrameNet and Frame Semantics do not posit explicit linking rules governing the mapping between FEs and grammatical functions. However, FrameNet provides a wealth of empirical lexical data about the realization of FEs in corpus sentences. Most LUs in FrameNet are linked to an "Annotation Report" page, which lists all of the FEs which are realized with the LU in question, along with several (generally between 10 and 20) sentences containing the LU from the BNC, annotated by color-coding each of the (core) FEs. An annotated corpus sentence with the verb *change* in the `Undergo_change` frame is provided in (3.8).

(3.8) As [$_{\text{Entity}}$ it] *CHANGED*$^{\text{Target}}$ [$_{\text{Initial\_category}}$ from mob gambling town] [$_{\text{Final\_category}}$ to corporate gaming venue], […] (FN)

Data from the annotation report is summarized in two tables found on the "Lexical Entry" page. The first of these, a table called "Frame Elements and Their Syntactic Realizations," lists each FE occurring in the data, its number of occurrences, and each of its realization patterns (pairing of grammatical function and phrase type; e.g. NP.Ext stands for subject noun phrase). Table 3.1 shows a portion of this data for *change* in the `Undergo_change` frame.

Frame Element	Number Annotated	Realization(s)
Attribute	(3)	INI.-- (1) NP.Ext (2)
Cause	(1)	PP[with].Dep (1)
Circumstances	(1)	Sub.Dep (1)
Degree	(3)	AVP.Dep (3)

Table 3.1: Portion of Frame Element Realization Report for *change* (`Undergo_change`)

The first column of the table lists the FE, the second lists the number of times it was annotated in the annotation data, and the third column lists the phrase type and grammatical function it appears in within each annotated sentence (along with the number of times it was annotated with this phrase-type/grammatical function combination). For example, third row of the table, for instance,

indicates that the CAUSE FE was annotated one time, and that it appeared as a dependent prepositional phrase headed by *with*.

The second type of data on the "Lexical Entry" page is the Valence Patterns table, which lists each documented combination of FEs, grammatical functions, and phrase types, along with the number of sentences annotated with this configuration. A portion of this table for *change* in `Undergo_change` is given in Table 3.2.

Number Annotated	**Patterns**				
1 TOTAL	Attribute	Final_category	Initial_category	Manner	
(1)	NP Ext	DNI --	DNI --	AVP Dep	
1 TOTAL	Attribute	Value_range			
(1)	NP Ext	INI --			
1 TOTAL	Cause	Degree	Entity	Final_category	
(1)	PP[with] Dep	AVP Dep	NP Ext	DNI --	

Table 3.2: Portion of Valence Pattern Report for *change* (`Undergo_change`)

Each Frame Element configuration (FEC) is linked to the annotated sentence(s) which contain(s) the constellation, thus clarifying the relation between the report tables and the annotated sentences. For instance, the first FEC in Table 3.2 comes from the sentence in (3.9). The ATTRIBUTE FE *this* is the nominal subject (NP.Ext) and the non-core MANNER FE *quickly* is also annotated as an adverbial phrase. The INITIAL_CATEGORY and FINAL_CATEGORY FEs are omitted under Definite Null Instantiation, described in more detail in the following paragraph, because the initial and final states of the changed entity can be inferred from context.

(3.9) Though the two cities remained unlinked by rail, [$_{\text{Attribute}}$ this] was about to *CHANGE* [$_{\text{Manner}}$ quickly]. [$_{\text{Final\_category}}$ DNI] [$_{\text{Initial\_category}}$ DNI] (FN)

Often, core FEs are "null-instantiated" and not overtly realized in sentences. Based on Fillmore (1986), FrameNet posits three different types of null-instantiation: Constructional null-instantiation (CNI) applies when the FE is omitted according to general constructions of the language which require its omission, such as the omission of active subject in passive contexts.

When FEs are omitted in situations outside of those covered by general constructions of the language, they are interpreted as either definite null-instantiation (DNI) if they can be recovered through context or as indefinite null-instantiation (INI) when they are interpreted generically and need not be mentioned in the discourse. For instance, the omitted object of *win* in *We won*, is DNI because a specific contest is understood in the context, but the omitted object of *We ate*, is INI because the ingested food is generic and need not apply to a specific entity.[67]

Although Frame Semantics makes no overt generalizations about the mapping of arguments to syntactic functions, FrameNet's rich empirical data on argument realization facilitates the formulation of accurate linking rules. Scholars such as Boas (2006, 2008, 2011a), Dux and Boas (2011), and Gotsoulia (2012) have exploited this data to get a better picture of the relation between the frame-semantics of LUs and FEs and their syntactic behavior.

3.1.2.4. Frame-to-frame relations and the Frame Grapher

Finally, FrameNet has identified a variety of relations which hold between frames in order to account for how individual frames relate to one another. One of the most important of these relations is the Inheritance relation. The daughter frame of an Inheritance relation involves the same set of FEs as the mother frame, but they are more semantically specific and have more restrictions. For instance, the `Cause_change` frame is inherited by the `Change_event_duration` frame, which is evoked by LUs such as *extend* or *cut short*. The more general ENTITY FE of the mother frame is substituted with the more specific EVENT FE in the daughter frame, because it is restricted to events and not semantically general as with `Cause_change` predicates, as shown in the following examples.

(3.10) a. She changed {the length of the meeting/her address/her boyfriend}.
b. She extended {(the length of) the meeting/*her address/*her boyfriend}.

Two other frame relations help to capture the alternating behavior of related predicates. One such relation, which is particularly relevant for the Change verbs discussed here, is the Causative-Inchoative relation. This relation accounts for the similarity between frames which involve an entity undergoing a change without explicit mention of a cause or agent and those in which the

[67] Ruppenhofer and Michaelis (2014) claim that the interpretation of omitted arguments is predictable from the frame evoked by the target LU. See Ruppenhofer et al. (2010:24-26) for more on null-instantiation within FrameNet and Lyngfeldt (2012) for a richer classification of null-instantiation types.

causing agent is expressed. The Undergo_change frame thus stands in an Inchoative relation to the Cause_change frame.

(3.11) a. She changed him into a frog. (Cause_change)
b. He changed into a frog. (Undergo_change)

The Causative-Inchoative relation thereby captures the alternating behavior of Change verbs, albeit in a rather different way than Levin (1993).[68]

The Perspective_on relation also accounts for some cases in which similar FEs appear in different syntactic functions. This relation holds when two frames involve the same types of FEs but differ in their relative profiling. For instance, the Theft frame (*steal*, *swipe*) and the Robbery frame (*rob*, *mug*) stand in such a relation: they both involve a PERPETRATOR taking GOODS from a VICTIM, but Theft predicates profile the GOODS FE as direct object, while Robbery verbs profile the VICTIM, as in (3.12).[69]

(3.12) a. She stole a wallet from the man.
b. She robbed the man of his wallet.

Other frame relations include Using, in which one frame refers to another frame but does not involve the same FEs, Precedes, in which frames form a chronological sequence, and Subframe, in which lower-order frames refer to phases within a superordinate frame.[70] The Frame Grapher tool on the FrameNet website provides visual hierarchies which show the frame relations for a given frame. Figure 3.1 shows a portion of the FrameNet hierarchy surrounding the Cause_change frame. The thick gray lines signify Inheritance relations, while the dashed black lines signify Using relations.

[68] Levin (1993) posits a single lexical unit (verb sense) which may occur in either of the variants, whereas FrameNet posits separate lexical units of each verb, one for each syntactic context, because the events in the two variants differ semantically and are thus seen as evoking distinct semantic frames.
[69] In Chapter 7, I discuss the relations between the Robbery and Theft frames, as well as their syntactic properties and implications for verb classification.
[70] See Petruck (2004), Ruppenhofer et al. (2010: 73f.), and Fillmore and Baker (2010) for more on frame-to-frame relations.

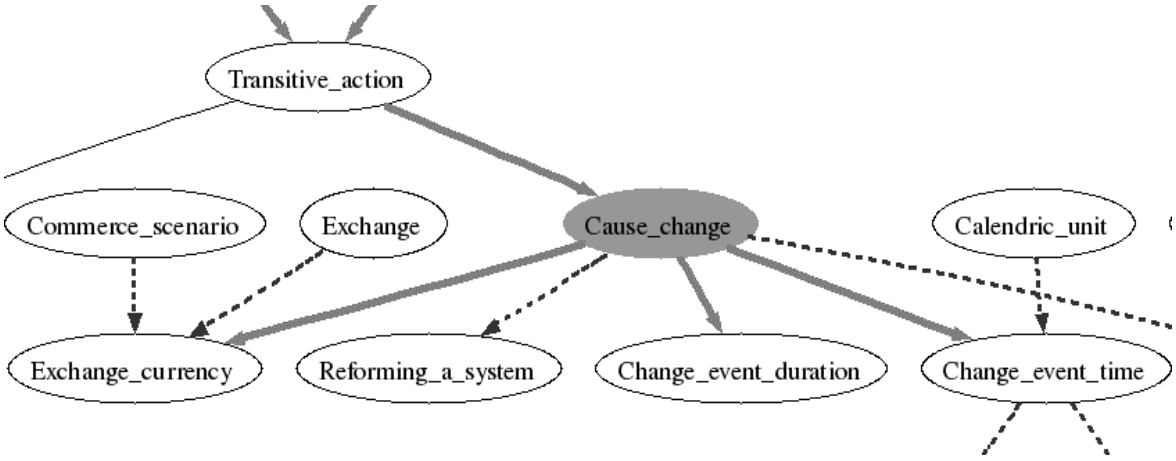


Figure 3.1: Frame hierarchy surrounding `Cause_change` frame

Having described how the theory of Frame Semantics is implemented in FrameNet to provide a detailed frame-semantic characterization the English lexicon, I now compare and contrast Frame Semantics and FrameNet differ from the approaches discussed in Chapter 2.

3.1.3. Comparing Frame Semantics to other approaches to the syntax-semantics interface

3.1.3.1. Frame Semantics and Levin (1993)

Two factors lead to radical differences between FrameNet and Levin's (1993) classes. The first of these is the main criteria for verb classification: while Levin uses alternating behavior as the main classification criterion, FrameNet relies solely on frame-semantic criteria. While Levin's *Turn* class is quite semantically uniform and similar to the corresponding FrameNet classes, other Levin classes are significantly less homogeneous with respect to verbal syntax. For instance, Levin's *Steal* verbs include verbs which do not necessarily have a "wrongdoing" interpretation, such as *take* or *withdraw*. In FrameNet, the `Theft` class only contains LUs with this meaning component and identifies separate frames for those without it (e.g. *take* is in the `Taking` frame, while `Theft` inherits from `Taking` and `Commiting_crime`). As such, there are significantly fewer verbal LUs in FrameNet's `Theft` frame than in Levin's *Steal* class.

The second major difference between the two approaches involves their treatment of verbal polysemy, i.e. the ability for a single verb to describe different event types. Levin takes a "lumping" approach to polysemy, as she often posits a single lexical entry for verbs with multiple senses (e.g. when a verb participates in two variants of an alternation). FrameNet, on the other hand, takes a "splitting" approach by positing separate lexical entries (one lexical unit for each frame) when a verb can be used to evoke multiple frames. This leads to important differences in

the classification of Change verbs in the two approaches. Many (but not all) of these verbs refer to two different scenarios, one in which an entity changes without reference to a cause for the change, and one in which a cause is explicitly mentioned. FrameNet views these two senses as evoking two different semantic frames, the former being the `Undergo_change` frame and the latter `Cause_change`. The verbs *change* and *turn* are associated with both frames, while the verb *make* only evokes the `Cause_change` frame.

(3.13) a. She {changed/turned/made} him into a frog.
b. He {changed/turned/*made} into a frog.

FrameNet accounts for this behavior by positing two LUs for *turn* and *change*, one for each of the two frames in question. The similarity between *make* and these verbs in the transitive (`Cause_change`) context is captured by including *make* as a LU of this frame. Their differing behavior in the other context is captured by only including *turn* and *change* in this class.

Frame	**LUs**
`Cause_change`	*change, turn, make, ...*
`Undergo_change`	*change, turn, ...*

Table 3.3: Lexical Units of the `Cause_change` and `Undergo_change` frames

FrameNet's employment of the "splitting" approach leads to an interesting difference from Levin's *Turn* class, which is defined by a verb's ability to appear in alternations such as the Causative-Inchoative alternation in (3.12). Because *make* only appears in the Causative variant (`Cause_change` pattern) and thus does not undergo the alternation, it cannot be included as a *Turn* verb in her classification. The reliance on alternating behavior in Levin's approach therefore cannot account for the similarity of *make* to other Change verbs in contexts such as (3.12a) above.[71]

Despite FrameNet's apparent disregard for alternating behavior in verb classification, FrameNet classes are not always more syntactically diverse than Levin classes. As shown above, Levin's *Turn* class includes verbs which appear in both the Causative and Inchoative patterns, as well as some verbs which only appear in one of these (e.g. *alter* typically only appears in

[71] See Baker & Ruppenhofer (2002) and Boas (2006, 2011a) for more on how the classifications in Levin (1993) and FrameNet differ.

Causative variants). FrameNet, however, posits finer-grained classes and thus ensures that LUs of the same class have the same number and types of arguments (FEs). While the FEs are typically arranged in the same syntactic configuration for a given frame, Frame Semantics does not explicitly state this.[72] Fortunately, FrameNet provides rich, empirical corpus data in the form of annotated sentences and valency reports, thus facilitating the formulation of accurate linking rules (see Dux and Boas 2011). Furthermore, FrameNet provides various tools to account for alternations in the form of frame relations and FE relations.[73]

3.1.3.2. Frame Semantics and semantic roles

In Section 2.3, I demonstrated that traditional semantic role-based approaches to argument realization encounter problems, most of which are due to pre-theoretical assumptions about semantic roles (SRs) and SR lists which limit their number and the types of analyses they may be subject to. For one, the assumption of a small set of role labels applicable to all verbs makes it difficult to determine exactly which role an argument bears. The view that SRs are unanalyzable primitives precludes the comparison of documented similarities between different roles. Finally, the assumption of a one-to-one correspondence between roles, arguments, and grammatical functions, does not stand up to data showing a single argument bearing multiple roles, multiple arguments bearing the same role, or a single role being realized in different ways across predicates. Here, I discuss how Frame Semantics takes a radically different view of semantic roles by abandoning or reformulating these assumptions.

Because Frame Semantics developed primarily out of traditional role-based approaches, particularly Case Grammar (Fillmore 1967, 1968), it focuses on predicate-argument structure and implicitly views LUs as predicators which provide empty slots to be filled by arguments (FEs). However, Frame Semantics differs from traditional approaches due to a strong influence from Cognitive Linguistics, which emphasizes the importance of real-world and cultural/social knowledge for language and the need for a comprehensive and non-modular grammar, as opposed to the syntax-centric approaches characterizing most research on the syntax-semantics interface.

[72] Although FrameNet posits different frames for Change verbs depending on whether they appear in transitive/causative contexts or in intransitive/inchoative contexts, it does not posit different senses based on other alternations such as the double object alternation. For instance, only one LU is posited for *give* in the Giving frame, even though it may realize a RECIPIENT FE as either a first object or as a (*to*) PP.

[73] In Section 3.2, I describe how Construction Grammar takes a different view of alternations, in which alternation variants are analyzed as independent (but often related) constructions that are semantically compatible with the same verbs.

Frame Semantics therefore recognizes the rich variety of situations which speakers encounter and speak about and the difficulty of categorizing this variety into a small set of roles. Frame Semantics posits numerous frames and even more numerous roles in the form of FEs, to account for the detailed encyclopedic knowledge that speakers rely on in language production and understanding. As cognitive approaches reject the existence of unanalyzable syntactic primitives, Frame Semantics defines its FEs with respect to (real-world) semantic frames and the relations they bear to other participants in the frame. Frame Semantics can thus analyze relations between FEs and accounts for these by means of frame relations and FE relations.

Traditional Case Grammar (e.g. Fillmore 1967, 1968) relies on a small set of abstractly defined roles such as Agent, Patient, Location, and Source.[74] The participant roles for predicates denoting Taking situations such as *take* or *steal*, for instance, include the one who takes, the object that they take, and the original location of the taken object. In traditional role-based approaches, the arguments for both verbs would be labeled Agent, Patient, and Source, respectively. However, Frame Semantics acknowledges that Theft events differ from general Taking events in several respects: the Agent commits a wrongdoing, the Source may be either a person or a location, and the Goods do not belong to the Agent. These additional implications associated with Theft events are captured in Frame Semantics by positing different frames and sets of FEs for the two predicates. *Take* is listed in the `Taking` frame, with generically defined FEs AGENT, THEME, and SOURCE, which lack further semantic specification, thus corresponding to the general meaning of *take*. On the other hand, *steal* is listed in the `Theft` frame, which inherits FEs from the `Taking` frame but defines them in more detail as PERPETRATOR, GOODS, VICTIM, and SOURCE, thus capturing the more specific situation of stealing vs. general taking. Because FEs are defined in more detail than traditional roles, they are more descriptive and empirically testable, but apply to smaller subsets of the verbal lexicon. However, FEs are connected across frames through frame relations, thus enabling a comparison of similar roles across verb classes. For instance, comparing the THEME of `Taking` with the GOODS of `Theft` reveals that both typically appear as nominal direct objects in active sentences, as in (3.14).

[74] Recall that I only employ the fonts and styles for FrameNet terms and concepts (e.g. writing FEs in small capital letters) when I refer directly to the FrameNet resource and its formulation of frames, lexical units, and FEs, but I do not employ the styles when referring to such concepts that are not defined in FrameNet.

(3.14) a. Pat took [the purse $_{\text{Theme}}$] from Sam.
b. Pat stole [the purse $_{\text{Goods}}$] from Sam.

3.1.3.3. Frame Semantics and aspectual approaches

Little work has been done explicitly comparing Frame Semantics to aspect-based approaches such as Vendler (1957) and Croft (2012). While Frame Semantics does not explicitly refer to aspectual properties, the methodology for categorizing LUs into frames seems to specify that all LUs of a frame exhibit the same aspectual behavior. Specifically, Ruppenhofer et al. (2010: 10) state that "in aspectually complex frames, the lexical units should all entail the same set of stages and transitions." Often, frame relations account for aspectual correspondences between frames. Petruck et al. (2004), for instance, describe how the Causative_of and Inchoative_of relations have been integrated into FrameNet to capture such correspondences. This relation results in the classification of Change verbs into two frames: `Cause_change` LUs involve an agent which carries out an activity leading to a change of state in the patient, whereas `Undergo_change` LUs do not involve this activity of an agent.

However, it is not clear that FrameNet sufficiently accounts for all types of verbal aspectual behavior, such as the notion of aspectual potential observed by Croft (2012; see Section 2.4.2), in which a verb may exhibit different aspectual types in different contexts. For instance, Change verbs may behave like achievements in which the change is sudden (3.15a) or like accomplishments with a run-up activity gradually leading to a change (3.15b).

(3.15) a. After hearing the news, he instantly turned into a better person. (Achievement)
b. I am gradually turning into an old man. (Accomplishment)

At present, it is unclear whether all verbal LUs of the `Cause_change` and `Undergo_change` frames can appear with the same range of aspectual types and thus have the same aspectual potential. If this is not the case, the question arises as to whether new frames should be posited to achieve greater uniformity with respect to aspect.

A further shortcoming of Frame Semantics' account of verbal aspect is the lack of an explicit representation of the temporal unfolding of the event specified by the frame. Osswald and Van Valin (2014) use data from Cutting verbs to argue that FrameNet classes do not systematically account for relations between frames, as it is limited by its empirical, bottom-up

approach. In particular, they point to the need for "a richer frame representation which systematically takes into account the inner structure of an event and thereby inherently captures structural relations between frames" (Osswald and Van Valin 2014: 125). In this respect, it appears that Frame Semantics would benefit from the integration of something like Croft's 3-d representation of aspect, which would help determine how to classify verbs into frames and to identify relations between frames of similar aspectual types.

On the other hand, it appears that Croft's approach could also be improved by integrating Frame Semantics more systematically into his representations. In Section 2.2.4, we saw how Croft's use of frame-semantic labels is rather idiosyncratic. This information comes differentially from the verb, from its arguments, or from the decomposition of verb meaning (i.e. into "core meaning" and "manner"). It is also unclear whether the set of frame-semantic labels in Croft's representations is infinite or limited, i.e. whether they are merely short-hand labels for real-world events or somehow primitive or universal. Finally, Croft does not embellish on the contribution of frame-semantic meaning to syntax, so it is unclear whether this information is grammatically relevant.

3.1.3.4. FrameNet and WordNet

Before moving on, I briefly mention another well-known English lexical resource that is comparable to FrameNet. WordNet (Miller et al. 1990, Gross and Miller 1990, Miller 1995, Fellbaum 1998, 2005, https://wordnet.princeton.edu) is an online database which organizes the English lexicon according to lexical relations (Lyons 1963, Geeraerts 2010: 80f.). A key organizational category of WordNet is that of a "synset," or a set of (near-)synonymous words.[75] These are defined using a simple gloss and most are exemplified with some example sentences. A polysemous lexeme may be listed in multiple synsets, one for each of its senses. Currently, WordNet documents 117,000 different synsets, including separate sets for nouns, verbs, adjectives, adverbs and function words.

Synsets are connected to one another by means of various relations, such as synonymy, entailment, meronymy, and hyponymy. Synsets containing verbs are linked in a hierarchical manner by means of the troponym relation (in addition to those just listed), whereby a more specific verb is a "troponym" of a more general verb with a similar meaning. For example,

[75] On the WordNet website, synsets are defines as "words that denote the same concept and are interchangeable in many contexts." (https://wordnet.princeton.edu/, accessed on 28 February 2016)

whisper is a troponym of *talk*, which is a troponym of *communicate*. Given this, WordNet is very useful for identifying which words may be substituted for one another and for establishing the richness of a word's meaning (its level of descriptivity in terms of Snell-Hornby (1983)) compared with other words. This will be demonstrated in Chapter 7, where I draw on WordNet data to establish the relative descriptivity levels of Change and Theft verbs.

At the same time, WordNet has some disadvantages that make it less useful for the present analysis. For one, it does not include any syntactic information, which is essential for a study of verb valency behavior. An important differences between this resource and FrameNet is that WordNet classifies words according to the relations that they have with one another, whereas FrameNet classifies words according to non-linguistic semantic frames. As such, WordNet is English-specific, as it relies on other English words for classification, which is not the case for FrameNet which relies on semantic frames that are not characterized using language-specific (i.e. English-specific) constructs. Another criticism of WordNet is that many words are listed in different synsets, but it is unclear what semantic difference is associated with the different synsets. As put by Hanks and Pustejovsky (2005: 66): "Closer inspection, however, shows that many of WordNet's senses are indistinguishable from one another by any criterion." For these reasons, I do not employ WordNet in this study, except to establish the relative richness of meaning of Change and Theft verbs in Chapter 7.[76]

3.1.4. Problems with Frame Semantics (and recent work)

While Frame Semantics promises greater advantages over alternation-based and traditional role-based approaches, it also encounters a number of shortcomings and can be accordingly improved to overcome these. In addition to the questionable treatment of verbal aspect just mentioned, Frame Semantics exhibits other methodological and empirical problems. One theoretical issue involves the evolution of Frame Semantics from its original formulation (Fillmore 1982, 1985) to its current implementation in FrameNet. Ziem (2008) points out that early work on frames stressed the importance of encyclopedic, experiential, and social knowledge in language use. This work emphasized the richness of frames and human experience and how individual lexical items are motivated by this experience. A capstone study in this regard is Fillmore and Atkin's (1992) analysis of the `Risk` frame, in which various concepts (i.e. the

[76] See also Baker and Fellbaum (2009) for more on the comparison of FrameNet and WordNet.

dangerous situation itself, the possible loss of something valuable, and the prize gained from enduring the risk) come into play and are highlighted by different lexical items. Since then, however, Frame Semantics has become increasingly grammar/syntax-oriented and focuses primarily on the "sentence frames" of traditional valency grammars rather than on rich cultural frames. As such, current frame-semantic analyses are typically limited to a single sentence and do not account for frames at a broader (e.g. discourse) level.[77]

This syntax-centric approach also has practical implications for FrameNet, which provides surprisingly sparse semantic information. The "Lexical Entry" page gives only a brief prose definition for its LU, which is often circular and refers to other LUs of the frame, making it unclear to what degree individual LUs perspectivize the frame, or organize the semantic space represented by the frame. For instance, the entry for the verb *transform* in the `Cause_change` frame reads "cause to have an altered nature," with words referring both to the frame name (*cause*) and another LU in the frame (*alter*). While frame descriptions in FrameNet provide somewhat more detail than LU definitions, they do not always explicitly state all apparently vital information for the frame or provide a systematic representation for it (as though this encyclopedic knowledge is taken for granted). However, it seems that, in many cases, relevant semantic information may be interpreted from other information such as FE labels and frame relations. For instance, the definition of the `Theft` frame[78] does not specifically mention possession or wrongdoing. However, it can be argued that this semantic information is implicitly provided, either embedded into the FE labels (PERPETRATOR, VICTIM) or derived from frame relations (i.e. Inheriting from both `Committing_crime` and `Taking`).

The elusive relation between lexicon and real-world scenarios also affects the formulation of verb classes in FrameNet. It is unclear exactly how similar an individual verb's arguments must be to the FEs specified for a given frame. Often, two verbs listed in the same frame have arguments of the same general type of, but which involve different semantic restrictions and entailments. For instance, while *modify* and *transform* are both in the `Cause_change` frame, they are associated with different types of changes: *modify* generally

[77] This shortcoming also relates to the methodological scope of FrameNet as a lexical database. Nevertheless, the theory of Frame Semantics can be applied to discourse analysis, as shoen in Ziem (2014).
[78] The definition of the Theft frame reads: These are words describing situations in which a PERPETRATOR takes GOODS from a VICTIM or a SOURCE. The MEANS by which this is accomplished may also be expressed (Ruppenhofer et al. 2010).

denotes relatively minor changes (of an attribute) while *transform* denotes a complete change (of an entity). In the `Theft` frame, the typical objects of *embezzle* and *misappropriate* are more restricted than the general GOODS FE of LUs such as *steal*, as they only apply to abstract financial property (Dux 2011). It is likely that there is no adequate solution to this problem, and one must find a balance between capturing every aspect of verb meaning and capturing a broader range of similarities between related verbs.[79]

Frame Semantics also falls short in its treatment of syntactic information. Most obviously, Frame Semantics does not offer any general linking rules which make broad-scale predictions about how FEs are mapped to syntactic functions. This is not an issue for FrameNet, as its stated purpose is solely descriptive and lexicographic, namely to document frame-semantic information on the English lexicon. However, Frame Semantics provides numerous tools which facilitate the formulation of linking rules, and much recent scholarly work is doing just this. Gotsoulia (2012) for instance, uses data from various "notion" frames to show how syntactic information can be linked to FrameNet frames and thereby capture similar syntactic behavior among different frames. Dux and Boas (2011) have also suggested that analyzing the FrameNet hierarchy and valency reports for individual LUs can give rise to linking rules which are more accurate than existing rules. Much work has focused on the relation between frames and syntactic constructions, leading to the integration of Frame Semantics and Construction Grammar, as described in the following chapter.

While the general principles of Frame Semantics lend themselves well to the description of syntactic information and the formulation of linking rules, the data provided by FrameNet leaves much to be desired. Despite its broad coverage, FrameNet has not yet documented all frames nor provided information for each LU of a given frame.[80] A greater difficulty arises in the breadth of syntactic data provided for the documented LUs. Most Valency Reports are incomplete and thus suggest that a LU occurs with a narrower range of FE configurations than it actually

[79] While all theories must posit generalizations at some level and overlook subtle differences in precise behavior at more detailed levels, it appears that FrameNet verb classes seek generalizations at a much finer-grained level than the verb classes based on alternations or aspectual / event structures introduced in Chapter 2.

[80] It is unlikely that full coverage will ever be reached, because language changes and new words are introduced every day.

does.[81] For instance, in the FE realization summary for *change* in the `Cause_change` frame (Table 3.1 above), the ATTRIBUTE FE is annotated three times, twice as an Indefinite Null Instantiation and once as a nominal subject. However, (3.16), taken from the Corpus of Contemporary American English, shows that this FE may also felicitously appear in a prepositional phrase headed by *in*.

(3.16) He was also correct in surmising that the old man might have changed *in appearance*. (COCA)

Although FrameNet annotated sentences are intended to represent the full range of patterns for a LU,[82] the current incompleteness of FrameNet valency data makes it necessary to conduct separate corpus analyses for each individual LU to gain a more complete picture of a verb's syntactic behavior.

Finally, there are various inconsistencies in the methodology for annotating sentences and formulating FE relations such as CoreSet or Excludes.[83] For instance, in the annotation for *transform* in the `Cause_change` frame, two sentences appear in passive voice, omitting the subject. The omitted (CNI) argument is labeled as CAUSE for one such sentence (3.17), but as AGENT for the other (3.18).

(3.17) [$_{\text{Entity}}$The embryo] has been *TRANSFORMED*$^{\text{Target}}$ [$_{\text{Initial_category}}$from a sphere] [$_{\text{Final_category}}$into a torus]; from a bun into a doughnut. **[$_{\text{Cause}}$CNI]** (FN)

(3.18) [$_{\text{Entity}}$The northern playground] is in the process of being *TRANSFORMED*$^{\text{Target}}$ [$_{\text{Final_category}}$into a communal garden] […]. **[$_{\text{Agent}}$CNI]** [$_{\text{Initial_category}}$INI] (FN)

Although the context suggests that the former sentence does not involve an external agent while the latter does, it seems that the annotators have taken some liberty in the interpretation of omitted arguments. The annotation of omitted CATEGORY or VALUE FE's is also unclear – when

[81] This is not an issue for the theory of Frame Semantics per se, but a result of methodological limitations in the FrameNet project.

[82] Boas (2010b: 8), for instance, claims that FrameNet entries provide "a summary of *all* valence patterns found with the lexical unit." (Emphasis added.)

[83] The issues with FrameNet discussed in the following paragraphs pertain to the characterization of FEs in the Cause_change and Undergo_change frames. In the analysis in Chapter 5, I overcome several of these problems by positing a simplified set of FEs that apply to both Change frames, presented in 5.1.1.2.

these are omitted one cannot clearly say whether the entity changes completely or merely in one attribute. While (3.19) shows the omitted arguments labeled as VALUES (e.g. change from a good society to a bad society), it is also possible to infer a change in CATEGORY interpretation (e.g. change from a society to an anarchy/dystopia).

(3.19) [$_{\text{Cause}}$The state] can (and does) *TRANSFORM*$^{\text{Target}}$ [$_{\text{Entity}}$society]. [$_{\text{Final_category}}$INI] [$_{\text{Initial_category}}$INI] (FN)

Such data suggest that FrameNet annotation procedures often rely on intuitive grammaticality judgments by annotators and thus are not entirely empirically justifiable.

There are also some questions regarding the FE-relations within the `Cause_change` frame. The only core set pair listed is that of {ATTRIBUTE, ENTITY}, which prevents the combination of arguments such as *the paper* and *the color of the paper* in a sentence. However, it seems that AGENT and CAUSE also form a core set which is not documented in FrameNet, as AGENT and CAUSE cannot felicitously appear in the same sentence.[84] Rather than formulating a core set relation between these arguments, FrameNet lists AGENT as a core Frame Element which "Excludes" the CAUSE argument. The CAUSE argument, however, is listed as a Core Unexpressed element without mention of any "Excludes" relation. At present, it is unclear why different mechanisms (core sets and Excludes) are posited to account for an apparently identical relation between two pairs of LUs (ATTRIBUTE/ENTITY and AGENT/CAUSE, respectively). These issues suggest that a more consistent methodology for annotating FEs and formulating FE-relations is desirable to document more systematically how Change verbs and their FEs are realized in corpus data.

This section described how Frame Semantics accounts for verb classification and argument realization and documents frame-semantic lexicographic information for the English lexicon in FrameNet. The comparison of Frame Semantics against related approaches suggested that it improves on alternation-based and traditional role-based approaches, but seems to fall short in the description of aspectual properties. FrameNet also exhibits areas that can benefit from more rigorous verb class studies, which may address the relative sparseness of semantic information,

[84] The complicated relationship between the Frame Elements discussed here could potentially be better explained by analyzing the roles themselves, as is the tradition in role-based approaches discussed in Section 2.3.

the absence of broad-scale linking rules, the incompleteness of FrameNet's coverage, and inconsistencies in annotation and FE-relation formulation. Throughout this chapter and in the analyses in the remainder of the dissertation, I show how a combination of frame-semantic concepts with other cognitively-oriented theories, particularly Construction Grammar and Valency Grammar may solve many of these issues.

3.2. CONSTRUCTION GRAMMAR

3.2.1 Construction Grammar: An introduction

In this section, I introduce Construction Grammar (CxG), which seeks to develop a comprehensive, monostratal account of all aspects of language from a cognitivist perspective (Goldberg 1995, 2006, Croft 2001, Boas and Sag 2012, Hoffmann and Trousdale 2013). There are many different types and applications of CxG, but each of these shares assumptions and methods that differ drastically from most research undertaken in the generative paradigm that characterized (American) linguistics in the second half of the 20th century. These include the view of all aspects of language in terms of Saussurean form-meaning pairings (i.e. constructions), the disregard for a separation of linguistic modules (e.g. semantics, phonology), and the goal of achieving a comprehensive and cognitively-grounded account of the entirety of language. CxG differs from previous accounts of syntactic patterns and alternations by emphasizing that every 'module' of language can be described in terms of constructions, or pairings of forms and meanings. Methodologically, Construction Grammar emphasizes the importance of natural language data and draws from other fields of cognitive science to address psycholinguistic questions of how language is acquired and organized mentally.

Among the various strands of CxG (described below), Goldberg's (1995, 2006) Cognitive Construction Grammar is of particular importance, as it deals specifically with the relationship between verbs and argument realization. A seminal example of the need for a CxG approach to argument realization is given in (3.20).

(3.20) Pat sneezed the napkin off the table.

The sentence in (3.20) is interesting because *sneeze* is an intransitive verb which does not take an object, yet it is completely grammatical (if somewhat humorous) in this transitive sentence with an *into* PP. Rather than positing an additional sense for *sneeze* to account for this meaning (e.g.

"cause to move by sneezing"), Goldberg's (1995, 2006) Cognitive CxG argues that syntactic patterns, more precisely configurations of arguments around a verb (here [NP V NP into N]), are meaningful in themselves. These "argument structure constructions," like any other linguistic structure, are form-meaning pairings that contribute to the meaning of the sentence. Specifically, the construction has the form [X verb Y off Z] and the meaning "X acts in the manner specified by the verb, and causes Y to move off of Z." This view that not only verbs, but also argument structure constructions, contribute to sentential meaning has led to fruitful research on the relation between verb meaning and syntax. After presenting the basic concepts of Construction Grammar and the shared goals and notions among its various implementations, I then introduce Goldberg's (1995, 2006) Cognitive CxG, its approach to argument realization, and various phenomena that complicate the characterization of argument structure constructions. Finally, I discuss recent research that integrates CxG with Frame Semantics.

CxG represents a break from syntacticocentric theories such as Government and Binding (Chomsky 1981), Minimalism (Chomsky 1993, 1995), Lexical-Functional Grammar (Bresnan 1982), or Categorial Grammar (Wood 1993), which focus primarily on formal descriptions of language competence (see Croft and Cruse 2004: 225f.). As such, it abandons many traditional assumptions and distinctions found in traditional generative grammar, such as that between *core* and *periphery*, *performance* and *competence*, and between various 'modules' of language (see Chomsky 1981). CxG differs from generative grammars in that it is comprehensive and non-modular, thus seeking to account for all traditional aspects of language (lexicon, syntax, semantics) without assuming there is an 'ideal' (*competence*) grammar which is somehow flawed in actual language performance (Chomsky 1965, 1986).[85] CxG is also non-reductionist: whereas generative approaches seek a minimal formalized representation of primarily syntactic phenomena with the goal of capturing language universals, CxG believes that linguistic descriptions must often be quite rich and detailed to account for actual behavior of linguistic material.[86]

[85]For example, Chomsky (1995: 20) claims that the purpose of the Principles and Parameters linguistic theory is "to focus on the core system, putting aside phenomena that result from historical accident, dialect mixture, personal idiosyncrasies, and the like."

[86] Croft and Cruse (2004: Chs. 9-11) offer a detailed account of CxG's development and its differences from traditional generative grammars.

CxG primarily developed out of analyses of various linguistic data which are not readily accounted for by traditional approaches. In traditional generative grammar, (argument structure) constructions are viewed as merely an epiphenomenon which result from lower-level, syntactic rules governed by universal principles and specified by language-specific parameters (Chomsky 1965, 1981; see also Boas 2013a). However, language is full of examples which are not clearly accounted for in such a view, as pointed out in detail by Fillmore et al. (1988). In particular, idiomatic expressions often have characteristics of both schematic syntactic and contentful lexical constituents. Various scholars have investigated non-core constructions such as the *let alone* construction (Fillmore et al. 1988) or the *What's X doing Y* construction (Kay and Fillmore 1999) and compared them with both core syntactic process such as subject-auxiliary inversion (*So will she / Where have you been*) and items traditionally belonging to the lexicon to show that there is a continuum from schematic constructions typically assumed to be strictly part of syntax, over idiomatic, partially-filled constructions, to fully specified lexical items. A small sample of different construction types of varying levels of specificity/abstraction are given in (3.21)-(3.24). The word construction in (3.21) is fully specified, containing only 'pre-determined' lexical material, the ditransitive construction in (3.24) contains purely unspecified schematic material, and the other two constructions include both specific lexical items and schematic slots.[87]

(3.21) word construction: apple [æpl]—'apple'

(3.22) idiom construction: e.g., *X take Y for granted*
[X TAKE Y *for granted*]—'X doesn't value Y'

(3.23) comparative construction: e.g., *John is taller than you*
[X BE Adj comparative *than* Y]—'X is more Adj than Y'

(3.24) ditransitive construction: e.g., *She gave Pat a cake*
[X VERB Y Z]—X causes Y to receive Z
(adapted from Hoffmann and Trousdale 2013b: 2)

[87] By positing constructions at all levels of language, CxG avoids the "rule-list fallacy" (Langacker 1987: Ch. I.A.2) found in most linguistic theories, whereby linguistic units must either be generated by abstract rules or stored in a list (i.e. lexicon).

As CxG accounts for the full spectrum of constructions found in language data, it does not separate syntax from semantics and pragmatics, or non-core constructions such as (3.22) from core constructions as in (3.24).

Because CxG deals with all aspects of language and its relation to human cognition, several versions of Construction Grammar have been formulated over the past decade, each with a different purpose and set of assumptions. The most popular rendition is Goldberg's (1995, 2006) Cognitive Construction Grammar, which seeks a cognitive, usage-based account of constructions. Radical Construction Grammar (Croft 2001) focuses on typological cross-linguistic work, Sign-based Construction Grammar (Boas and Sag 2012) attempts to formalize the properties of constructions, and Embodied Construction Grammar (Feldman et al. 2009) is employed in artificial intelligence. In this dissertation, I focus primarily on Goldberg's (1995, 2006) Cognitive Construction Grammar. Before discussing her theory in more detail in Section 3.2.3, I first describe some of the central notions that are shared by all flavors of CxG.

3.2.2. Principles of CxG

3.2.2.1. Definition of "construction" and formalization

Central to the definition and representation of constructions in CxG is Saussure's notion of the linguistic sign as a pairing of form and meaning (Saussure 1916). In CxG, every aspect of language ranging from phonemes to discourse patterns is described in terms of such form-meaning pairings. The original definitions of constructions in Goldberg (1995: 4) is as follows:

> "C is a construction iff$_{def}$ C is a form-meaning pair <F_i, S_i> such that some aspect of F_i or some aspect of S_i is not strictly predictable from C's component parts or from other previously established constructions."

This definition emphasizes the role of compositionality in identifying constructions. Specifically, constructions are only posited when a given linguistic form has a meaning that is not predictable from its individual parts, or vice versa. In this view, larger utterances such as sentences are not viewed as constructions of themselves, but instead as a combination of numerous lower-level constructions.

Recently, many Construction Grammarians have adopted a broader definition of constructions, given below, which includes frequent and entrenched linguistic units that may be

interpreted compositionally. This definition is in line with usage-based grammars which emphasize psycholinguistic notions such as frequency and entrenchment.[88]

> "Any linguistic pattern is recognized as a construction as long as some aspect of its form or function is not strictly predictable from its component parts or from other constructions recognized to exist. In addition, patterns are stored as constructions even if they are fully predictable as long as they occur with sufficient frequency." (Goldberg 2006: 5)

Constructions of all types are represented as such form-meaning pairings, as shown in Figure 3.2 and Figure 3.3.

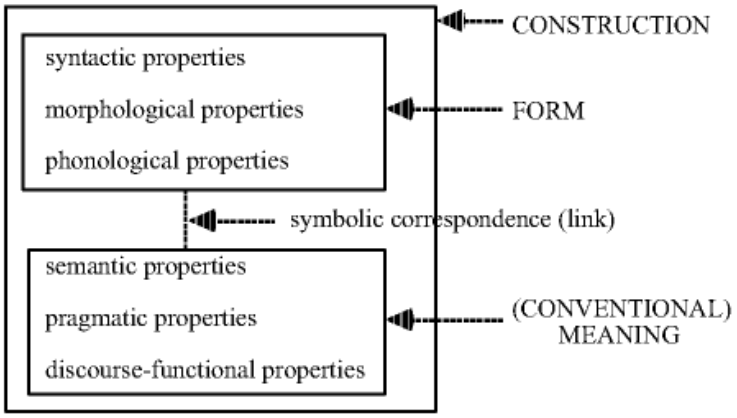


Figure 3.2: The symbolic structure of a construction (Croft and Cruse 2004: 258)

Figure 3.2 demonstrates the general structure of a construction – a pairing of form and meaning. The entire box represents the construction itself, the box on the top represents the form side of the construction and lists the types of information it may include, and the lower box represents the meaning side of the construction and lists the types of information associated with constructional meaning. The form and meaning portions of the construction are combined by a symbolic correspondence link. Figure 3.3 gives a cursory demonstration of the formal representation of constructions on the basis of the sentence *Heather sings*.

[88] Bybee (2013: 51) describes the motivation for this broadened definition of constructions: "From the broader perspective of usage-based theory, however, constructions can be viewed as processing units or chunks—sequences of words (or morphemes) that have been used often enough to be accessed together. This would mean that word sequences that are often used are constructions even if they do not have idiosyncrasies of meaning or form […]".

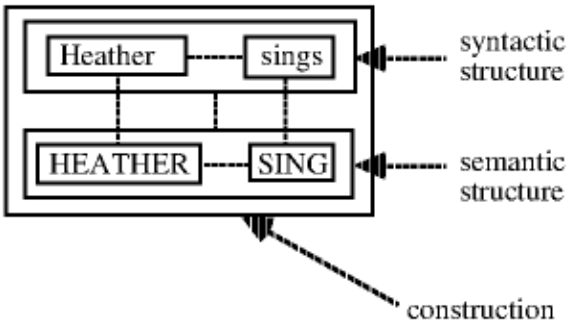


Figure 3.3: Constructional representation of the sentence *Heather sings* (adapted from Croft and Cruse 2004: 260)

Figure 3.3 shows how the sentence *Heather sings* and its corresponding interpretation are formalized in CxG. The form side of the construction (at the top) shows two smaller-level constructions that provide the individual lexical items for the broader construction, namely *Heather* and *sings*.[89] Each of these word-constructions also has a meaning side, represented by the lower boxes with the words HEATHER and SING (capitalized words represent the meaning typically associated with the word, e.g. the act of singing for SING). The two individual words are also grouped together, formally by the box containing both "Heather" and "sings" to represent the phonetic string when these two words combine into a sentence, and semantically by the box containing both HEATHER and SING to represent the interpretation of the sentence.

3.2.2.2. Construction Grammar, Usage-based Theory, and Corpus Linguistics

The cognitive orientation of Construction Grammar associates it closely with the related fields of Usage-based Theory (Langacker 1987, 2000; Kemmer and Barlow 2000) and Corpus Linguistics (Gries and Stefanowitsch 2004, Lüdeling and Kytö 2009, Gries 2013). One of the basic tenets of Usage-based Theory is that speakers learn, conceptualize, and produce language by means of more general cognitive processes (e.g. categorization, neuromotor automation) rather than an abstract language-specific apparatus independent of from the rest of cognition (i.e. the "language acquisition device" introduced by Chomsky 1965). More specifically, a speaker's linguistic knowledge arises by categorizing over the vast number of actual encounters with language. These concrete experiences with language are referred to as exemplars in usage-based

[89] A fully spelled-out formalization of this utterance would be much more complex, as the actual form of these constructions consist of all the individual phonemes of the words. These are taken as given in this figure, but are not formally represented for reasons of simplicity.

linguistics; a single utterance consists of numerous types of exemplars including phonetic, lexical, and syntactic characterizations of the utterance (among others). Upon repeated exposure to numerous exemplars, speakers identify similarities among the individual usage events and arrive at a more abstract characterization of them, resulting in (what linguists identify as) linguistic categories (e.g. phonemes, clause types, morphological processes).

This view of language is highly compatible with Construction Grammar, which assumes no distinction between grammar and lexis and emphasizes that utterances (or broader discourse segments) are built up out of the combination of numerous constructions types. More specifically, many constructions identified in CxG include both grammatical and lexical material, as well as both fixed and schematic elements. A prime example of this is the "drive crazy" construction (Boas 2003, Bybee 2013), represented in Figure 3.4.

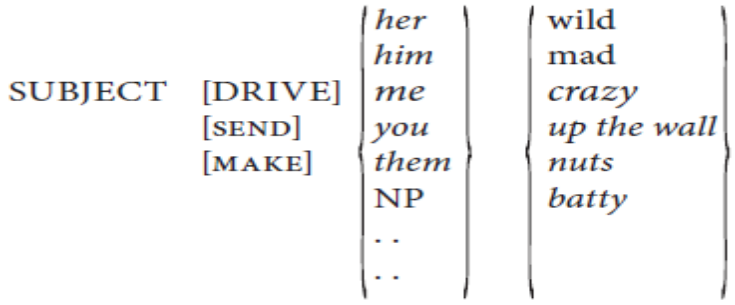


Figure 3.4: Fixed and schematic elements in the "drive crazy" construction (Bybee 2013: 61)

A usage-based approach is necessary to account fully for the interpretation and distribution of lexical items in this construction. For one, if speakers rely solely on minimal lexical entries and abstract syntactic processes, they would not be able to correctly interpret the sentence, as it does not involve any driving event or any motion at all. Instead, after repeated exposure to such utterances (exemplars), speakers learn to interpret the construction as a whole rather than as a composition of independent lexical items. Speakers also become aware that certain portions of the construction are highly restricted (e.g. the verb *drive*), that some are virtually unrestricted (e.g. the subject and object positions), and that some are only partially restricted (e.g. the resultative phrase must be *crazy* or a closely related concept).[90]

[90] In addition to synonyms of *crazy* such as *mad* or *up the wall*, Boas (2003) also identifies resultative phrases that are only indirectly related to the concept of "crazy," such as *to despertation* or *to suicide*.

Frequency also plays an important role in usage-based approaches to language and, consequently, in CxG. An important distinction is that between token and type frequency. Token frequency corresponds to overall frequency; with respect to constructions/exemplars, frequently-occurring morphemes (e.g. the *–ed* past tense marker) or sentences (e.g. *I don't know*) have high token frequency. Because speakers are exposed to these exemplars repeatedly (and at an early age), they are said to have a high degree of "entrenchment." Highly entrenched constructions are cognitively accessed as whole "chunks" rather than being interpreted based on their individual parts (Bybee 1985, Hay 2011). Entrenchment has been viewed as one of the driving forces of language change, as repeated exposure to and production of constructions lead to phonological reduction (e.g. *I dunno* for *I don't know*) and eventually to reanalysis, where the phonological string is no longer associated with the meanings of its original components (Bybee 1988, Tomasello 2003). Type frequency, on the other hand, "refers to the number of distinct items that can occur in the open slot of a construction" (Bybee and Beckner 2015: 841). Drawing on the "drive crazy" construction introduced above, the verb slot has extremely low type frequency as it is (nearly) always instantiated by a form of the verb *drive*, whereas the resultative argument slot has slightly higher type frequency, as it is instantiated not only by *crazy* but also related expressions. In contrast, a more general construction such as the Transitive Construction has extremely high type frequency, as a nearly infinite number of items can fill each of its slots. Type frequency correlates closely to the degree of productivity of a construction: constructions (or construction slots) with high type frequency are more likely to appear with novel types.

The relevance of type and token frequency for the nature of linguistic constructions has also led to the development and application of corpus linguistic methods within CxG (Gries and Stefanowitsch 2006, Gries 2013). As CxG strives for a comprehensive, empirically-grounded theory of language, the role of introspection in linguistic analysis is (slowly but surely) being replaced with more measurable data, specifically involving the statistical analysis of linguistic corpora. Of particular prominence are studies drawing on the method of collostructional analysis developed by Stefanowitsch and Gries (2003) and Gries and Stefanowitsch (2004), which are employed to determine the degree to which linguistic elements are attracted to one another. Specific applications of this method have suggested that the meaning of a construction often corresponds to that of the verb which most frequently occurs in the construction: such as *give* in the Ditransitive Construction or *put* in the Caused-Motion Construction (Gries 2003, Goldberg et

al. 2004). Corpus-based analyses also reveal subtle features of word behavior that native speakers are frequently unaware of.[91] For instance, such analyses show that specific verb types are more frequent in *try to do* vs. *try doing* type patterns (Wulff 2006, 2008) or reveal differences in which verbs British and American English speakers use in the "persuasion" construction (e.g. *He talked/provoked me into doing it*; Wulff et al. 2005). Corpus analysis thus allows for a more empirical identification of linguistic facts are either unidentified or untestable based solely on native speaker intuition.

3.2.2.3. Constructional inheritance networks

In order to account for the mental organization of the vast number of constructions language users must know, CxG argues that constructions exist at different levels along a continuum, ranging from those which are abstract, schematic, productive, and predictable on one end, to those which are specific exemplars/instances of these constructions and often exhibit idiosyncratic behavior that is not predictable from the higher-level construction. As such, a string of linguistic data (e.g. sentence, phrase, utterance) can be viewed simultaneously as a high-level or low-level construction, depending on the type of analysis. Positing constructions at different granularity levels is in line with usage-based, bottom-up approaches. Specifically, positing a continuum/hierarchy helps to avoid the "rule-list fallacy" (Langacker 1987: Ch. I.A.2), which assumes a strict division between abstract productive grammatical rules and lexical entries that list all idiosyncratic information.[92]

The existence of both high-level abstract constructions and low-level constructions accounts for both the creative use of novel combinations as well as for how children learn language. Specifically, high-level abstract constructions are necessary in the formation of novel structures. With respect to valency, a speaker must know that an abstract Caused Motion Construction exists in order to create the sentence *sneeze the napkin off the table*, and can use an intransitive verb without a "motion" sense (e.g. *sneeze*) in this pattern to make a novel utterance. Without knowing that an independent Caused-Motion Construction exists, speakers would be unable to productively use verbs in novel argument structure patterns. On the other hand, low-

[91] Despite these advantages of corpus-based research, introspection also has a place in linguistic investigation, as it may identify potential grammatically acceptable sentences that are not found in corpora.

[92] This strict separation of rule-based and list-based information in language is summarized in the following quote: "The lexicon is really an appendix of the grammar, a list of basic irregularities" (Bloomfield 1933:274).

level specific constructions form the basis for high-level constructions. Language users abstract over the similarities among individual exemplars, thus forming mental representations of higher-level abstract constructions. For instance, language users are exposed to many instances of Caused Motion in real language use (*drive X through Y; walk X into Y; bring X to Y; throw X across Y*, etc.). Upon repeated exposure, speakers recognize that regardless of verb the verbs in these patterns have Caused-Motion interpretation, so the pattern [A verbs X preposition Y] is associated with an abstract meaning and which can then be used productively. Such an approach thus accounts for both regularities and generalizations in language structure as well as creativity in language use.

Relations between constructions of various types and abstraction levels have been captured by means of a network-like hierarchical structure called, among other names, *inheritance network* (Hoffmann 2013: 312), *hierarchical lexicon* (Booij 2013: 257), *taxonomic hierarchy* (Croft and Cruse 2004: 199f.), and *inheritance hierarchy* (Goldberg 2013: 18). As constructions capture highly diverse types of linguistic structures, the exact form and content of hierarchies and their individual nodes will differ. Typically, the lowest end of the hierarchy includes actual linguistic utterances involving specific words and meaning(s), as in *She walked the dog into the park*. As one goes up the hierarchy, constructions have more schematic and abstract representations, such as configurations of phrase types (e.g. NP V NP into NP) that are associated with more abstract meanings.

To demonstrate, Figure 3.5 relates low-level idiomatic constructions such as [Sbj *kick the bucket*] as in *He kicked the bucket*, to the highly schematic "Clause" construction.

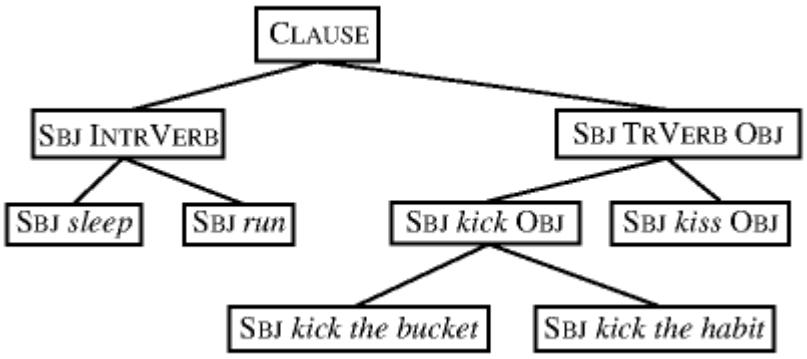


Figure 3.5: Hierarchy from *kick the bucket* idiom to general clause construction (Croft and Cruse 2004: 264)

At the lowest level are the idioms *kick the bucket* and *kick the habit*: these constructions are almost fully specified and only have one schematic slot for the subject. These idiomatic expressions are sub-types of a more schematic construction involving transitive uses of *kick*, which specify only the verb and have open slots for both the subject (kicker) and object (kicked item). This construction can then be viewed as a sub-type of a higher-level "Transitive Construction" which does not even specify the verb and is thus instantiated by any simple transitive utterance (*John ate food, Pat scrubbed the floor,* etc.). Even the completely unspecified Transitive Construction can be viewed as an instance of a higher-level "Clause Construction," which relates transitive and intransitive clause types (as well as others). Such hierarchies are not only possible for clausal and idiomatic constructions, but can be formulated for any type of linguistic data, such as morphological processes (Booij 2013) or idiomatic P-N combinations (e.g. *at work, in bed*; Goldberg 2013).

One of the key relations between individual constructions within the hierarchy is that of *inheritance*. Specifically, constructions at lower levels of the hierarchy inherit properties from higher-level constructions (see Michaelis 2012). In Figure 3.5, for instance, both the Transitive and Intransitive Constructions inherit from the more general Clause Construction. The Transitive Clause Construction is inherited by more specific constructions in which the verb position is filled by an actual verb (e.g. *kick, kiss*). These constructions have the same semantics associated with prototypical Transitive Constructions, namely that the Subject NP carries out an act specified by the verb onto the Object NP (e.g. Subject kicks Object). At the lowest level in Figure 1 are specific utterances which inherit the form of the verb-filled Transitive Construction, but have semantic interpretations which differ from these. The low-level *X kicks the bucket* construction, for instance, has the interpretation "X dies" rather than the expected "X kicks Y" meaning.

The description of the hierarchy in Figure 3.5 reveals that lower-level constructions do not inherit all formal and semantic properties of higher-level constructions, but instead are related by default inheritance rather than complete inheritance.[93] As such, lower-level constructions inherit by default all properties from higher-level constructions, but may specify differences from

[93] Goldberg (1995: 73-74) refers to this distinction in terms of normal mode inheritance vs. complete mode inheritance, following Flickinger, Pollard, and Wasow (1985). Lakoff (1985) refers to default inheritance as "inheritance with override."

the more abstract schema. As put by Booij (2013: 257): “By using inheritance as a default mechanism, we allow for individual - *able* adjectives [or concrete exemplars in general] to have idiosyncratic properties that differ from what is predicted by the schema.”

The actual content of constructions in the hierarchy can be represented in two ways. In the *impoverished entry* representation, the lower-level constructions only list properties which set it apart from higher-level constructions. In the *full entry* representation, all constructions contain all of the relevant information, even if it is redundant and can be predicted from higher-level constructions (Jackendoff 1975, Jurafsky 1992, Goldberg 1995: 74). Despite this redundancy, the full entry approach is cognitively more plausible, as speakers likely still associate low-level exemplars with the properties which characterize higher-level schemas (i.e. they still see them as instances thereof) (see Sag et al. 2003: Ch. 8, Booij 2013: 257).

Several different types of inheritance relations (or “links”, Goldberg 1995) have been observed in the literature, including polysemy links, instance links, subpart links, and metaphorical links. Polysemy links capture relations between constructions which share formal (syntactic) properties but vary subtly in their semantic interpretation (Goldberg 1995: 75f.). A prime example of constructions related by polysemy links is the set of English ditransitive constructions. The formal pattern [NP V NP NP] is interpreted slightly differently depending on the verb it occurs with, some examples of which as summarized in (3.25)-(3.27), modified from Goldberg (1995: 75).

(3.25) X causes Y to receive Z
Joe gave Sally the ball.

(3.26) X causes Y not to receive Z
Joe refused Bob a cookie.

(3.27) X intends to cause Y to receive Z
Joe baked Bob a cake.

Some sets of constructions related by polysemy links can be represented in terms of radial categories surrounding a prototype (see Lakoff 1987: 483–87). The various ditransitive constructions, for instance, all appear to modulate the meaning “X causes Y to receive Z” that is associated with verbs such as *give, hand,* and *pass,* among others. As such, this sense can be seen

as the "core sense" (Goldberg 1995: 75), and the individual constructions associated with specific modulations of this sense are related by polysemy links.

Another inheritance type is that of a *subpart link* (Goldberg 1995: 78-79), which accounts for cases in which one construction forms a proper subpart of another, independently existing construction. Such a link is posited to link to connect sentences involving the Intransitive Motion Construction (*The dog walked to the park*) with those involving the Caused Motion Construction *Pat walked the dog to the park*, as in Figure 3.6.

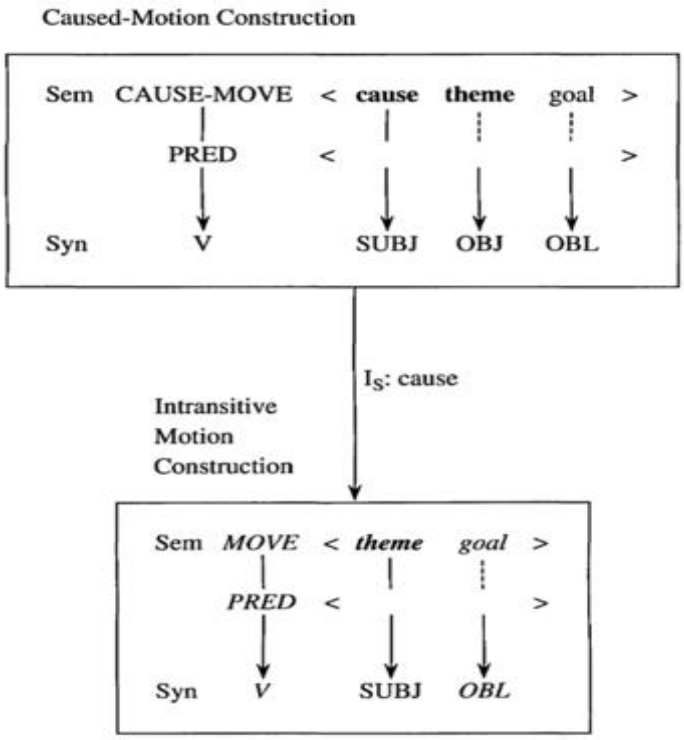


Figure 3.6: Subpart inheritance link between caused-motion and intransitive motion constructions (Goldberg 1995: 78)

The figure represents that the Intransitive Motion Construction is a subpart of (i.e. related through a subpart link to) the Caused-Motion Construction by connecting the representations of each construction (the lower and upper boxes) with an arrow marked "I_S: cause". This link captures the similarity of the constructions, namely that the two roles of the Intransitive Motion Construction (theme, goal) are also in the (Transitive) Caused-Motion Construction, as well as the differences between them, namely that the Caused Motion Construction also includes an additional cause role, which causes the theme to move to the goal.

The *instance link* (Goldberg 1995: 79) refers to cases in which one construction is a special case of another construction. The general Resultative Construction, for instance, can appear with a wide range of verbs and result states, as with (*shoot sb. dead, hammer sth. flat, wipe sth. clean*). However, there also exists a more specific type of resultative construction, the "*drive crazy*" construction, with more restrictions than the more general Resultative Construction. Specifically, the verb slot must be filled with the verb *drive*, the theme is an animate sentient entity, and the (goal) result phrase must be the word *crazy* or a related term (*bonkers, mad, to despair,* etc.). Here, the "drive crazy" construction is related to the broader Resultative Construction by an instance link.[94]

Finally, the *metaphorical link* (Goldberg 1995: 81) refers to cases in which one construction can be seen as a metaphorical extension of another construction. Goldberg (1995: 81f.) describes how the Resultative Construction is metaphorically linked to the Caused-Motion Construction. Specifically, the Caused Motion Construction involves a concrete locational goal, whereas the Resultative Construction involves a final state role that is a metaphorical extension of the goal of Caused Motion. The relatedness of these constructions can be seen in (3.28), which shows that the two constructions exhibit syntactic similarity but differ in their interpretation.

(3.28) She drove him to church. (Caused Motion; concrete locational goal)
She drove him to despair. (Resultative; abstract metaphorical state)

Having described the main concepts which unite various strands of CxG, I now discuss Goldberg's (1995, 2006) Cognitive Construction Grammar in more detail, as it deals explicitly with the combination of verbs and argument structure constructions, a main topic of this dissertation.

3.2.3. Constructional approaches to argument realization

3.2.3.1. Goldberg (1995, 2006): Argument structure constructions

Goldberg (1995, 2006) demonstrates how argument realization patterns can be viewed as constructions with meanings independent of the verbs they occur with. These constructions are called "argument structure constructions" (ASCs) and differ from other constructions in that they govern the syntactic realization of verbal arguments. Goldberg (1995: 3) defines ASCs as "a

[94] Boas (2003) provides a detailed treatment of both the general resultative construction and specific sub-constructions thereof, including the "drive crazy" construction. See Bybee (2013) for additional discussion.

special subclass of constructions that provides the basic means of clausal expression in a language." Well-established ASCs include the Ditransitive Construction (*She baked him a cake*), the Caused Motion Construction (*She walked the dog to the park*), and the *Way* construction (*We worked our way through the chapter*). Figure 3.7 demonstrates Goldberg's formulation of a particular ASC, the Resultative Construction, which is necessary to capture the acceptability of both "canonical" sentences such as *Pat wiped the table clean* and of more creative sentences such as *Pat sneezed the napkin off the table*.

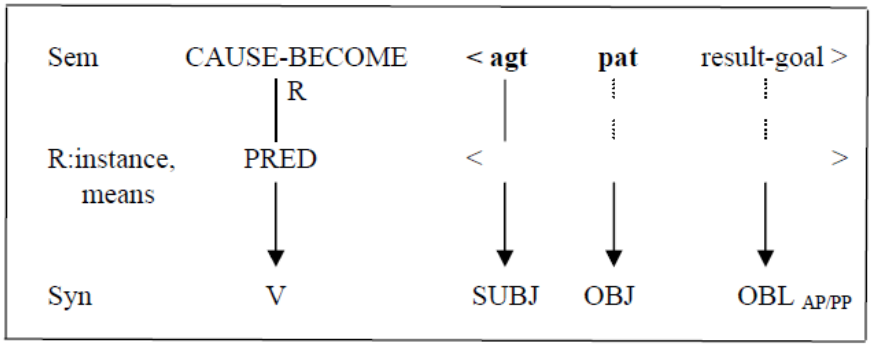


Figure 3.7: Formal representation of the Resultative Construction (Goldberg 1995: 189)

As with all constructions, ASCs are form-meaning pairings and are thus represented in Figure 3.7 with a mapping of a semantic side (on the top) and a syntactic side (on the bottom). The semantic side provides the meaning of the entire construction (CAUSE-BECOME; or more precisely *X causes Y to be in state or location Z*) as well as coarse-grained characterizations of the "constructional roles" it is associated with: Agent (agt), Patient (pat), and Result-Goal. The bottom portion of the figure shows the syntactic form of the construction and how each of the constructional roles maps to its syntactic form (Agent is subject, Patient is object, Result-Goal is an oblique adjectival or prepositional phrase).

To account for how constructions fuse with verbs, Goldberg posits (fairly minimal) verbal lexical entries such as those in (3.29).

(3.29) sneeze: < **sneezer** >
wipe: < **wiper** wiped >

These entries list the "participant roles" (arguments in traditional Case Grammar, core FEs in Frame Semantics) associated with the verb, with "profiled" participant roles marked in bold. Goldberg (1995: 44) defines a role as profiled if it is "obligatorily accessed and function as focal

points within the scene, achieving a special degree of prominence (Langacker 1987)." As such, profiled roles are more central to the verb's meaning (and often more obligatory) than non-profiled roles.

Returning to the description of Figure 3.7, the middle portion of the figure represents the fusion of constructional roles with verbal participant roles. The solid line connecting the Agent to the subject signifies that the verb occurring in the construction must have a profiled participant role that can fuse with the constructional role. The lines coming down from the other two constructional roles signify that the verb need not be associated with compatible participant roles; instead, the construction itself may supply the roles. The PRED and its related description in the left of the middle portion specifies that the verb occurring in the construction describes the means by which the more general CAUSE-BECOME semantics is achieved. Examples (3.30)-(3.31) demonstrate how the verbs *wipe* and *sneeze* combine with the Resultative ASC.

(3.30)	*Sentence*:	Pat	wiped	the table	clean.
	Cx roles:	Agt		Pat	Result-goal
	Verb roles:	**wiper**		**wiped**	--
(3.31)	*Sentence*:	Pat	sneezed	the napkin	off the table.
	Cx roles:	Agt		Pat	Result-goal
	Verb roles:	**sneeze**		--	--

In (3.30), *Pat* instantiates the Agent constructional role which fuses with the profiled "wiper" role of the verb and *the table* instantiates the Patient role which fuses with the "wiped" participant role. The Result-goal constructional role, however, does not correspond to a verbal participant role, because *wipe* is only associated with the two roles (wiper, wiped). Instead, this argument is supplied by the construction alone. The representation of the *sneeze* sentence in (3.31) differs only from that above in that the verb only supplies one participant role (the "sneezer") while the other two arguments are supplied by the construction.[95]

[95] The view that argument structure constructions have meanings and are independent of the verbs that occur within them calls into question Levin's alternation-based classification approach. Whereas Levin's (1993) methodology assumes that verbs occurring in a given alternation belong to a different semantic class than verbs which occur in only one or in neither of the alternation variants, Construction Grammar claims that the verb exhibits a different sense when used in one or the other construction. See also Dowty (2000), Baker and Ruppenhofer (2002), and Boas (2011a) for similar arguments for the independence of alternation variants.

To illustrate how constructions are sensitive to nuances in verb meaning, Goldberg (1995: 45f.) discusses the differing syntax of the near-synonymous verbs *rob* and *steal*. While both verbs describe scenarios in which a thief takes some goods from a 'target' (i.e. source or victim), the verbs differ in which argument is grammatically profiled. Goldberg claims that the grammatical functions of subject and direct object have higher prominence than obliques and that semantically profiled arguments of a verb appear in prominent syntactic positions. With *rob*, the victim of the theft event is profiled, because it appears in the prominent direct object position (3.32). With *steal*, the goods argument of the event is profiled as direct object (3.33). The non-profiled arguments appear in an oblique prepositional phrase which may be omitted.

(3.32) She robbed the woman (of her purse).
(3.33) She stole the purse (from the woman).

A closer analysis of the constructions in which these verbs occur reveals further semantic differences. Goldberg notes that the 'target' argument of *steal* may be an inanimate location, while that of *rob* must be animate (or at least sentient).[96]

(3.34) a. He stole money from the woman.
b. He robbed the woman.

(3.35) a. He stole money from the safe.
b. *He robbed the safe of its contents. (Goldberg 1995:48)

Furthermore, *rob* entails that the victim is negatively affected, while *steal* focuses on the fact that goods do not belong to the thief (see also Pinker 1989: 396f).

(3.36) a. He stole ten cents from me.
b. ??He robbed me of ten cents.

Using this and other data, Goldberg argues that the seemingly similar verbs *rob* and *steal* in fact exhibit semantic differences, which are reflected in the constructions they occur in. *Rob* profiles

[96] However, see Stefanowitsch (2011) for evidence that the animacy restriction of *rob* is not a strict rule but rather a tendency.

the ‘target’ while *steal* profiles the stolen goods. Goldberg represents this difference in the verbs’ lexical entries with profiled arguments given in bold-faced font:

(3.37) a. rob <**robber victim** goods >
b. steal <**stealer** source **goods** > (Goldberg 1995: 48)

Goldberg ties the verbs’ occurrence in different syntactic patterns to the way these two syntactic constructions differ in the construal of participants in the theft event. The profiled target of *rob* and the profiled goods of *steal* both occur in the profiled grammatical function of direct object, while the goods of *rob* and the target of *steal* are optional oblique phrases.

Goldberg (1995: 50) posits an important, yet highly debated, principle which governs the fusion of verbs and constructions. The Semantic Coherence Principle states that the specific participant role(s) of a verbal argument must be semantically compatible with the more general argument role(s) of the construction.[97] For instance, the construction occurring with *steal* has the argument role slots Agent, Patient, and Location, which can be fused with the stealer, goods, and source participants of *steal*, respectively. While the principle seems adequate for this specific case, scholars have argued that it is not informative enough to account for the full range of data (Iwata 2008, Boas 2011b, 2011c, Stefanowitsch 2011), referring to issues which suggest that the combination of verbs and constructions is not entirely predictable: partial productivity of constructions, constructional polysemy, and the granularity of constructional analyses. I now discuss each of these issues in turn.

3.2.3.2. Questions about the combination of verbs and constructions

Partial productivity refers to the phenomenon that, although a construction may appear with a particular verb, it does not always appear with semantically similar verbs (Barðdal 2008, Goldberg 1995: Ch. 5). Some constructions, such as the transitive construction, are highly productive in that they occur with a wide range of verbs, and with all members of semantically related classes of verbs, such as ‘cooking’ verbs.

[97] Goldberg (1995: 50) also posits a second principle, the Correspondence Principle, which states that all profiled participants of a verb must be expressed as an argument of the construction. The Correspondence Principle is a default principle, as it may be overridden when the construction’s function is to suppress prominent arguments (e.g. passive, middle constructions).

(3.38) a. She baked a cake.
b. She cooked a steak.
c. She simmered the beef.
d. She braised the beef.

However, many constructions are partially productive, as they only occur with a limited number of verbs. One such construction is the ditransitive (a.k.a. dative object) construction.

(3.39) a. She baked Mary a cake.
b. She cooked Mary a steak.
c. *She simmered Mary some beef.
d. *She braised Mary some beef.

Partial productivity raises problems for Goldberg's Principle of Semantic Coherence, as it is not strong enough to constrain the generation of sentences such as (3.39c)-(3.39d). The principle states that verb's participants must be semantically compatible with the construction, yet it is unclear that the semantics of *simmer* and *bake* are significantly different than that of *bake* or *cook*, so their unacceptability in the ditransitive is not accounted for by Goldberg's principle.

A second major topic in CxG research involves the notion of constructional polysemy. Many constructions exhibit different senses, often as variations on a central or prototypical sense (Goldberg 1995: 31f., Boas 2003, 2008b). For instance, although the ditransitive construction (Goldberg 1995: Ch. 6) has a central sense of a prototypical giving scenario (3.40a), the notion of giving/receiving is extended to 'intended future giving' (3.40b) or 'disallow giving' (3.40c) when it is used with different verbs.

(3.40) a. He gave me a pencil.
b. He promised me a gift.
c. He denied me entry.

Recent research has investigated how individual senses of a construction are related to one another and how verbs fall into classes according to the polysemy sense which arises when they are combined with the construction. Dowty's (1999) analysis of *swarm* type constructions or Michaelis and Ruppenhofer's (2001) analysis of the German applicative (*be-* prefix) pattern

demonstrate how the same syntactic frame may receive subtly different interpretations when combined with different verbs.[98]

The phenomena of partial productivity and constructional polysemy are likely best explained in a usage-based approach to language, as described in the previous sub-section. The notions of type frequency and entrenchment are of particular relevance for determining whether a verb may be used in a certain construction. Specifically, when a given verb is frequently used within a certain construction, verbs with similar meanings may also be used in the same context by analogy to the frequent example.

A third relevant discussion in the CxG literature involves the proper level of granularity at which constructional behavior should be analyzed. The argument structure constructions proposed by Goldberg (1995, 2006) are abstract, high-level constructions. Scholars such as Boas (2003), Croft (2003), and Iwata (2008) criticize Goldberg's abstract constructions for not properly accounting for their combination with individual verbs, as demonstrated in the discussion of partial productivity and Goldberg's principles. Drawing on data from the resultative construction (Boas 2003), ditransitive construction (Croft 2003), and locative alternation (Iwata 2008), these scholars argue that constructional analyses must proceed from the bottom up, identifying individual instances of constructions in combination with verbs. This approach falls in line with usage-based principles which emphasize the importance of low-level analyses of actual data.[99] In contrast to Goldberg's high-level argument structure constructions, these scholars claim that more fruitful analyses are possible at the level of medium-level verb-class-specific constructions or low-level verb-specific constructions (or "mini-constructions" in Boas's (2003) terminology). Figure 3.8 below shows how the ditransitive construction can be analyzed at various levels of granularity.

The lowest portion of Figure 3.8 shows instances (exemplars) of verb-specific ditransitive constructions, including specific verbs (*give*, *bake*) and nominal arguments. At the lowest level, the types of arguments may be more or less restricted depending on the verb (e.g. *bake* requires some baked goods as object, while *give* allows a much wider range of object types).

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[98] The following sub-section includes a discussion of how Boas (2010b) and Dux (fc.) appeal to frame-semantic verb classes in order to account for constructional polysemy.

[99] This view also aligns with work in Valency Grammar, which focuses on item-specific valency properties (described in detail in the Section 3.3).

Argument structure construction level:				
Ditransitive Cx:	Agent	Verb	Recipient	Theme
Medium (verb class) level:				
Giving:	Giver	{give/donate}	Recipient	Given Item
Cooking:	Cook	{bake/cook}	Recipient	Produced_food
Low (verb) level:				
give:	John	gave	Susan	a present.
bake:	John	baked	his friend	a cake.

Figure 3.8: The ditransitive construction at various levels of granularity

The middle rows represent verb-class-specific ditransitive constructions, with the classes of Giving and Cooking. Croft (2003) argues that the specific interpretation of the ditransitive is determined at this level, with verbs of Giving denoting actual transfer events (in which the recipient actually receives the theme) and verbs of Cooking associated with intended transfer events (while the agent intends for the recipient to receive the cake, it is not entailed that the recipient actually receives it). At the highest level is the abstract ASC (as in Goldberg 1995, 2006) which does not specify the verb (class) or the specific interpretation: this level is nevertheless necessary to capture novel uses of verbs in the ditransitive construction. Before discussing how CxG has been complemented with findings from Frame Semantics to address the aforementioned issues, I briefly describe how CxG research on argument structure compares with projectionist approaches relying on predicate decomposition and event structure templates that were discussed in Section 2.4.

3.2.3.3. Constructional and projectionist approaches to argument structure

The constructional approach to argument structure outlined above is frequently contrasted with the projectionist (i.e. event-structural) approaches (see Croft 2003, 2012: Ch. 9, Boas 2006, Levin and Rappaport Hovav 2005, Section 2.4).[100] The primary difference between these approaches is whether argument realization is attributed to verb-independent constructions or to the verb (more specifically, the verb's meaning). As discussed in Section 2.4, projectionist

[100] The distinction in these approaches has been defined as that between "constructional" vs. "projectionist" (Levin and Rappaport Hovav 2005) or as between "phrasal" vs. "lexical" approaches (Müller and Wechsler 2014). The intensity of this scholarly debate is demonstrated, for instance, by the publication of an entire issue of *Theoretical Linguistics* (2004, vol. 40, iss. 1/2) to a discussion of the two approaches.

approaches view argument realization behavior as a product of verb meanings, which are arrived at through predicate decomposition and defined using structured entries relying on primitive predicates such as CAUSE, BECOME, and ACT. In Rappaport Hovav and Levin's (1998) formulation, each verb is associated with a basic event structure template (i.e. a basic meaning) which, for certain template types, can be augmented thus allowing the verb to occur in argument structures (i.e. constructions) not associated with the basic template. This approach, for instance, accounts for why manner verbs such as *sweep* or *run* require only a single participant but can also appear in transitive, resultative, caused-motion, and other syntactic contexts, whereas result verbs such as *break* or *kill* (typically) require two participants and cannot be augmented and used in patterns such as the resultative or caused-motion.

In contrast, constructional approaches (as formulated by Goldberg 1995, 2006) view argument realization as a property of independently existing (argument structure) constructions. It is the construction that determines the number and syntactic realization of arguments, while the verb is associated with a minimal lexical entry specifying its meaning (i.e. its frame semantics) and associated participant roles. One motivation for the development of constructional approaches is the widespread and unpredictable nature of multiple argument realization, whereby a single verb may occur in multiple syntactic contexts. On a strict projectionist view, one must posit numerous senses of a verb (i.e. numerous event structure templates, either basic or arrived at through augmentation) to account for its occurrence in different syntactic contexts (e.g. *Pat swept, Pat swept the floor clean, Pat swept the leaves into a pile*). However, in most cases, sense proliferation is problematic because the scenario described by the verb is static across the different contexts and because it requires one to posit improbable senses (e.g. 'create something by sweeping', 'move something by sneezing'). This issue does not surface on a constructional view in which verb meanings are static and the realization and interpretation of arguments is determined by the argument structure construction.

Constructional approaches also overcome issues associated with three interacting assumptions that guide (traditional) projectionist approaches: that a verb's meaning is divisible into a grammatically relevant event structure and a "root" that is not grammatically relevant, that each verb is associated with a single "basic" event structure from a limited set of event

structures,[101] and that the event structure determines how the verb's arguments are projected (i.e. syntactically realized). If there are a small set of "basic" event structures that determine argument realization, then one would also expect there to be a small set of verb classes, with each verb of a given class exhibiting the same syntactic distribution. However, as shown in the discussion of partial productivity above, this is not the case. Even verbs with near-identical meanings (i.e. the same "basic" event structure) may differ in their precise options for argument realization. The assumptions above prohibit an accurate account of this behavior, which would require one to allow verbal roots to determine grammatical behavior, to posit a much larger number of event structure templates, and/or to recognize that event structure templates only determine a limited range of a verb's argument realization properties.

Indeed, more recent projectionist research has also recognized these issues and emphasized the need for more detailed descriptions of verb meaning, including encyclopedic real-world aspects of meaning (traditionally relegated to the grammatically non-relevant "root"). As discussed in Section 2.4, Rappaport Hovav and Levin (1998) discuss how a verb's root determines its basic event structure and its number of (required) arguments. Pinker (1989) posits "narrow range" rules to account for how fine-grained semantic features influence alternational and argument realization behavior. More recently, Beavers and Koontz-Garboden (2012) make a specific case that root meanings are relevant for other grammatical features such as sublexical scope. Although they approach the problem from a different perspective, these formulations of verb roots are not dissimilar to work in constructional approaches seeking to better understand issues such as partial productivity and verb classification (Boas 2003, Croft 2003, Nemoto 2005, Iwata 2008).

In recent years, scholars have increasingly appreciated the compatibility and complementarity of projectionist and constructional approaches to argument realization. Croft (2012: Ch. 9) clearly and succinctly points out that the major difference depends on whether

[101] Croft (2012: 191-192) also notes that the assumption of a basic sense conflicts with how we interact with language: verbs are always used in sentences which include argument structure properties, and, given multiple argument realization, each verb can be viewed as exhibiting a wide range of meanings. Therefore, a verb's basic meaning is essentially an abstraction over all of its uses in various contexts.

attributes multiple argument realization as a property of verbs or constructions, respectively.[102] This decision, in turn, depends on whether one denies or assumes the existence of grammatical constructions. And there is significant supporting evidence for their existence, including the polysemous nature of syntactic configurations (i.e. constructional polysemy; cf. Levin and Rappaport Hovav 2005: 189-190)), the inability to interpret certain (idiomatic) syntactic structures on the basis of general syntactic principles (Fillmore et al. 1988, Croft 2001), and further evidence from language processing and language acquisition studies (cf. Croft 2012: Ch. 9). As such, the present analysis assumes the existence of constructions and therefore eschews the assumptions associated with projectionist approaches, but also recognizes the compatibility of the two approaches and the need for detailed analyses of verb meanings and their interaction with arguments structure constructions. In the following, I discuss how Frame Semantics is employed to arrive at such detailed analyses.

3.2.3.4. Frame Semantics and Construction Grammar

In recent years, a rich body of research has investigated the extent to which CxG and Frame Semantics can be integrated to provide an even more comprehensive approach to linguistic description. Various questions which cannot directly be answered by CxG alone are better suited for approaches which combine these theories. As discussed in Section 3.2.3.2, such questions include why certain verbs but not semantically related verbs occur in a given construction (partial polysemy), how to capture similarities between verbs which 'force' a certain interpretation of a polysemous construction, how to represent inheritance relations among various constructions in a given language, and how to compare constructions across languages. Here, I discuss research showing Frame Semantics aids in constructional analyses of these problems.

The phenomenon of partial productivity is treated in detail by Boas (2008a), who attempts to account for the varying constructional behavior among `Self_motion` verbs by appealing to detailed frame-semantic properties of the verb and its arguments. One proposed solution is to identify specific entailments of a verb which allow it to appear in the construction. Boas proposes that `Self_motion` verbs may appear in the caused-motion construction when they entail that the SELF_MOVER is moving quickly and energetically (cf. *He jogged/*crawled*

[102] The compatibility of the two approaches is also evidenced by article titles such as "Lexical rules vs. constructions: a false dichotomy" (Croft 2003) or "Lexical and phrasal approaches to argument structure: Two sides of the same coin" (Boas 2014b).

her off the sidewalk). He also suggests that a verb's constructional behavior may be related to its semantic weight. Here, he appeals to Snell-Hornby's (1983) notion of verb descriptivity: low-descriptivity verbs have fairly general meanings, such as *walk* or *run*, while high-descriptivity verbs describe the situation in more detail, as with *wander* or *crawl* (see also Sections 6.1 and 7.1). In particular, Boas argues that low-descriptivity verbs occur in a wider range of constructions than high-descriptivity verbs. Dux (2011) observes similar behavior among verbs evoking the `Theft` frame, showing that high-descriptivity *shoplift* and *embezzle* appear in fewer syntactic patterns than lower-descriptivity *pilfer* and *swipe*.[103]

As discussed above, certain argument structure constructions may receive different interpretations depending on the verb they occur with. The examples in (3.25)-(3.27) above show that the ditransitive construction is polysemous, as it denotes a typical receiving event with *give*, a future receiving with *promise*, and prevented receiving with *deny*. Boas (2010b: 11) ties the notion of constructional polysemy directly to Frame Semantics, arguing that the polysemy of constructions results from their ability to combine with verbs of different semantic frames.

> "[…] each syntactic frame expressing a specific aspect of a lexical unit's frame-semantic meaning can be regarded as a grammatical construction. This means that each syntactic frame may be polysemous because it may be used to express the semantics of a broad variety of semantic frames […]" (Boas 2010b:11)

Research on such polysemous constructions (Goldberg 1995: 31f., Croft 2012: Ch. 9, Dux fc.) has recognized that semantically related verbs are often associated with the same sense of a polysemous construction, giving rise to verb classes that are defined according to the interpretation yielded when they combine with a given construction.

Dux (fc.) argues that classes may be identical to FrameNet classes, demonstrating that verbs evoking the same frame receive the same interpretation when appearing in a given construction (although verbs may differ in their ability to appear with the construction). For instance, other verbs of the `Giving` frame (*give, hand, pass*) each receive the prototypical

[103] The analysis in Chapter 7 builds on these verb-class-specific studies and compares the number and types of syntactic structures that occur with Change verbs, which have low descriptivity, and with Theft verbs, which have high descriptivity

receiving interpretation, and other verbs in the `Deny_permission` frame (*deny, forbid*) receive the 'deny receiving' interpretation.

(3.41) He {gave/handed/passed} me a football.
(3.42) He {denied/forbade} us entry into the building.

Ruppenhofer and Michaelis (2010, 2014) also show the usefulness of FrameNet classes for predicting/disambiguating polysemous senses. In particular, they demonstrate that when a FE of a given frame is left unexpressed in an utterance, it will consistently receive either a definite or an indefinite interpretation, but not both. Such findings suggest that FrameNet classes are not merely sets of semantically related verbs, but also have predictive power in various phenomena at the syntax-semantics interface, particularly when paired with principles from CxG.

Another goal of CxG research is the identification and documentation of the set of constructions existing in English and the interrelations between these constructions. Fillmore et al. (2012) demonstrate how findings about English constructions can be represented in a "Constructicon," which has a very similar structure to FrameNet. Table 3.4 summarizes the parallels between the two resources as they are discussed by Fillmore (2008) and Fillmore et al. (2012).

FrameNet lexicon	‚Constructicon'
Lexical entries: description of frame elements (= valency pattern/semantic roles), frame-to-frame-relations, annotated examples	Constructional entries: description of (i) constructional elements (= syntactic components/functions), (ii) meaning of the construction, (iii) the position in the network
Frame elements = semantic roles in a frame	Constructional elements = syntactic functions
Examples illustrate lexical units in context	Examples illustrate constructional units in context
Illustration of frame-to-frame-relations and inheritance links in a network	Illustration of relations to familiar constructions and inheritance links

Table 3.4 Entries in FrameNet and Constructicon (cf. Fillmore 2008, Fillmore et al. 2012)

A FrameNet lexical entry corresponds to a constructional entry in the Constructicon, which includes information about constructional elements, the meaning of the construction, and its relation to other constructions in the inheritance network. FEs in FrameNet correspond to construct elements (CEs) in the Constructicon, which are the constituent syntactic functions that make up the construction (e.g. such as the word *way* and a Path specification in the *Way-*

construction). The Constructicon also includes corpus examples in which constructional units are annotated, as well as a hierarchy which illustrates relations between similar constructions.

Finally, work integrating the principles of Frame Semantics and CxG has also been extended to cross-linguistic analyses, particularly in the form of a Contrastive CxG (Boas 2010a, 2010b). As contrastive literature on constructions and verb classes is discussed in detail in Section 6.1, I only provide a brief overview here. Although few studies on CxG have tackled purely contrastive questions, many scholars have identified and described constructions in other languages (see Boas 2010a: 4, for a list of such works). The general success of research applying CxG to other languages suggests that this framework is also fruitful for contrastive analyses. In particular, Boas shows how Frame Semantics provides a useful semantic interface for comparing constructions across languages. Frames and FEs are not language-dependent, but rather characterizations of real-world situations which can be objectively compared without reference to linguistic structures. As such, "it is in principle possible to map the same frame-semantic meaning to different forms across languages" (Boas 2010b: 11). Contrastive frame-semantic analyses can determine the extent to which languages are similar in the syntactic expression and semantic interpretation of frames, FEs, and FE configurations. For instance, a brief comparison of the expression of the FEC [DONOR, THEME, RECIPIENT] of the `Giving` frame reveals interesting differences.

(3.43) a. He gave her a book.
b. He gave a book to her.

(3.44) a. Er gab ihr ein Buch.
b. *Er gab ein Buch zu ihr.

In particular, while English allows the RECIPIENT to be realized as either a first object in a double object construction or as a *to* PP, German only allows the double (dative) object construction. Furthermore, the RECIPIENT is realized as a dative NP in German, whereas in English there is no clear difference between dative and accusative marking. By analyzing sentences in this way, it is possible to determine the range of syntactic frames (i.e. constructions) associated with individual LUs and with semantic frames in general. This method for mapping semantics, in the form of frames and FEs, and syntax, in the form of phrase types and grammatical functions, allows one to

identify similar classes of verbs in different languages and determine the range of syntactic patterns they may appear in.[104] These classes then serve as a basis for comparison and facilitate the identification of cross-linguistic variability in the syntactic expression of a given function (or semantic domain). Having discussed research combining Frame Semantics with Construction Grammar, the following subsection presents a brief constructional analysis of English Change verbs and describes how the analysis can be applied to a German-English comparison.

3.2.4. Change Verbs in CxG

I now briefly describe how Change verbs are analyzed in CxG. More precisely, I discuss a specific construction associated with Change verbs and how it behaves with respect to other constructions, partial productivity, and constructional polysemy. A typical syntactic frame for Change verbs is given in (3.45).

(3.45) She changed the man into a frog.

For an analysis of verb valency and argument realization, this particular construct involves (at least) four construct elements: subject, direct object, and *into* prepositional object.[105] These elements are respectively mapped to the sentence arguments *she, the man,* and *a frog*. In Goldberg's analysis, each of the constructional slots is filled by a schematic participant role which is instantiated by the phrases in the sentence, as shown in Figure 3.9.

Syntax:	NP.Subject	Verb	NP.Object	PP.into
Semantics:	Cause-Agent		Patient/Ch_entity	Final_state
Example:	She	changed	the man	into a frog.

Figure 3.9: Transitive + *into* PP Construction with *change*

[104] While this method for documenting valency behavior is not only possible in frame-constructional frameworks, work within these theories (as well as Valency Grammar) emphasizes the importance of comprehensive, item-specific analyses for cross-linguistic comparison.

[105] There are actual a large number of constructions in this example, only a few of which can be described here. First, each of the words in the sentence is a construction, pairing the phonological string (form) to the entity it describes in the world (meaning). The verb *changed* is an instance of a more complex construction which combines the verb *change* with past suffix *-ed*. Additionally, the noun phrases *the man* and *a frog* each result from constructions which combine bare nouns with determiners/articles. Furthermore, the entire grammatical structure [NP V NP into N] involves a construction which combines a bare transitive construction [NP V NP] with a prepositional phrase [into N] to create a transitive + prepositional phrase construction.

The degree of specificity for the schematic roles in the "Semantics" line is a matter of debate: it is unclear whether to use abstract roles such as Agent and Goal or verb-class specific roles such as Cause_change or Final_state (see Croft 2003, Herbst 2014). While using abstract roles allows various senses of the construction to be subsumed under one general construction (as with Goldberg's abstract argument structure constructions), verb-class specific roles show that the combination of syntactic frame and arguments, may receive different interpretations when it appears with a different verb (as with Boas's (2003) or Iwata's (2008) low-level constructions). To demonstrate, consider an example where the same syntactic frame is used with a different verb, namely *walk*.

(3.46) She walked the dog into the park.

There are a number of similarities and differences between the examples in (3.45) and (3.46), making it difficult to decide at which level to posit an (argument structure) construction. Apart from the syntactic similarities, semantic similarities include the agency of the subject and its influence on the direct object. Also, in the *change* sentence, the object *caused to be in the state of* a frog, and the object of *walk* is *caused to be located at* the park. This parallel suggests that the constructions are similar to the extent that states and locations are similar. However, there are also differences between the two sentences. Syntactically, the prepositional phrase used to introduce the Final_state argument of *change* must be headed by *into* (or *to*), whereas the Goal argument of *walk* may be expressed with a wide range of prepositions (*through/around/out of the park*). Semantically, the subject of *change* does not change its location, while that of *walk* changes their location in parallel with the object. Also, while the object of *change* (*the man*) is no longer visible as such after undergoing the change, the object of *walk* (*the dog*) remains intact in its original form. These data show that it is necessary to posit both high-level constructions to account for similarities between various interpretations of the same syntactic frame, and low-level constructions to tease out the meaning differences associated with the different verbs.

While the above discussion demonstrated the polysemy of constructions with Change verbs, there is also evidence that many constructions are partially productive with Change verbs.

This was shown already in Section 2.2, where numerous constructions appear with some, but not all, Change verbs. These examples are repeated in (3.47)-(3.49).[106]

(3.47) The witch {changed/*turned/altered} the man.
(3.48) He {changed/turned/*altered/*modified} into a frog.
(3.49) The man {changed/*turned/*altered}.

The data in (3.47) show that *change* and *alter*, but not *turn*, may appear in simple transitive constructions without prepositional phrases, and (3.48) shows that *change* and *turn* may appear intransitively with an *into* PP, while *alter* and *modify* are ungrammatical in this context. Finally, (3.49) shows that *change*, but not *turn* or *alter*, may appear in simple intransitive constructions without PPs. Boas's (2008a) hypothesis that verbs with lower descriptivity appear in a wider range of constructions does not clearly hold for this data. While the restricted range of constructions for *alter* and *modify* may result from their relatively high descriptivity, both *change* and *turn* are quite low in descriptivity and exhibit nearly the same meaning, but the two verbs are not compatible with the same range of constructions. In sum, a constructional analysis of Change verbs raises the same questions as other constructional analyses: Why do semantically related verbs exhibit different constructional behavior? Why do constructions have different meanings when they appear with different verbs? What level of constructional analysis is best suited to answer these questions?

It is straightforward to extend the language-specific constructional analysis to a comparison of German and English, following the methodology of Boas (2010b).[107] The closest translation equivalent to (3.45) above, with the FEC [AGENT, ENTITY, and FINAL_CATEGORY] is given in (3.50b).

(3.50) a. She changed the man into a frog.
b. Sie verwandelte den Mann in einen Frosch.

The German expression exhibits various differences from English. General structural differences between the languages result in more intricate case-marking in German than in English: the

[106] The judgments in these examples are based on intuition, but will be shown to correspond to corpus data in Chapter 5.
[107] Boas's (2010b) methodology for comparing constructions across languages is described briefly in th previous sub-section and in more detail in Section 6.1.

AGENT is in nominative, the ENTITY in accusative, and the FINAL_CATEGORY in an accusative-assigning *in* PP. The overt expression of case marking allows the word order to be freer in German, as the NPs and PP may be (relatively) freely reordered as long as the verb remains in the second position. Also, the preposition marking the FINAL_CATEGORY FE is *in* in German, but *into* in English. Lexically, the languages also differ, as the most straightforward translation equivalents of English *change*, namely *ändern* or *verändern*, are inappropriate in this context, and the verb *verwandeln* is used instead. This brief comparison of the expression of just one FEC of the `Cause_change` frame reveals that German and English constructions differ in case-marking, word order, and lexical semantics. In Chapter 6, I carry out a more comprehensive comparison of Change verbs and constructions in the two languages.

3.2.5. Summary of CxG

In this section, I have introduced CxG as a comprehensive, cognitively-oriented approach to language description. I pointed out relevant differences between CxG and generative grammars, emphasizing the importance of idiomatic expressions for the development of this framework. I then presented important principles for analyzing constructions, including the Saussurean concept of form-meaning pairings, the unified representation of all aspects (syntax, semantics, phonology) of constructions, and the organization of constructions into inheritance networks. I then described Goldberg's (1995, 2006) concept of argument structure constructions and her principles for the fusion of verbs with constructions, as well as issues which challenge Goldberg's approach, including partial productivity, constructional polysemy, and the proper granularity of constructional analysis. I then described research which seeks to integrate CxG with Frame Semantics to provide a more unified, comprehensive account of the relation between verbs and constructions. Finally, I undertook a brief analysis of constructions appearing with Change verbs and discussed its implications for answering various questions relevant in the CxG literature. In the following section, I discuss Valency Grammar, which is another important theory for the study of verbs, verb classification, and argument realization which emphasizes the uniqueness of verb valency behavior and the importance of item-specific analyses.

3.3. VALENCY GRAMMAR

3.3.1. Introduction

In this section, I present the theory of Valency Grammar as formulated by Herbst et al. (2004), Herbst and Schüller (2008), Faulhaber (2011), and Herbst (2014), specifically focusing on the *Valency Dictionary of English* (Herbst et al. 2004).[108] Like many of the theories described previously, Valency Grammar focuses on the relation between lexis and grammar, specifically the relationship between valence-bearing lexical units and the types of words and phrases that they appear with. With respect to verb classes and constructions, Valency Grammar places heavy emphasis on the idiosyncrasies of individual verbs and has played a large role in documenting such information for lexicographic and foreign language pedagogy purposes (Helbig et al. 1969, Herbst et al. 2004, Schumacher et al. 2004). Given the view and purpose of Valency Grammar research, it exhibits important differences from Frame Semantics and Construction Grammar, as discussed at the end of this section.

Many of the original works motivating the development of Valency Grammar were also treated in the discussion of Case Grammar (Section 2.3).[109] Specifically, certain words are seen as opening up slots for other words. This is most apparent with verbs, which have traditionally been viewed as the main word within a clause, as they determine the number, type, and syntactic realization of nominal and other phrases appearing in the clause (Bühler 1934, Tesnière 1959). However, nouns and adjectives are also capable of opening up one or more valency slots, as in *X's discussion with Y about Z* or *be fond of X*, respectively. Valency is thus defined as the ability of a word (or multi-word expression) to open up slots for other linguistic units (Herbst and Schüller 2008: 106; Herbst 2014: 162).

As with Case Grammar, much work in Valency Grammar focuses on the distinction between valency slots that are required to be filled and those that are optionally filled. Complements (actants, Ger. *Ergänzungen*), on the one hand, must be realized with and/or are morphosyntactically determined by the valency-bearing item. In contrast, adjuncts (circonstants,

[108] Valency Grammar was a prominent framework in German linguistics from the 1960s to 1980s, particularly in the former East Germany (see Helbig and Schenkel 1969, Helbig 1992, Welke 2011) and in the work of the Institute for German Language (IDS) in West Germany. It is still highly relevant in European linguistics but is only recently being adopted by American scholars.

[109] Valency Grammar also bears a strong relationship to Dependency Grammar, particularly as formulated by Tesnière (1959). See Welke (2011) for additional discussion.

Ger. *Angaben*) are not required or determined by the valency-bearing item. Various tests have been posited to distinguish complements from adjuncts, but these tests are not always entirely accurate and the distinction is likely more gradient than categorical (Herbst and Schüller 2008: 113-116; Herbst 2014: 162-163). The items which fill valency slots are characterized in terms of semantic or participant roles, similar to those employed in Case Grammar and Frame Semantics (i.e. Frame Elements). As with these other theories, it remains unclear exactly how many such roles are required, and different variations of Valency Grammar take different views on this issue (Helbig 1992; Herbst and Schüller 2008: 126-135).

A major motivation for work in Valency Grammar is that foreign language learners require detailed, item-specific information about lexical units in order to use them correctly. As such, Valency Grammar often takes an applied, lexicographic approach that seeks to fulfill the needs of foreign language learners. This research has resulted in numerous valency dictionaries which provide detailed descriptions of valency-bearing items, such as the *Valency Dictionary of English* (VDE; Herbst et al. 2004) or the *Valenzwörterbuch deutscher Verben* (VALBU; Helmut et al. 2004). In the remainder of this section, I introduce the VDE on the basis of its characterization of the English verb *change*, and then compare the VDE and Valency Grammar more generally, to Construction Grammar and Frame Semantics.

3.3.2. The Valency Dictionary of English (Herbst et al. 2004)

An important implementation of Valency Grammar is the *Valency Dictionary of English* (VDE; Herbst et al. 2004), which provides detailed valency information for over 1300 words, including 511 verbs. This print resource was developed for teachers and advanced learners of English and covers words which are especially frequent, complex, or difficult for learners (VDE: xi). The entries provided for each word are quite extensive, including:

- a division of words into various senses
- Cobuild-style (Sinclair 1987) definitions which label the participants associated with each sense
- a list of how each of these participants may be realized syntactically
- example sentences exemplifying the various valency patterns, taken primarily from the Bank of English corpus (www.collins.co.uk), and
- a list of idiomatic phrases involving the word, when these exist.

Because of the detailed nature of the VDE's valency descriptions, its entries employ a complex notation system involving various symbols and fonts. Here, I describe the VDE's verbal entries on the basis of its treatment of *change*.

3.3.2.1. *Change* in the VDE

Figure 3.10 shows a portion of the sense distinctions and definitions for *change*.

A *Change* can mean 'become or make different'
(i) **Something or someone^{II} can change or be changed,** i.e. become different in some form or another.
(ii) **Something^{I} can change something^{II} from one thing^{VI} to another^{IV},** i.e. make it different
→ M D1 D2 D3 D5 D6 T2 T3 T5 T6 Q1 Q2
B *Change* can mean 'put on different clothes,' **A person^{I} can** […]

Figure 3.10: Portion of definitions and sense distinctions for *change* (verb) in VDE (VDE: 123)

The A sense ('make different') is relevant for our discussion, while the B sense ('change clothing') is included merely for demonstration, and four other senses are omitted from the image and this discussion.[110] The 'make different' sense includes two sub-senses: (i) refers to intransitive uses of *change,* while (ii) refers to transitive uses. The participants associated with *change* are marked with super-script roman numerals. The relevant A sense of *change* involves the following participants:

I entity which causes change
II entity undergoing change
IV state of entity after undergoing change
VI state of entity before undergoing change[111]

[110] These senses include 'change mode of transportation,' 'exchange/replace,' '(ex)change money,' and 'change gears.' It is also worth mentioning that the idiomatic collocation *change one's mind* is listed in the example sentences (but not the sense distinction section) as a separate sense of *change*, rather than treated as a specific instance of the A sense treated here.
[111] The numerals III and V are not included in the A sense definitions, but are used to indicate participants for other senses of *change*.

The valency patterns for the A sense of *change* are given in Figure 3.11.

change	*verb*			
A	'make different'			
	Active: 1/4	Passive: 1/4	General:0	
I	[N]A/ [by N]	D1	T2	Q2
	[V-ing]A	D1	T2	Q2
	[that-CL]A	D1		
	[N V-ing]A	D1	T2-3	Q1-2
II	[N]P	D1	T2-3	Q1-2
III	[for N]	D2		
IV	[into N]	D3	T2, 5	Q1
	[to N]	D3	T2, 6	Q2
	[to ADJ]		T6	
V	[with N]P	D6		
VI	[fron N]		T5, 6	Q1-2
	[from ADJ]		T6	

Figure 3.11: Portion of Valency Patterns for *change* in VDE (VDE: 122)

The first line shows the minimum and maximum number of participants that may appear in active, passive, and general[112] uses. Active uses, for instance, require at least one participant but may realize up to four of them, as indicated by the coding "Active: 1/4".

The main part of Figure 3.11 shows how each of the participants is realized syntactically.[113] The II participant (i.e. the entity undergoing change), for instance, may be realized as a noun, as indicated by the [N]. The sub-script P in $[N]_P$ indicates that this argument is the subject of the passive use of *change*.[114] The right side of the Figure 3.11 refers to the example

[112] "General" refers to verb uses in which there are no arguments, as in *It is necessary to change*.

[113] One problem with this entry is that the valency list includes participants (III, V) for *change* which are not listed in the definition for the 'make different' or any other sense of the *change* definitions. As such, it is quite unclear what the semantic contribution of these participants is.

[114] This is opposed to the I argument (i.e. the entity which causes change) which has a sub-script A, indicating it is the subject of active sentences. See Herbst (2014) for a justification of why subjects, but not objects, are indicated in these valency reports and in Valency Grammar research in general.

sentences in which that participant/realization combination appears. Thus, we see that the II argument as a noun appears in patterns D1, T2, T3, Q1, and Q2.

Finally, the VDE provides example sentences demonstrating each of the valency patterns available to a given verb. Most of these sentences (including all of the sentences for the *change* entry) are taken from the Bank of English corpus, which contains authentic present-day English data. Figure 3.12 provides a list of all patterns that VDE identifies for the 'become/ make different' sense of *change*, along with at least one example of each pattern.

M
[…] things will change […]

D1 + N_P
Emotions can change the perception of pain.

D2 + for N
[…] funding may change for the worse […]

D3 + into N
The clan leaders […] began to change into fine, flowery Edinburgh gentlemen.

D5 + to N
Her tone changed to that of a pedantic headmistress.

D6 + with N_p
I think if you change with the trends you lose yourself.

T2 + N_P + into N
[…] music has the power to change one mood into another.

T3 + N_P + to N
She changed her name to Melissa

T5 + from N + into N
But boat ownership can quickly change from a joy into a trauma.

T6 + from N/ADJ + to N/ADJ
Her expression changed from anger to a suppressd [sic] terror.
The grass changed from brown to green almost immediately.

Q1 + N_P + from N + into N
[…] enzymes which help to change a substance from one form into another.

Q2 + N + from N + to N
Its name has been changed from Bernadette to Bernard.

Figure 3.12: Valency patterns for 'become/make different' sense of *change* in VDE

The valency patterns in the VDE are organized according to the number of participants realized. D refers to two-participant, T to three-participant, and Q to four- or more-participant patterns (Z and M are not listed in this table but refer to zero- and monovalent patterns, respectively). The patterns are characterized only according to arguments that appear to the right of the head verb in active clauses and do not include specifications of the subject position, so that the patterns may account for both active and (where possible) passive variations of the same general valency pattern. The pattern T3, for instance, is labeled + N_P + *to N* and describes patterns such as the active example provided in Figure 3.12, as well as passive examples such as *Her name was changed to Melissa.*

By providing fine-grained sense distinctions and detailed valency descriptions based on corpus evidence, the VDE offers a great deal of idiosyncratic information for many lexical units that are not accounted for in more general grammar references. The VDE is thus very important for teachers and advanced learners, as well as linguists, who need to know in exactly which valency patterns a given word (in one of its senses) may appear. This type of information is apparently not provided in any other existing resource, so the VDE serves an important purpose in the description of the English lexicon.

3.3.2.2. Critique of VDE

At the same time, the Valency Grammar approach in general and the VDE in particular only offer so much when it comes to the study of the form-meaning relationship among verb classes. Specifically, Valency Grammar emphasizes the idiosyncratic behavior of individual lexical units, but does not seek to identify similarities among larger partitions of the lexicon, such as verb classes. For instance, the VDE also includes an entry for *turn*, but does not mention that the verbs *change* and *turn* are related but differ in their precise range of valency patterns. This item-specific approach also applies to the types of roles identified in the VDE. Participants are simply associated with numbers, and their semantics are not defined explicitly (apart from general ontological categories such as *someone* or *something*). As such, it is not possible to observe similarities among roles across different valency-bearing items, such as the theme which undergoes change across the verbs *change* and *turn*. Given this verb-centric perspective, Valency Grammar approaches cannot identify regularities in correspondence between word meaning and syntactic form, that is, they cannot say why a verb is associated with the valency patterns it occurs in.

Ideally, one would be able to extract the item-specific data from a resource such as the VDE in order to arrive at such generalizations among verb classes. However, this is not possible for three reasons: lack of coverage, lack of frequency information, and some minor inaccuracies. With respect to coverage, the VDE only contains entries for the most frequent, useful, and complicated verbs, nouns, and adjectives in the English lexicon, without systematically defining what makes a word frequent or complicated (VDE: xl). For instance, the VDE only contains two Change verbs (*change* and *turn*) and one Theft verb (*steal*), so a comparison with semantically related verbs (e.g. *alter, modify, transform* for Change; *snatch, pilfer, shoplift* for Theft) requires one to carry out their own valency analysis for these verbs. While the VDE itself does not provide the coverage necessary for detailed verb class studies, its coverage could be expanded (perhaps through an integration with FrameNet) to provide a valency description of a larger portion of the English lexicon.

Second, while frequency information is supposedly included in the VDE in the form of labels such as "rare," "frequent," "very frequent," and ">30%" (VDE: xx), none of these labels are included in the entries for the verbs analyzed in the present work and included in the VDE (*change, turn, steal*). It is thus impossible to state whether these verbs are more frequent in a given (set of) pattern(s) than others based on VDE data alone, information that is important for both descriptive valency reports and predictive generalizations about verb meaning and argument structure. For instance, the corpus analysis of Change verbs in Chapter 5 reveals that the final two patterns in Figure 3.12 involving the original state of the entity before the change (Q1 and Q2 in Figure 3.12) are highly infrequent compared with other patterns, but this information is not found in the VDE.

Finally, there appear to be some inconsistencies in the presentation of valency patterns. The final pattern listed for *change* (Q2 in Figure 3.12), for instance, does not include the sub-script P after the first post-verbal noun indicating that this participant is the subject of passive clauses. However, the example provided is in the passive and realizes this participant as its subject. Further, the II argument is only indicated as subject of passive sentences (with the P sub-script), but it appears as active subject in intransitive uses, as in the first ("M") example in Figure 3.12. While pointing out such shortcomings may seem rather demanding, a resource such as the

VDE would be much more useful if it provided broader and more accurate coverage, including detailed frequency information.[115]

3.3.3. Valency Grammar and other theories

3.3.3.1. FrameNet and Valency Grammar

Fillmore (2009), in his review of the VDE, provides an overview of differences and similarities between the VDE and FrameNet.[116] Both projects aim to provide an empirically-based resource documenting valency behavior of lexical units for the English language. Both draw on large corpora, with the VDE using the Bank of English corpus and FrameNet using the smaller British National Corpus. This reliance on corpus data, while ensuring that documented data is indeed natural, is also problematic due to gaps in the corpora (i.e. a possible felicitous pattern is not listed in the resource because the corpus does not contain the pattern). The VDE and FrameNet also include detailed valency reports which document both the possible realizations for each semantic role as well as the various full configurations of roles and realizations within a sentence.

One of the most important differences between the two resources relates to their base of analysis. While the VDE provides exclusively word-specific information, FrameNet groups words together according to richly defined semantic frames. This organization allows FrameNet to relate participants (i.e. Frame Elements) across other words, including words of different parts of speech, of the same frame. As such, FrameNet defines its FEs in much more detail than the VDE's participants and relates them to the broader scenario described by the semantic frame. By relating lexical units and FEs to semantic frames, it is possible for linguists to observe broader generalizations among semantically related lexical units and across different parts of speech. Because FrameNet also relates different frames through relations such as Inheritance in a frame hierarchy, it is also possible to arrive at generalizations across different semantic frames.

The two resources also differ in that the VDE only documents valency behavior within the verb phrase (e.g. "to the right of the head word", Fillmore (2009:75)), whereas FrameNet

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[115] Another, more practical criticism of the VDE pertains to how easily it may be used. Because VDE entries are so detailed, it is quite difficult (even for the trained linguist) to decode all of the symbols, numerals, and other notations employed by the VDE. Further, the VDE provides no negative evidence which tells learners that a given pattern is not possible with a given verb. These and further issues with the VDE are discussed in more detail by Fillmore (2009).

[116] See also Fillmore (2007) for an account of how valency issues are treated in FrameNet. As the current chapter focuses on Valency Grammar and the VDE, I focus on Fillmore (2009).

documents semantic roles in all contexts (within a given sentence). As such, in a sentence such as *She told the boy to change his name*, FrameNet observes that *the boy* is the Agent of the verb *change* in the infinitival clause, whereas the VDE does not make this connection. FrameNet also has a detailed system for documenting null-instantiation (i.e. omitted valents), which is not the case for the VDE. Despite these differences and given the shared goals of the two projects, Fillmore (2009: 82) calls for collaborations which would align the findings and build on the strengths of these and related projects.

3.3.3.2. Construction Grammar and Valency Grammar

Herbst (2014) offers a comprehensive comparison of Valency Grammar and Construction Grammar. Both theories have a strong focus on the relationship between grammar and lexicon. Specifically, both investigate how linguistic structures open up spaces for other structures and determine both their form and their semantic interpretation. Valency Grammar, despite its focus on verb-specific valency constructions, recognizes the existence of more abstract argument structure constructions, as seen for instance in its varying notation of subjects in active vs. passive constructions. In the same vein, recent developments in Construction Grammar (e.g. Croft 2003, Iwata 2008, Boas 2008b) have emphasized the need for more detailed lexical representations of individual verbs' participation in argument structure constructions, or their valency behavior.

At the same time, the perspective that each theory takes to the relation between lexis and grammar are quite different. With respect to the slots opened up by linguistic structures, Valency Grammar views verbs as the prime valency carrier within sentences, whereas Construction Grammar defines abstract constructions which open up slots not just for complements, but for verbs themselves as well. These two perspectives, however, can serve complementary purposes. Specifically, Valency Grammar observes detailed verb-related valency patterns, while Construction Grammar seeks generalizations over these verb-specific patterns in order to identify more abstract argument structure constructions.[117] As such, the two approaches vary primarily with respect to the level of abstraction with which they describe valency behavior.

[117] Construction Grammar also goes further than simple argument structure constructions which relate to verbal valency, but also describes constructions which are unrelated to valency, such as word order constructions, constructions for building noun phrases, combinatorial constructions that combine multiple clauses, and idiomatic constructions such as the *let alone* construction. For an overview, see Goldberg (2006) and Fillmore et al. (2012).

Herbst's (2014) detailed discussion of the concepts analyzed in the two frameworks demonstrates their compatibility. Specifically, Herbst relates Goldberg's abstract argument structure constructions to item-specific valency constructions in Valency Grammar. As with all constructions, valency constructions consist of a form side, represented by valency patterns, and a meaning side, represented by participant patterns. Valency patterns "represent clusters of complements in terms of phrases" (Herbst 2014: 180) and are thus purely formal descriptions of argument configurations.[118] (3.51) shows the valency construction which characterizes the form side of not only traditional ditransitive constructions as in *Pat gave Sam a book*, but also predicative constructions as in *Pat called Sam a liar*.

(3.51) [SCU: NP]__VHC_{act}__[PCU1: NP]__[PCU2:NP][119]

Participant patterns represent the meaning side of valency constructions in terms of constellations of participants or semantic roles.[120] The sentences in (3.52)-(3.53), despite having the same formal valency pattern, involve distinct sets of participants and thus represent distinct participant patterns.

(3.52) Pat gave Sam a book. 'AGENT' – V – 'BENEFICIARY/RECIPIENT' – 'ÆFFECTED'

(3.53) Pat called Sam a liar. 'AGENT' – V – 'ÆFFECTED' – 'PREDICATIVE'

Valency constructions are pairings of valency patterns with participant patterns, and thus the sentences in (3.52)-(3.53) exhibit different valency constructions despite their formal similarity. Specifically, the formal argument slots in the valency pattern are associated with the participant roles from the participant pattern, resulting in (3.54)-(3.55).

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118 In Pattern Grammar, as developed by Francis, Hunston, and Manning (1996), the *grammar pattern* corresponds closely to the valency pattern of Valency Grammar.

119 In Valency Grammar terminology, SCU stands for Subject Complement Unit, PCU stands for Predicate Complement Unit, and VHC stands for Verbal Head Complex. See Herbst et al. (2004) for more details on these concepts. A theory-neutral representation of this valency pattern would be [NP V NP NP].

120 Herbst (2014: 181) is non-committal as to the exact degree of specificity of participant roles, but mentions that "Although […] the roles identified at this level are less specific than the verb-specific roles of the "SENDER"-type and to be seen more on a par with Fillmore's (1968) case roles, this does not mean that all verb-specific roles can be subsumed under such general roles."

(3.54) [SCU: NP ‘AGENT’] _give_ [PCU1: NP ‘BENREC’] _ [PCU2:NP ‘*Æ*FFECTED’]

(3.55) [SCU: NP ‘AGENT’] _call_ [PCU1: NP ‘*Æ*FFECTED’] _ [PCU2:NP ‘PREDICATIVE’]

Similarly, a single participant pattern may be given different formal realizations. For instance, the participant pattern in (3.52) may not only be expressed in the ditransitive pattern (3.54), but also in a prepositional pattern, as in (3.56). Thus, a single participant pattern may combine with different valency patterns, and vice versa, resulting in different valency constructions.

(3.56) Pat gave a book to Sam.

At a higher level of generalization, valency constructions such as those in (3.54)-(3.55), can be seen as instances of broader *general valency constructions* (Herbst 2014:182), which roughly correspond to Goldberg’s ASCs.[121] Specifically, while normal valency constructions are associated with specific verbs, ASCs (or general valency constructions) pair a valency pattern with a participant pattern but leave the verb slot unspecified, as in (3.57), which represents the valency construction in (3.54) at a non-verb-specific level.

(3.57) [SCU: NP ‘AGENT’]__$verb_{act}$__[PCU1: NP ‘BENREC’]__[PCU2:NP ‘*Æ*FFECTED’]

ASCs differ from valency constructions in several ways, however. Most noticeably, valency constructions are item-specific while ASCs are broader generalizations. As such, the verb slots of ASCs is not specified, while those of valency constructions include a specific verb. The argument roles associated with ASCs are also more abstractly defined than the verb-specific roles of participant patterns (and valency constructions). As a result of this, the meaning attributed to ASCs is broader and more abstract than that of valency constructions.

Another prominent difference pertains to the representation of syntactic form in the two approaches. Herbst (2014: 183f.) points out that while valency patterns (the form side of valency constructions) use strictly formal phrase type categories (e.g. NP, VP, AP), the form side of

[121] While Herbst (2014: 182) seems to equate Goldberg’s ASCs with the verb-class-specific constructions of Croft (2003), my understanding is that verb-class-specific constructions are more specific than ASCs. For instance, Croft (2003) identifies various verb-class-specific constructions associated with different interpretations when occurring with *give*, *promise*, and *deny* (among others), but all of these verb-class-specific constructions are treated as instances of the broader Ditransitive ASC.

Goldberg's ASCs uses functional terms (e.g. Subject, Object, Oblique).[122] An analysis of this difference leads to an important discussion of the point at which subtle formal differences require one to posit a new construction. A functional definition of a construction's form allows one to generalize over patterns which realize the same participant/role in different phrase types. For instance, both the final NP of (3.58a) and the AP of (3.58b) instantiate the same 'PREDICATIVE' role, despite their formal difference.

(3.58) a. She considered him a fool.
b. She considered him crazy. (cf. Herbst 2014: 184)

In this case, a functional characterization of this syntactic slot as PRED, which can be instantiated by either NPs or APs, does not obscure the similarity between the semantic interpretations of different formal categories. Herbst argues that cases such as those in (3.58) can be captured by positing *allostructions* or sub-constructions with slightly different formal realizations of a participant pattern (see Cappelle 2006), rather than positing abstract and arbitrary categories such as PRED. As such, the patterns in (3.58) can be captured as two allostructions of one valency construction in which the 'PREDICATIVE' role may be realized as either AP or NP. Herbst (2014: 186-187) shows that multiple possibilities for the formal realizations of participants can easily be represented in the construction. For example, the various realizations of the theme (i.e. message) shown in (3.59) are captured by listing numerous phrase types in the form (Syn) side of the theme role in the construction's representation (Figure 3.13).

(3.59) a. You never told me *that*!
b. Now let me tell you *all the news*!
c. Tell them *I don't want to be disturbed*.
d. When did you tell him *that you were pregnant*?
e. He's telling us *how he spent last night here, on the car-park, in his van*.

[122] Herbst (2014: 186) notes that the valency descriptions in FrameNet are formal as in Valency Grammar, and that they also capture instances in which a single role (i.e. Frame Element) can be realized in different phrase types.

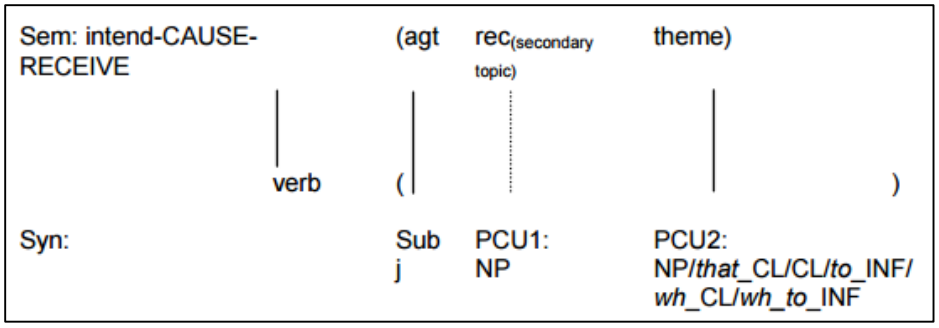

Figure 3.13: Ditransitive Construction with valency specifications (Herbst 2014: 187)

Along similar lines, Herbst (2014: 190) introduces the concept of a *constructeme*, which describes "[t]he constellation of a participant pattern […] and all the valency constructions that can be seen as reali[z]ations of this participant pattern." Thus, the ditransitive in (3.54) and prepositional variant in (3.56) are instances of two allostructions of the constructeme involving the Giver, Theme, and Recipient roles of *give*. Similarly (3.59a)-(3.59e) all represent constructemes of the Ditransitive Construction.[123] This view of a construction is thus much more detailed and fine-grained than the abstract ASCs of Goldberg (1995, 2006) discussed in the previous section. Among other things, it accounts for subtle phrase type differences in certain constructional slots and thereby captures relations among syntactically distinct configurations instantiating the same semantic roles.

A further contribution of Valency Grammar principles to generalizations made in Construction Grammar involves the fusion of verb-specific valency constructions with generalized ASCs. As discussed above, Goldberg's (2006: 40) Semantic Coherence Principle and Correspondence Principle are not constrained enough to prevent the generation of ungrammatical utterances such as those in (3.60).

(3.60) a. *Pat explained Sam the story.
b. *Pat said Sam something.

Given fact that the participant roles of *explain* and *say* (i.e. Speaker, Message, and Recipient, match up with the argument roles of the (independently existing) Ditransitive Construction (i.e.

[123] Herbst (2014) also discusses several cases which make it challenging to determine whether different valency constructions should be grouped together or not. When two distinct valency patterns exhibit different semantics, then two separate constructions are posited. However, in some cases formal differences are due to more general principles such as information structure or pragmatic constraints.

Agent, Theme, and Recipient), Goldberg's principles predict that *explain* and *say* should be acceptable in the ditransitive as in (3.60). However, this is not the case, as these verbs are infelicitous in the construction. To constrain Goldberg's principles so as to not overgenerate, Herbst (2011, 2014: 191) introduces the Valency Realization Principle.

> **Valency Realisation Principle**: if a valency construction of a verb is fused with an argument structure construction and all of its participant roles are construed as argument roles, then the formal reali[z]ation of the argument structure construction (SYN) must coincide with the valency pattern of the valency construction.

The examples in (3.60) violate the Valency Realization Principle because the formal realization of the recipient role in the ASC (as a first object) does not coincide with the formal realization of valency constructions associated with *explain* and *say*. The valency patterns of the valency constructions associated with these verbs instead specify that the recipient can only be expressed in a *to* PP.

While the Valency Realization Principle prevents the generation of utterances in (3.60), it nevertheless allows for creative and novel verb-ASC combinations, as in (3.61).

(3.61) Pat sneezed it off the table.

Specifically, (3.61) does not violate the principle because there is no valency construction of *sneeze* that could be seen as fusing with the Caused-Motion (argument structure) Construction. Neither is *sneeze* associated with participant roles (e.g. Theme and Goal) that fill argument slots of the ASC. As such, the Valency Realization Principle is a welcome addition to the principles of verb-construction fusion which combines the item-specific analyses of Valency Grammar with abstract generalizations of ASCs.[124]

This discussion has demonstrated how a combination of Valency Grammar and Construction Grammar can lead to a more complete picture of the relation between verbs and

[124] The Valency Realization Principle is similar to my analysis's specification of the *constructional range* (general) and listing of each verb's *valency distribution* (specific). The constructional range shows all possible configurations of the participant roles (FEs) associated with the verb class, and thus the range of possible constructions each verb could possibly appear in (as with ditransitive and prepositional for communication verbs). However, the verb's constructional distribution lists which constructions the verb actually appears in and thus specifies which constructions in the constructional range are not felicitous with the verb.

constructions. Herbst (2014: 195-196) points out that this strain of valency research represents a break from traditional Dependency Grammar (Tesnière 1959) in that it recognizes that item-specific valency is not the only factor in argument structure, but abstract ASCs also exist independent of (and often interact with) valency and also determine clause structure. Further, the item-specific analyses of verbal valency provide the core data for positing abstract ASCs, which are generalizations over verb-specific valency constructions.

3.3.4. Faulhaber (2011) and the idiosyncratic nature of verb valency

Before concluding this section on Valency Grammar, I first describe Faulhaber's (2011a, 2011b) important investigation into the predictability of verb valency behavior. Faulhaber's goal is to determine the extent to which semantically related verbs differ in their argument realization properties, thus testing the traditional assumption that a verb's grammar is predictable from its meaning. Dixon (1991: 6), for instance, states that "once a learner knows the meaning and grammatical behavior of a new word he can infer its likely grammatical possibilities". Faulhaber observes that, while most research recognizes that there might be exceptions in the exact syntactic distribution of semantically related verbs, such exceptions are often viewed as minimal or insignificant and thus not fully appreciated in verb valency research (Levin 1993: 13, Levin and Rapaport Hovav 2005: 15, see Section 2.4).

Analyzing 87 lexical units from 22 groups of semantically related verbs, Faulhaber seeks to identify "syntactic gaps," valency patterns which occur only with some but not all verbs of a given semantic class. She identifies the valency behavior of verbs on the basis of the VDE as well as native speaker consultations and examples found on the internet. If the data reveal even just one instance of a verb occurring in a given valency construction, Faulhaber includes it as a possible construction for the verb in question, regardless of its frequency.[125] Table 3.5 shows some of the data resulting from Faulhaber's study.

[125] This methodology thus further supports Faulhaber's claim that verb valency behavior is not predictable. That is, many constructions identified for a verb seem to be very infrequent and/or judged as infelicitous by most native speakers. If such examples were excluded from her analysis, an even greater amount of "syntactic gaps" would be identified. While her methodology is certainly non-problematic given the purpose of the study, my analysis seeks to provide a more accurate view of the precise distribution of verbs and valency constructions and thus accounts for the relative frequency of verb-construction combinations.

verb groups	+ [about_X]	+ [on_X]	+ [upon_X]	+ [of_X]	+ [over_X]
'quarrel'	*quarrel* *argue* *bicker* *dispute*	*quarrel* *argue*			*quarrel* *argue* *bicker* *dispute*
'remember'	*remember* *reminisce* *recall* *bear in mind*				*reminisce*
'think'	*consider* *think* *reflect* *ponder*	*(consider)* *think* *reflect* *ponder*	*think* *reflect* *ponder* *contemplate*teach	*(consider)* *think*	*(consider)* *ponder*
'teach'	*teach* *instruct* *educate*	*instruct* *educate*			

Table 3.5: Variability of the participant TOPIC (cf. Faulhaber 2011a: 166)

The data shows that individual verbs within narrowly-defined semantic verb classes ("verb groups" in Faulhaber's terminology) do not have the same syntactic possibilities for expressing the TOPIC role. For instance, while all four of Faulhaber's 'quarrel' verbs may realize the TOPIC in *about* or *over* PPs, only *quarrel* and *argue* may realize it in an *on* PP.

Faulhaber's (2011a, 2011b) findings are particularly striking for those who assume the predictability of a verb's valency from its meaning. She shows that, while the set of possible valency constructions for a verb class is clearly determined by the meanings of those verbs, the precise distribution of individual verbs within such classes differs greatly. Specifically, 68% of the verb-construction combinations were consistent within the classes, Faulhaber's analysis of the 32% of unexpected syntactic gaps demonstrates the unpredictability of verb valency. For each syntactic gap (e.g. when a verb does not occur in a construction that is found with other verbs of the class), she determines whether the gap results from detailed aspects of the verb's meaning, specifically its participant roles and aspectual characteristics. She concludes that 55% of the syntactic gaps cannot be predicted based on any semantic properties of the verb in question. These findings underscore the idiosyncratic nature of verb valency behavior and further emphasize the need for bottom-up item-specific analyses, a converging finding of both Valency Grammar and Construction Grammar (Boas 2003, Croft 2003, Iwata 2008, see Section 3.2).

Given Faulhaber's (2011a, 2011b) empirical demonstration of the idiosyncratic nature of verb valency, the present analysis (particularly in Chapter 5) builds on her findings and integrates

them with existing views of verb meaning and argument realization. For one, I seek to reconcile Faulhaber's findings with the prominent view of grammatical uniformity within verb classes by positing generalizations at different levels of granularity. Specifically, I propose (frame-based) verb entries which capture not only the shared valency behavior of verbs in a given class by providing a full list of the valency constructions that are found with (any of the) verbs in the class, but also the idiosyncratic verb valency properties by specifying the exact set of valency constructions the verb occurs in (based on a modest number of corpus examples). Furthermore, I identify very fine-grained and verb-class-specific aspects of meaning that determine more subtle aspects of a verb's valency distribution. I also address the role of frequency in verb valency more systematically, by specifying the frequency with which a given verb occurs in specific valency constructions. In addition to recognizing these nuanced differences within verb classes, in Chapter 7 I demonstrate the syntactic relevance of semantic verb classes by showing the drastic differences in the set of valency constructions possible for two different verb classes (Change and Theft). As such, my analysis brings together both the broad generalizations and item-specific idiosyncrasies identified in verb class and verb valency research.

3.4. CONCLUSION

To conclude the literature review, this section summarizes the advantages of the cognitive and usage-based frameworks introduced in this chpater over the more traditional approaches described in Chapter 2 (Section 3.5.1). In Seciton 3.5.2, I then describe some shortcomings of Frame Semantics, Construction Grammar, and Valency Grammar, and discuss how the present analysis combines the best parts of each of these theories to overcome these shortcomings in order to provide a detailed and accurate analysis of classes of semantically related verbs.

3.4.1. Advantages of usage-based and cognitive approaches

In this chapter, I have demonstrated how Frame Semantics, Construction Grammar, and Valency Grammar overcome many problems associated with the three approaches discussed in Chapter 2. The major difference between verb classification methods in Levin (1993) and Frame Semantics is the latter's emphasis on meaning for classification, rather than syntactic behavior. As such, verbs in FrameNet classes are required to have the same participants (FEs), relations between participants, presuppositions, and aspectual stages, thus ensuring semantic similarity

within frames. The emphasis on semantics sometimes requires verbs with different alternating behavior to be included in the same frame (as with *turn* and *make*), resulting in drastic differences between the classes posited in the two frameworks. However, syntactic behavior is not neglected in Frame Semantics, but documented empirically in FrameNet through FE-annotation of natural language data from the BNC and COCA corpora, thereby ensuring the accuracy of claims about argument realization. Frame Semantics also overcomes the lack of structure found in Levin's classification, as frames and FEs are explicitly related in a hierarchy by means of various frame relations. Construction Grammar provides a more detailed view of syntactic patterns (i.e. alternation variants), as it looks closely at possible meaning differences between alternation variants and recognizes constructional polysemy, in which the same syntactic pattern receives different interpretations depending on the verb and nominal arguments.

Frame-constructional approaches have a very different view of case roles than those proposed in early work on Case Grammar, as they are not restricted by the a priori assumption of a small set of primitive roles. Frame Semantics posits a unique set of roles (FEs) which are defined with respect to each individual frame, resulting in thousands of roles. This semantic specificity ensures that roles are empirically (and intuitively) testable, thereby avoiding the problems of vague role definitions and 'wastebasket' categories such as Theme and Patient. Frame-specific FEs also fall in line with the observation of context dependence, as a frame is associated with a specific set of core FEs. The argument-adjunct distinction is more sophisticated in FrameNet, where FEs are related both within a frame through FE-relations, such as CoreSet and Requires, and across frames through frame-to-frame relations, such as Inheritance, Perspective_on, and Causative_of. The verb-centric view of traditional role-based approaches is challenged in Construction Grammar, where sentential arguments are not necessarily provided by the verb. Instead, valency and the argument-adjunct distinction are a function of the grammatical construction or an interaction between verb and construction. While students of these frameworks have not yet defined specific linking rules which predict the realization of a given argument, there have been attempts to formulate such rules with reference to prominence and profiling (Goldberg 1995, 2006) and the FrameNet's frame hierarchy (Boas and Dux 2011, Gotsoulia 2012).

Research on verbal aspect, particularly Croft (2012), offers a number of insights which can be enhanced by and integrated into CxG and Frame Semantics. As discussed in Section 2.3, Croft's representations would benefit from a more detailed discussion of what the frame-semantic

labels in his 3-d representation contribute to the meaning and how or whether they might influence syntactic, argument realization properties. Croft's observation that a verb's aspectual potential is determined by its specific context falls neatly in line with the emphasis in CxG of the interaction between verbs, constructions, and real-world context, and Croft presents new ways of examining and representing these interactions. On the other hand, there is little literature on the treatment of aspect within FS and CxG, apart from the statement in Ruppenhofer et al. (2010: 10) that LUs of the same frame must have the same aspectual properties. Osswald and Van Valin (2014), however, describe how FrameNet and the frame hierarchy do not adequately account for aspectual similarities between frames, arguing, for instance, that several frames involving a change of state should be linked to `Cause_change` and `Undergo_change` through an Inheritance relation (which is not currently the case in FrameNet).

The discussion up to this point has shown the advantages of Frame Semantics and Construction Grammar over other approaches for dealing with the verb classification and argument realization phenomena addressed in this dissertation. Traditional approaches based on alternating behavior (Levin 1993), case roles (Fillmore 1968, Dowty 1991), and event structure (Jackendoff 1990, Levin and Rappaport Hovav 1998), each address merely one part of a complete description of verbal behavior. Cognitive and usage-based approaches such as those described in this chapter, however, offer the proper mechanisms for adequately and empirically describing the enigmatic relation between verbs, constructions, and arguments. The notion of semantic role is the most important factor in frame-semantic verb classification, and Frame Semantics uses a large inventory of roles which are richly defined with reference to a semantic frame. Syntactic (i.e. alternation) behavior is only secondary in Frame Semantics, but is documented on the basis of annotated natural data from the BNC and COCA corpora. Valency Grammar, on the other hand, seeks detailed and comprehensive descriptions of valency patterns available to individual verbs, suggesting that no two verbs are identical in their syntactic behavior (Faulhaber 2011). Similarly, CxG researchers have argued against traditional views of alternations, and have produced fruitful research documenting semantic differences between alternation variants, partial productivity of constructions, and constructional polysemy. Verbal aspect is only implicitly addressed in FS through a stipulation that LUs of a frame must have the same aspectual properties, and a more detailed description of the role of aspect in frame-constructional approaches therefore remains a desideratum.

3.4.2. Combining Construction Grammar, Frame Semantics, and Valency Grammar

I now summarize the advantages and disadvantages of the three approaches presented in this chapter and describe how they are implemented and enhanced in the present study. In 3.1, I described the advantages of Frame Semantics over other role-based or verb-class-based approaches to argument realization. Frame Semantics (and specifically the FrameNet project) provides relatively fine-grained verb classes and defines these using intuitive and empirically-based frame and Frame Element descriptions. As such, verbs evoking the same FrameNet frame all share the same set of roles (FEs) and relations between these roles, ensuring a high degree of semantic uniformity within the class (as opposed to the issues identified in Levin (1993)). FrameNet classes thus provide a useful starting point for the verb class analyses conducted in the following chapters. FrameNet practice also provides a systematic methodology for documenting valency behavior, specifically by annotating the phrase type and grammatical function of (Core) FEs in naturally occurring corpus sentences. The current analysis employs a very similar methodology for documenting verbal valency behavior. A further advantage of Frame Semantics and FrameNet is that both entire frames and individual FEs of different frames are related to one another in a hierarchical structure using a rich set of frame-to-frame and FE-to-FE relations.

Despite its strong emphasis on rich semantic descriptions, the cursory analyses of Change verbs in the preceding sections have shown that even verbs within the same FrameNet frame exhibit nuanced differences that are not always treated in detail in the FrameNet database. At best, individual LUs are associated with a brief prose description (often taking from the Concise English Dictionary) that only sometimes mention relevant semantic components. In this study, I provide more detailed semantic analyses than those in FrameNet, explicitly showing how individual verbs evoking a given frame differ from one another.[126] A further shortcoming of a purely frame-semantic approach is that syntactic and valency behavior takes a back seat to semantic description. As such, Frame Semantics does not make any explicit claims about how verbs in a given frame behave syntactically. While the FrameNet database documents valency behavior for most LUs using corpus data, the amount of data annotated is too sparse to make solid claims about how FEs are realized (most LUs are associated with around 10 annotated sentences, but some LUs do not have any annotated data). To address this, my dissertation examines a larger

[126] These detailed meaning analyses allow for the identification of subtler grammatically relevant meaning components and, in some cases, finer-grained sub-classes than those posited in FrameNet.

number of examples than FrameNet for each verb to assess more accurately the valency behavior of both individual verbs and sets of verbs within a frame. These analyses will show the degree of overlap in valency patterns among verbs within a frame and may facilitate the prediction of valency behavior for novel verbs evoking a given frame.

Section 3.2 discussed (Cognitive) Construction Grammar and the analytical tools it provides for analyzing the syntax-semantics interface. A major insight in CxG research is that not only lexical items, but also grammatical structures contribute to the semantics of utterances. This has led to the identifications of high-level argument structure constructions with unspecified verb slots that nonetheless contain a schematic meaning, such as the Resultative or Caused Motion Constructions. ASCs are necessary to account for uses of verbs in novel valency patterns, such as the popular *sneeze the napkin off the table* example. The usage-based approach that characterizes CxG emphasizes that more abstract structures, such as ASCs, are abstractions over multiple instances of specific exemplars found in actual language use.[127] Other usage-based concepts crucial to CxG analyses are the importance of frequency information and the hierarchical organization of linguistic structures. Frequency plays a role in the present analysis, as I show how frequently individual verbs and verb classes appear in individual valency patterns, thus identifying tendencies for the syntactic behavior of verbs with a given meaning. Finally, the present study also posits hierarchical networks for verb classes, or, more specifically, for combinations of verbs within a given class with valency constructions.

At the same time, recent work within CxG has exposed some issues with Goldberg's (1995, 2006) formulation of the theory. Specifically, Goldberg's Semantic Coherence Principle and Correspondence Principle have been shown to generate verb-construction combinations that are not empirically attested. This has prompted scholars (Croft 2003, Iwata 2008, Boas 2012, Faulhaber 2011, among others) to analyze more closely the relation between verbs (with similar meanings) and abstract constructions. My project enhances this strand of research by showing that closely related verbs vary significantly in their constructional distribution, despite being associated with a small set of possible constructions in a given language. I capture this tension

[127] While the current study does not deal specifically with ASCs as in other works such as Michaelis and Ruppenhofer (2001), Boas (2003), or Iwata (2006), it shows how the participation of sets of related verbs in a given valency pattern may contribute to the constructional meaning of that pattern, as with the pattern [NP V NP into PP] having a 'change something into something else' meaning due to its frequency with verbs of Change.

between predictable and idiosyncratic valency behavior by more explicitly formalizing the relationship between Goldberg's principle's and the Valency Realization Principle proposed by Herbst (2014) to prevent this over-generation. This study also further advances CxG formulations of constructional hierarchies by proposing that verbs of a given class form a hierarchical network which captures both the full behavior of individual verbs and the general tendencies for verb classes. At present, only hierarchies for abstract ASCs and more general phrase structure constructions have been proposed.

Finally, the presentation of Valency Grammar in Section 3.3 highlighted the theory's emphasis on item-specific information, specifically its detailed, empirically-based descriptions of the full range of valency behavior for individual verbs. The descriptive focus of Valency Grammar has led its proponents (Faulhaber 2011, Herbst 2014, among others) to argue against the hypothesis that verbs with shared meanings also exhibit shared syntax (i.e. valency behavior). The current project shares this view of the importance of analyzing individual verbs before making more sweeping claims about the relation between verb meaning and argument structure. Specifically, I carry out verb-specific analyses of individual verbs' distribution across valency patterns based on corpus data.

However, the item-specific focus of VG often inhibits the identification of broader generalizations that capture shared behavior among related verbs. Specifically, VG does not allow for the formulation of verb classes or for constructs which may predict a verb's valency behavior based on its meaning. I thus aim to demonstrate how one may arrive at such generalizations by comparing the results of detailed verb-specific analyses and grouping verbs together if they share relevant aspects of meaning and syntax. Such empirically-grounded verb classes allow verbs to be associated to one another and to a range of possible valency patterns, only some of which may be applicable to any individual verb. I also address two other shortcomings of the VG approach taken in the creation of the VDE, namely its ineffective use of frequency data and semantic roles. Specifically, I provide more detailed descriptions of the frequency with which a verb appears with a given valency pattern, and I describe verbal complements using rich frame-semantic roles rather than the abstract numbering system employed in the VDE.

3.4.3. Summary

This chapter has introduced three usage-based cognitive theories of language that focus on problematic issues surrounding the syntax-semantics interface that are not adequately

accounted for by traditional approaches discussed in Chapter 2. Section 3.1 introduced Frame Semantics and its corresponding lexical database, FrameNet, and compared it in detail with traditional approaches based only on alternations, case roles, and verbal aspect. The section concluded by discussing some general issues with frame-semantic theory and some particular issues with the presentation and documentation of data within FrameNet, as well as recent work which uses Frame Semantics to provide in-depth analyses of verb classes and argument realization.

Section 3.2 introduced Construction Grammar, particularly as formulated by Goldberg (1996, 2005), with a particular focus on its application to data in which near-synonymous verbs behave differently with respect to grammatical constructions. I then presented some research that seeks to combine insights from Frame Semantics with Construction Grammar, before carrying out a cursory analysis of the argument structure constructions that occur with Change verbs. This section concluded with a detailed discussion of the hierarchical organization of constructions in inheritance networks, which have been proposed for more abstract 'syntactic' constructions or idiomatic constructions, but not yet for verb classes and valency patterns.

Section 3.3 introduced research on Valency Grammar, which has enjoyed much popularity within Germany, but is only now gaining ground in the American linguistics tradition. This introduction drew primarily on *The Valency Dictionary of English* (Herbst et al. 2004), which provides detailed and comprehensive valency descriptions for over 1,300 English words, and touched on various problems with the dictionary's organization and presentation. After briefly comparing Valency Grammar with Frame Semantics, I then discussed in detail several points of overlap and digression between Valency Grammar and Construction Grammar, focusing on the terminology employed in the two theories and various principles which have been proposed to predict the combination of verbs with valency constructions. I concluded the chapter by discussing Faulhaber's (2011a) important findings about the idiosyncratic nature of verb valency behavior.

Finally, this concluding section recapped the advantages of Frame Semantics, Construction Grammar, and Valency Grammar over traditional approaches, and discussed how these theories are combined and built upon in the present analysis. The following chapter presents the terminology and methodology employed in the remainder of the dissertation.

Chapter 4: Methodology

4.1. INTRODUCTION

In this chapter, I discuss the methodology underlying the analyses in the following chapters. In Section 4.2, I describe the primary analysis used to characterize the meanings and valency behavior of all classes analyzed here (English Change in Ch. 5, German Change in Ch. 6, English and German Theft in Ch. 7). Specifically, I describe my methodology for choosing verb classes (4.2.1) and then analyzing individual verbs' meanings (4.2.2) and valency behavior (4.2.3). Section 4.3 describes my approach to capturing both the shared behavior among verbs in a semantic class as well as idiosyncratic, verb-specific behavior at various levels of granularity. This approach is most relevant and demonstrated in the most detail in the English Change verb analysis of Chapter 5, but addressed less comprehensively for the other chapters. In Section 4.4, I briefly introduce the methods and goals of Chapter 6, where I compare Change verbs across German and English (4.4.1), and Chapter 7, where I compare Change and Theft verbs both within and across the languages (4.4.2). The methodology of those analyses are introduced in more detail in the respective chapters. This chapter also defines some of the key terminology employed in the dissertation (set off in italic font) and briefly situates the terms and methods in the broader literature.

4.2. PRIMARY ANALYSIS

In this section, I describe the methodology for selecting the verbs and verb classes to analyze and assessing their meanings and valency distributions. This methodology is explicitly demonstrated in Chapter 5 (English Change verbs) and Chapter 6 (German Change verbs). The data resulting from these analyses serves to capture both shared and unique behavior of verbs in a given class (Sections 4.3. and 5.4) and compare verb classes across languages (Sections 4.4.1 and Chapter 6) and across semantic domains (Sections 4.4.2 and Chapter 7).

4.2.1. Selection of verb classes and verbs

The first decision involves selecting two verb classes to analyze. One of the goals of this project is to improve existing verb classifications, such as those of Levin (1993), who herself states that her work "is likely to contain inconsistencies, omissions, and inaccuracies" (1993:19). Therefore, I surveyed the classes in Levin (1993) to identify classes which may exhibit such issues and could thus be better characterized through a more detailed empirical analysis. As

discussed in Section 2.2 and 3.1.2.1, for many Levin classes, individual verbs differ in their actual "alternating" behavior or there is an unclear fit between the verbs' meanings and their syntax. For instance, the verbs in Levin's *Turn* class (1993: 177 - 178) differ with respect to their syntactic behavior in transitivity constructions and with certain prepositional phrases. Also, Levin's *Steal* class (1993: 128 - 129) contains verbs with drastically different semantics, such as *withdraw*, *rescue*, and *capture*.[128] Such classes are prime candidates for further analysis, as they must be reformulated to better capture the relationship between verbal syntax and semantics.

After identifying potentially interesting classes, I checked FrameNet to ensure that frames roughly corresponding to Levin's classes had been created and populated with lexical units and annotated examples.[129] A second desideratum in choosing the verb classes was that the classes come from significantly different semantic domains involving very different types of arguments and relations between them. This is necessary for the cross-class comparison in Chapter 7, which compares verb classes of different semantic domains. Among the classes which fulfilled these criteria, I chose classes which potentially exhibit interesting cross-linguistic differences between German and English in terms of lexical semantics and the types of constructions the verbs are used with. This process resulted in the choice of verbs of Change verbs (e.g. *alter, turn*) and Theft verbs (e.g. *steal, embezzle*).[130]

The next step required choosing five to seven verbs in each class for detailed analysis. In choosing these verbs, it was important that the verbs vary in their meaning, in terms of both specific meaning components, their general semantic weight/level of descriptivity, and the range of constructions the verb appears in.[131] Furthermore, if any German-English verb pairs exhibited noteworthy differences in meaning components or constructional behavior, they were selected over verbs which do not exhibit these. It is, however, important to note that exact translation

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[128] Section 2.2 discusses specific problems with Levin's *Turn* class, and Dux (2011) discusses problems with Levin's *Steal* class.

[129] In some cases, Levin and FrameNet classes are quite similar, but in other cases the varying methodologies of the two approaches leads to significantly different classifications. See Section 3.1.2.1 as well as Baker and Ruppenhofer (2002) and Boas (2006, 2011b) for more on how Levin and FrameNet classes differ.

[130] More specific reasons for choosing these classes are discussed at the beginning of their respective chapters.

[131] One way to quickly and informally assess the range of valency constructions that individual verbs appear in was by consulting the valence pattern tables in FrameNet (see Section 3.1). Typically, verbs with larger tables have a higher range of syntactic possibilities than those with smaller valency tables.

equivalents are rare across languages, and most words in one language are mapped to multiple "translation equivalents" in another language (Snell-Hornby 1983, Jarvis and Pavlenko 2008: 82f.). Table 4.1 shows the classes and verbs chosen for investigation in this dissertation.

Class	English verbs	German verbs
Change	*alter, change, modify, transform, turn*	*ändern, abändern, verändern, verwandeln, wandeln,*
Theft	*steal, snatch, pilfer, embezzle, shoplift*	*stehlen, entwenden, klauen, mopsen, stibitzen, unterschlagen*

Table 4.1: Verbs and verb classes for analysis

The Change verbs provide the data for in-depth language-specific (Ch. 5) and contrastive analyses (Ch. 6), while the Theft verbs serve primarily as a comparison for the findings based on the Change verbs (Ch. 7).[132]

With respect to terminology, I refer to classes posited by Levin (1993) and FrameNet as *Levin classes* or *(FrameNet) frames*, respectively. After discussing differences between their classifications and arriving at my own criteria for grouping related verbs, I refer to this revised grouping of verbs simply as a *verb class*.[133] I refer to verbal lexemes that fit the criteria for grouping within a verb class as verbs or, more specifically verbs of the Change/Theft class. That is, unless otherwise specified, I use the term *verb* in the frame-semantic sense of a verbal lexical unit of a given frame, or a verb in one of its senses. This usage is distinguished from the term *lexeme* (Cruse 1986: 76f.), which refers to a phonological (or orthographic) string that may be associated with multiple senses. Thus, the lexeme *steal* corresponds to both a verb of the Theft class (as in *Pat stole money from Sue*) and a verb of the Self-motion class (as in *Pat stole across the room*).

4.2.2. Semantic analysis of verbs

The first step in the analysis of these verbs is to gain a general understanding of their meanings and possible differences in meanings between related verbs. Traditional dictionaries provide a good foundation for this type of research, and I thus consult various dictionaries and

[132] As such, the methodologies introduced in the remainder of this section and in Section 4.3 are discussed in the most detail for the English Change verb analysis, in slightly less detail for the German Change verbs (given that chapter's focus on contrastive comparisons), and in little detail for the Theft verbs.

[133] When referring to the verb classes, verbs, and semantic roles (i.e. Frame Elements) that I define and employ in this analysis, I do not follow the font styles employed by FrameNet (e.g. small caps for FEs, Courier New font for frame names), as some of my theoretical constructs differ from FrameNet's.

report on meaning differences noted in these resources.[134] The goal of the semantic analysis is to identify the meanings of the verbs. I first establish the *general meaning* of the verb class, which is the meaning that is shared among all verbs in the class. This meaning typically corresponds to the Frame Definition for FrameNet frames, and involves a characterization of the Frame Elements (FEs) (see Section 3.1) and the relationships among them. Based on a close analysis of the Change and Theft classes, I slightly modified the set of participants posited by FrameNet, and thus call the roles that I employ in the analyses *Revised Frame Elements (RFEs)*.[135] (Revised) Frame Elements are defined solely according to semantics and do not have any implications for their syntactic realization. I also distinguish between *core FEs*, participants which are essential for understanding the frame evoked by the verb, and *non-core FEs*, which are not essential to the frame but provide more adverbial information such as means, manner, location, iteration, and time setting, similar to adjuncts in terms of Case Grammar and Dependency Grammar (Tesnière 1959, Herbst 2014; Sections 2.3 and 3.1.2.2).

I also identify *(additional) meaning components* of individual verbs: semantic features that are not shared by all verbs of a class but further specify the general meaning of the class for certain (sets of) verbs within the class.[136] To arrive at meaning components, I begin with the full dictionary definitions for the given verb. Table 4.2 shows the full definition of the English Change verb *transform*, which includes not only Change senses but also other senses that do not strictly fall under the Change sense. For instance, parts (2) and (3) of the MW definition refer to domain-specific senses of *transform* used in mathematics and biology, respectively.

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[134] For English, I use the *Collins-Times English Dictionary and Thesaurus*, 2nd Edition (CT), the *American Heritage Dictionary of the English Languages*, 5th Edition (AH), and the online version of the *Merriam-Webster Dictionary* (MW; http://www.merriam-webster.com). For German, I refer to the online *Digitales Wörterbuch der Deutschen Sprache* (www.dwds.de; 'Digital Dictionary of the German Language), as well as print versions of *Duden Deutsches Universalwörterbuch* (7th edition), *Wahrig Deutsches Wörterbuch* and the bilingual German-English *Langenscheidts Grosswörterbuch Deutsch-Englisch* (1st Edition).

[135] After introducing the RFEs and discussing any differences from their characterization(s) in FrameNet in the introductory sections of Chapter 5 and Chapter 6, I then simply call them Frame Elements or arguments (e.g. the Cause_change argument) in the actual analyses in the remaining sections of these chapters.

[136] In Chapter 7, I describe how meaning components differ along several dimensions and propose a classification of meaning component types. (Additional) meaning components correspond to the modificants in Snell-Hornby's (1983; see Sections 3.1 and 7.1 for more details) approach, while the general meaning corresponds to her act nucleus.

MW	AH	CT
: to change (something) completely and usually in a good way **Full Definition of TRANSFORM** *transitive verb* **1** **a :** to change in composition or structure **b :** to change the outward form or appearance of **c :** to change in character or condition **:** convert **2** **:** to subject to mathematical transformation **3** **:** to cause (a cell) to undergo genetic transformation *intransitive verb* **:** to become transformed **:** change	*tr*. 1. To change markedly the appearance or form of: "*A thick, fibrous fog had transformed the trees into ghosts and the streetlights into soft, haloed moons*" (David Michael Kaplan). 2. To change the nature, function, or condition of; convert: *A stream engine transforms heat in to mechanical energy*. See Synonyms at **convert**. 3. *Mathematics* To subject to a transformation. 4. *Electricity* To subject to the action of a transformer. 5. *Genetics* To subject (a cell) to transformation. - *intr.* To undergo a transformation.	*vb* 1 to alter or be altered in form, function, etc. 2 (*tr*) to convert (one form of energy) to another form. 3 (*tr*) *Maths.* to change the form of (an equation, etc.) by a mathematical transformation. 4 (*tr*) to change (an alternating current or voltage) using a transformer.

Table 4.2 Full definitions for *transform* from Merriam Webster, American Heritage, and Collins-Times Dictionaries

Next, any irrelevant definitions are eliminated, including any sense of the lemma that evokes a different semantic frame (e.g. *turn* in "turn the car" is not relevant for the Change analysis) as well as conventionalized metaphorical expressions such as *steal a kiss*.[137] Finally, the remaining relevant meaning components are combined to identify all meaning components for a given verb. The general meaning and additional meaning components[138] comprise a verb's *semantic description*. Semantic descriptions provide much more detail than traditional dictionary definitions or the semantic characterizations in FrameNet. Specifically, semantic descriptions describe how individual verbs foreground and constrain certain aspects of the more general semantic frame and thus highlight how they differ from other verbs evoking the same frame.

[137] If such senses are excluded from analysis, their exclusion is specifically stated in the discussion of that verb's dictionary definitions.

[138] The semantic description of some verbs also includes pragmatic (e.g. informal/formal) or collocational information (e.g. *alter clothing*).

For example, after eliminating the technical (biological, mathematical, electrical) senses of *transform* from the entries in Table 4.2, two meaning components remain in addition to the verb's general Change meaning. The first component specifies that the change is drastic in some way, as evidenced in the introductory definition of MW ("completely") and definition (1) of AH ("markedly"). A second meaning component is only found in the introductory definition of MW ("usually in a good way"), suggesting that *transform* is also optionally associated with changes that are deemed positive. Given that individual dictionaries may characterize the same meaning component in different ways (e.g. *completely* vs. *markedly*), in some cases the meaning component from the dictionary definitions is rephrased slightly for clarity and economy. The meaning components for *transform*, or its semantic description, are summarized in Figure 4.2.

Transform
-Change verb -drastic changes -changes to improve (optional)

Figure 4.2 (Additional) meaning components for *transform*

After identifying the detailed meanings of each verb in a given class, including both semantic information (e.g. restrictions on argument types) and pragmatic information (e.g. register/formality), I create tables summarizing the meaning components associated with each verb in the class, which serve as the basis for the syntax-semantics mapping described in Section 4.3. These tables differ from class to class, as the dictionary definition analysis outlined above reveals that each class is associated with a different set of meaning components. The meanings of Change verbs, for instance, vary with respect to whether the change is subtle or drastic, whereas Theft verbs vary with respect to the value and type of goods that are stolen, among others. Table 4.3 shows a portion of the full meaning component table for English Change verbs. Each meaning component corresponds to one row in the in the meaning component table, as specified by its label in the first column. The other rows refer to the verbs under analysis. If a verb exhibits a given meaning component, then the appropriate cell includes a + symbol. For example, the table shows that all three of *alter, change,* and *modify* have the basic Change semantics as specified with + symbols in the column for "Make/become different." Of the three verbs, only *alter* and *modify* denote subtle changes, and the fact that *change* does not have this restriction is captured by leaving the appropriate cell empty.

Component	Alter	Change	Modify
Make/become different	+	+	+
Subtle Change	+		+
Drastic Change			
Change for a purpose			+
Change to make less extreme			+

Table 4.3: Portion of full meaning component table for English Change verbs

The meaning analysis allows for the identification of *semantic sub-classes*, which contain sets of verbs within a class that share some meaning components. For instance, *alter* and *modify* comprise a semantic sub-class, as they both have the "subtle" change meaning component, but there is no semantic sub-class for "change for a purpose" verbs, because only *modify* has this meaning component. As Levin classes and FrameNet frames provide the basis for the more general frame membership, semantic sub-classes are more fine-grained and capture shared additional meaning components among verbs evoking the same general frame. The meaning summaries such as those demonstrated in Table 4.3 provide the basis for the identification of grammatically relevant meaning components and, where possible, for the formulation of syntactic-semantic sub-classes based on such meaning components.[139]

The English Change verb analysis in Chapter 5 involves an investigation of each verb's level of descriptivity (i.e. semantic weight; Snell-Hornby 1983).[140] To measure verb descriptivity, one point is assigned for each meaning component that applies to a verb's meaning, and the verbs are then grouped into three categories according to the number of meaning components identified, namely high-descriptivity, medium-descriptivity, and low-descriptivity. Low-descriptivity verbs do not have any additional meaning components beyond the shared general meaning of the class, as with *change*. Medium-descriptivity verbs have one additional meaning component, and high-descriptivity verbs have two or more additional meaning components. Measuring the relative descriptivity level of each verb allows me to then test Boas's (2008a) claim that verbs with high descriptivity tend to appear in a narrower range of argument structure constructions. This analysis

[139] The process for utilizing these summaries is discussed in more detail in Section 4.3.

[140] In addition to its brief presentation in Section 3.2, I discuss Snell-Hornby's (1983) concept of verb descriptivity and Boas's (2008a) application of the concept to Frame Semantics in more detail in Sections 6.1 and 7.1, because it is more closely related to the topics of those chapters.

also relies on the syntactic (valency) data arrived at using the methods described in the next sub-section.

4.2.3. Valency analysis

4.2.3.1. Use of corpora

This section describes how I utilize corpus data to arrive at an accurate characterization of the valency behavior of the analyzed verbs. For English, I use the *Corpus of Contemporary American English* (COCA; http://corpus.byu.edu/coca; Davies 2008-), which contains over 450 million words, including 20 million words for each year from 1990 to 2011. The corpus includes over 160,000 texts equally divided among five general genres (spoken, fiction, popular magazines, newspapers, and academic journals). COCA is also easily searchable and offers a "Random Sample" function which facilitates the balanced and representative extraction of data. For the English Change verbs, I extracted 1,000 instances each for *change* and *turn*, and 500 each for *alter*, *modify*, and *transform*, because *change* and *turn* are highly polysemous and thus return many examples with undesired non-Change senses of the lemmas. As the corpus includes only data from 1990-2011, the dates of the search were not limited. After filtering the data as described in the following paragraphs (and in Section 5.3), a total of 549 sentences were analyzed.[141]

For the German Change verbs, I use the *Kernkorpus 20* ('main corpus – 20th century') from the *Digitales Wörterbuch der deutschen Sprache* (DWDS; http://www.dwds.de; 'Digital Dictionary of the German Language'). This corpus contains over 100 million words from throughout the 20th century, with texts taken from five genres: fiction, journalistic prose, specialized texts, everyday texts, and transcriptions of spoken language. The DWDS corpus is also easily searchable and offers a "Random Sample" option to increase the representativeness of data. I applied this option to my search of German verbs. Furthermore, I limited results to only those instances from 1970 and later, in order to maintain relative temporal uniformity among the German data and between German and English data.[142] Because the DWDS corpus is much smaller than COCA, it does not always contain 500 sentences for each verb under analysis. In this case, all sentences containing the verb are extracted and the number of sentences is noted in the respective sections. Because some German Theft verbs appear very infrequently in the DWDS

[141] The data analysis and amount of examples for Theft verbs is discussed in Section 7.

[142] While the English data range from 1990-2011, limiting the DWDS corpus search to the years after 1990 would result in too little data.

corpus, I use the Deutsches Referenzkorpus (DeReKo; Kupietz et al. 2010) housed at the Institute of German Language (IDS) for the German Theft data discussed in Chapter 7. These were accessed and extracted through the web interface of COSMAS-II. DeReKo contains over 25 billion words of German written text from various genres, from around 1950 to the present. Again, I extract 500 or 1,000 examples for each verb.

The corpus sentences are used to assess the range of constructions that verbs in a given class may appear in. From the core data (i.e. the 500 or 1,000 sentences), I remove all sentences which exhibit verb senses that differ from those under investigation (e.g. *turn* as rotational movement rather than change, as in *turn the car into the driveway*). I also limit the analysis to active sentences, so I remove sentences in which the relevant verb appears in a passive or imperative clause. Examples are also excluded from the analysis if the verb appears in relative or infinitival clauses making it difficult to relate all arguments to FEs in a straightforward manner.[143]

From the filtered data, I analyze 75-135 valid sentences per verb.[144] If the first 75 sentences with a given verb are fairly uniform (with respect to their valency properties), then I do not necessarily analyze more sentences with that verb. If the first 75 exhibit a wide degree of variation, then I analyze examples (up to 135). The number of examples analyzed here strikes a balance between the lexicographic orientation of Valency Grammar (*VDE*, Faulhaber 2011) and FrameNet (Ruppenhofer et al. 2010), which seek to describe a verb's full range of complementation patterns and thus list every valency construction attested regardless of its frequency, and the big data orientation of other work in corpus linguistics which involves automated analysis of a much more specific, predetermined aspect of valency behavior based on much larger amounts of data (Lapata 1999, Gries and Stefanowitsch 2004). While a larger number of examples would surely be desirable, analyzing approximately 100 examples per verb gives a good general picture of the verb's valency behavior, especially for the purposes of a comparative analysis of five verbs in a semantic class.

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[143] Although these data are interesting, they interact closely with other construction types (e.g. clause formation for passive, NP modification for relative clause) and thus may distract from the present focus on valency constructions and argument realization among verb classes. See Section 5.3 for more on which example types are included and excluded in the analysis.

[144] This is not the case for *abwandeln* in the analysis of German Change verbs, which rarely occurred in simple active constructions and thus resulted in only 22 examples analyzed. I thus compared the findings resulting from this small dataset with data from the DeReKo COSMAS corpus to ensure their accuracy.

4.2.3.2. Documenting valency: valency constructions, valency distribution, valency behavior

These corpus examples correspond with "exemplars" in usage-based frameworks (Section 3.2, Croft 2003, Bybee 2013), which are concrete instances of language use whose repeated exposure and production give rise to more abstract linguistic generalizations, such as phrase structure rules or argument structure constructions (see also Herbst 2014). To introduce the terminology I employ, examples consist of a verb combined with a set of *arguments*, which are defined as any phrase (including clausal phrases) that occurs in a sentence with a verb. Arguments can be characterized according to either their semantic role/FE (e.g. the Agent argument) or according to formal or functional properties (e.g. the prepositional argument). While some arguments are instantiations of core FEs, others are peripheral or non-core FEs (Ruppenhofer et al. 2010) or adjuncts (Tesnière 1959, Herbst 2014). While I generally use *argument* to refer to both core FEs that are closely related to the verb as well as non-core FEs (adjuncts), I occasionally use the terms *core FE* or argument and *non-core FE* or argument to highlight the difference. This more general use of "argument" is required, as the distinction between obligatory and optional arguments is not always undisputed and forms more of a continuum (Section 2.3, Herbst 2014).

In documenting the verbs' argument realization patterns, I draw on the methodology of FrameNet and Valency Grammar which maps verb-(class-)specific semantic roles (FEs) with their phrase type and grammatical function. I refer to such constellations of FEs, phrase types, and grammatical functions as *valency constructions*, which I contrast with related theoretical concepts in the next sub-section.

The core FEs Cause_change argument (C) which causes the change, an Undergo_change argument which undergoes the change, as well as the Original_state (O) and Final_state (F) of the Undergo_change argument, representing its states before and after the change, respectively. Each occurrence of the given FEs is then associated with its grammatical function (GF) and phrase type (PT) in the given sentence. Each sentence is then annotated with the full constellation of FEs and their respective GFs and PTs. To demonstrate, the sentence "*Sam changed Pat from a person into a frog*" occurs with all four roles. The C (*Sam*) is a NP subject, the U (*Pat*) is a NP direct object, the O (*from a person*) is an oblique PP headed by *from*, and the F (*into a frog*) is in an oblique PP headed by *into*. Table 4.4 shows how the concrete example is associated with the valency construction by mapping each word to a FE, PT, and GF.

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	Sam	changed	Pat	from a person	into a frog
ROLE	C	verb	U	I	F
PT	NP	VP	NP	PPfrom	PPinto
GF	SUBJ		OBJ	OBL	OBL

Table 4.4: Documentation of valency construction based on an example

The fully spelled out formalization of this VC reads as follows: [C.NP.Subj + verb + U.NP.Obj + O.PPfrom.Obl + F.PPinto.Obl]. For reasons of simplicity, within the text and certain figures and tables, a short-hand description is used here, which only provides the FE labels, their relative ordering, and any prepositions or other words (e.g. complementizers) that introduce the FEs. For instance, the valency construction in Table 4.4 is represented as: [C _ U from O into F]. These briefer labels are easier to read and take up less space. In the analyses of English and German Change verbs in Chapters 5 and 6, respectively, I also develop more formal labeling systems to characterize and categories individual valency constructions available to a given verb class, in order to capture similarities among the individual VCs. For instance, valency constructions for English Change verbs fall into categories of various types, such as transitive vs. intransitive VCs, or VCs with vs. without Final_state and/or Original_state arguments. The labels and VC classes are described in more detail in Sections 5.3 (for English Change) and 6.2 (for German Change).

After analyzing the valency constructions in corpus data for each verb, I produce tables summarizing each verb's *valency distribution*: the specific set of valency constructions the verb appears with based on the corpus data, as well as how frequently it appears in each valency construction. Table 4.5 below shows the valency behavior of *change*. The second row of the valency distribution table shows that *change* appears most frequently in simple transitive VCs without any oblique (state) arguments (i.e. [C _ U]), as these comprise 55% of the analyzed corpus examples for *change*. The next most frequent VC for *change* is the simple intransitive VC (i.e. [U _]), comprising 42% of the analyzed examples, as seen in the fifth row of the table. The three other VCs found with *change* each occurred only one time and comprised (less than) 1% of its data.[145]

[145] The Supplementary Materials document published electronically with this dissertation contains all of the analyzed corpus sentences and the valency construction documented for each sentence.

VC	Freq.	%	Pattern	Example
T2[146]	74	55%	[C.NP.Subj + verb + U.NP.Obj]	Barbed wire would CHANGE **everything**, […][147]
T3b	1	1%	[C.NP.Subj + verb + U.NP.Obj + F.toPP.Obl]	Should Canada CHANGE **its clocks** *to the American standard*?
T4b	2	1%	[C.NP.Subj + verb + U.NP.Obj + O.fromPP.Obl + F.toPP.Obl]	He […] CHANGED **the sport** from shamateur *to professional*.
I1	56	42%	[U.NP.Subj + verb]	[…] but **the plans** have CHANGED, [...]
I2a	1	1%	[U.NP.Subj + verb + F.intoPP.Obl]	At six, **it** CHANGED *into "One Man's Family."*

Table 4.5: Valency distribution of *change*

Based on the precise valency distribution of a verb, more general statements can be made about the verb's distribution across types/classes of valency constructions, referred to as a verb's *valency behavior*. For instance, the data suggest that *change* is equally frequent in transitive VCs (rows 2-4) and intransitive constructions (rows 5-6). Another property of *change*'s valency behavior is that it only rarely occurs in VCs realizing the Final_state (or Original_state) FEs. The valency behavior of each verb is used in the formation of (syntactic) sub-classes and the identification of grammatically relevant meaning components, as discussed in 4.3.

Again, given the relatively small amount of examples analyzed, the valency distributions arrived at in the analysis may not precisely reflect the verbs' complete valency behavior for various reasons. For one, this is simply not enough data to make broad generalizations. Ideally, one would be able to optimize the corpus search to automatically extract all constructions in the entire corpus that each verb appears in (and how frequently).[148] However, automatic methods are complicated by the high degree of polysemy of English verbs, which leads to inaccurate parsing and annotation (e.g. the *from* phrase interpreted as Original_state in *She changed the man from*

[146] The labels in this column are used to classify sets of VCs for a given verb class, as described in detail in Section 5.3. The first digit refers to whether the VC is transitive (T) or intransitive (I), the second refers to the number of arguments (including oblique or clausal arguments) in the VC, and the third refers to how the F argument is syntactically realized.

[147] FEs are annotated in the examples as follows: C is underlined, U is in bold font, F is in italics, and O is marked with dotted underlines. The target verb is in capital letters. This annotation scheme is arbitrarily chosen and differs from standard FrameNet FE annotation formats (i.e. with FE labels in subscripts next to the phrases instantiating them) for reasons of space.

[148] In this respect, the present analysis is reminiscent of the highly detailed studies of verb valency that characterizes work in Lexicon Grammar (Salkoff 1983, Gross 1994).

Austin into a frog) or the extraction of irrelevant verb senses (e.g. *turn* as rotational movement). On the other hand, the corpus search also reveals constructions that are not acceptable to all native speakers. This is due to the nature of corpus data, where sources may include figurative, literary, or genre-specific language that differs from everyday language use. Furthermore, as with any linguistic data, there will be a high degree of inter-speaker and dialectal variation and the exact results may differ for individual speakers. As such, it is expected that this small-scale manual analysis will at least give a good general picture of the range of constructions available to individual verbs and verb classes, but it will not be substantial for claims about the exact frequency and number of verb-construction combinations.

4.2.3.3. The theoretical status of "valency constructions"

Adopting ideas from Cognitive Grammar and Construction Grammar, each example can be seen as a specific exemplar or instance/instantiation of a more general construction, where *construction* is understood as a pairing between form and meaning. As this work focuses on constructions that involve combining a verb with its arguments, the form side of the construction is defined according to the phrase types and grammatical of arguments in the sentence, following the practice in FrameNet (Ruppenhofer et al. 2010). The meaning side of the construction is defined according to the (R)FEs instantiated by arguments in the sentence. The syntactic side of the construction corresponds to Herbst's (2014) definition of "valency pattern," to the grammatical portion of valency reports in FrameNet lexical entries, or to the term "syntactic frame" used by Pinker (1989) and Schuler (2005). The semantic side of the construction corresponds to Herbst's (2014) "participant pattern" or to the *Frame Element Configuration* in FrameNet (i.e., the FE portion of FrameNet valence pattern tables).

Constructions are assumed to exist at varying levels of abstraction and granularity (see Langacker 2000, Croft 2003, Boas 2011b). As such, individual examples can also be seen as instantiations of constructions at different levels. The various granularities of analysis for constructions involving verbal argument realization are represented in Figure 4.1 below. At the lowest, most specific level (see bottom of Figure 4.1), a construction can be seen as a pairing of an individual verb and the phrases that fill its argument slots with a specific interpretation of each argument and the sentence as a whole. This level of construction is most closely related to concrete instances experienced in language use. These are called "verb-specific constructions" by Croft (2003), "mini-constructions" by Boas (2003), and "valency constructions" by Herbst

(2014). In frame-semantic terms, verb-specific constructions refer to a specific combination of FEs realized in specific phrase types and grammatical functions with a specific verbal LU. The verb-specific construction in the bottom of Figure 4.1, for instance, has as its formal side the verb *transform* combined with a nominal subject argument, a nominal object argument, and an oblique prepositional argument introduced by *into*. On the meaning side, the nominal subject corresponds to the entity which causes the transforming event, the nominal object argument corresponds to the entity which is transformed, and the prepositional argument corresponds to the state of the object after the transforming event.

NP.Subject	Verb	NP.Object	intoNP.Oblique
Agent		Patient	Result_state

(Abstract) argument structure construction

NP.Subject	Change-verb	NP.Object	intoNP.Oblique
Cause_change		Undergo_change	Final_state

Verb-class-specific construction

NP.Subject	transform	NP.Object	intoNP.Oblique
Cause_change		Undergo_change	Final_state

Verb-specific construction

Figure 4.1: Valency constructions at various levels of abstraction

At a slightly higher level of abstraction are *verb-class-specific constructions* (Croft 2003; see middle of Figure 4.1), whose formal side consists of a configuration of arguments defined according to phrase type and grammatical function along with any verb from a specified verb class. The semantic side of verb-class-specific constructions consists of the specification of which FEs each syntactic argument instantiates and a general interpretation of the construction's meaning. Verb-class-specific constructions arise from recurrent use of and exposure to verb-specific constructions which involve semantically related verbs and have similar interpretations. The formal side of the verb-class-specific construction in the middle of Figure 4.1, like that of the verb-specific construction, consists of a nominal subject, a nominal object, and a prepositional argument headed by *into*. Unlike the verb-specific construction, however, the verb slot does not contain a specific verb (e.g., *transform*), but may be filled by any verb in the class of Change verbs (provided that the verb is associated with this syntactic configuration (see Herbst 2014).

The meaning side of this verb-class-specific construction also relates the subject to the entity which causes the change, the object to the entity undergoing the change, and the prepositional argument to the resulting state of the change. The meaning of the verb-class-specific construction, however, is more abstract than that of the verb-specific construction, as the event is not specific as with *transform*, but rather a more general changing event.

At the highest level of analysis are abstract *argument structure constructions* (Goldberg 1995: 3) which pair a set of arguments and any verb with a more abstract meaning than that associated with verb-class-specific constructions. Argument structure constructions are not associated with verb-class-specific roles/FEs, but with more abstract semantic roles such as Agent, Patient, and Recipient (i.e. *argument roles* in Goldberg 1995, 2006 and Herbst 2014). The verb slot in such constructions is not limited to an individual verb (as with verb-specific constructions) or a class of related verbs (as with verb-class-specific constructions), but may be filled by any verb provided that the verb's semantics align with that of the construction (see Goldberg 1995, 2006). The existence of argument structure constructions allows verbs not typically associated with a given sense to be used productively in new syntactic contexts with a new meaning. Thus, while the verb-class- and verb-specific constructions associated with Change verbs (e.g. *change, turn, transform*) and their default interpretations are not particularly novel in the [NP V NP into NP] context, abstract argument structure constructions license speakers to use verbs outside of the Change class to express a "change" meaning, as with sentences such *She beat him into submission*, or *They talked me into doing it.*[149]

As the present study focuses on the valency behavior of individual verbs and verb classes, the high-level argument structure constructions are not treated in as much detail as they would be in a study of a specific construction. Instead, I focus primarily on verb-specific and verb-class-specific constructions. In many cases, a clear distinction between these two construction types is not useful. For instance, in discussing the frequency of a construction among all verbs within a class, the construction may be viewed as either a verb-class-specific

[149] A single syntactic configuration of arguments may be associated with multiple argument structure constructions. The pattern [NP V NP into NP], for instance, is the formal side of (at least) two argument structure constructions. One of these has a "cause change of state" interpretation, as with Change verbs, while another argument structure construction pairs this form with a "cause change of location" interpretation, as exemplified in sentences such as *He turned the car into the driveway*, or *She poured water into the cup*. See Goldberg (1995: 81f.) for additional details.

construction or a set of closely related verb-specific constructions. For this reason, I use the term *valency constructions* to refer to verb- and verb-class-specific constructions jointly. I abbreviate this term as *VC* and also simply refer to valency constructions as *constructions*, when it is obvious that verb-(class-)specific valency constructions are under discussion.

4.3. CAPTURING GENERALIZATIONS AND IDIOSYNCRASIES IN VERB CLASSES: VALENCY FRAMES, SUB-CLASSES, AND FRAME-BASED VERB ENTRIES

In this section, I present my approach to the second major research question of how to account accurately for both shared properties and idiosyncratic behavior among verbs in a given class. This approach is described in more detail in Section 5.4 and demonstrated explicitly only for the English Change verb class. A less detailed account of the approach based on German Change verb data is provided in Appendix E but not included in the main text. I do not carry out this methodology in detail for Theft verbs, but only briefly describe how it can be applied to other verb classes on the basis of a single Theft verb.

To capture both shared and idiosyncratic behavior in the meanings and valency of verbs within a given class, I propose that verbal lexical entries require various levels and types of information. In the following, I demonstrate how I arrive at such *frame-based verb entries (FBVEs)* and briefly mention the theoretical advantages of such entries.[150] The frame-based verb entry contains five types of information which capture both the systematic and idiosyncratic aspects of a verb's semantic and syntactic behavior. These levels are summarized in Table 4.6 and described in the following paragraphs.

[150] The theoretical implications of FBVEs are laid out in more detail in Section 5.4. Again, I discuss FBVEs and valency in the most detail with English Change verbs and in some detail for German Change verbs, but only cursorily for the Theft verb analysis.

Level	Character-ization	Information	Example
Valency frame	Synt-sem; Systematic	-coarse-grained shared meaning -all constructions available to any verb	[CHANGE] Semantics: (Agent causes) Undergoer to undergo change Syntax: full list of transitive/intransitive constructions and various configurations of initial and final state
Sub-frame	Synt-sem: Systematic	-verb sets which share grammatically relevant meaning components	[MINOR CHANGE] Semantics: change is subtle Syntax: no resultative, no intransitive, no states in PP
Additional semantic properties	Sem: Idiosyncratic	- additional meaning components not captured by sub-frame	*modify* – "change in order to improve"
Additional valency properties	Synt: Idiosyncratic	additional restrictions or "special constructions" not captured by sub-frame	*turn* – can appear in resultative
Other	Idiosyncratic	additional information: register, pragmatics, domain-specific	*modify* – has a specific use in the domain of grammar, e.g. *adjective modifies a verb*

Table 4.6: Levels of information in frame-based verb entries

Valency frame

The most systematic and general type of information is the verb's *valency frame*, which includes both the frame-semantic characterization of the meaning shared by all members of the class (often corresponding to FrameNet frame definitions), as well as the full range of constructions which are available to any verbal LU in the class, or its *constructional range*.[151] Change verbs, for instance, all share the meaning that an Undergo_change participant changes from an Original_state to a Final_state, and that the change may be caused by a Cause_change

[151] My use of the term *valency frame* here differs from the conception of a *semantic frame* as in Frame Semantics, as described in Section 4.1. In particular, semantic frames merely describe the meaning of LUs, whereas the *valency frame* also includes a syntactic description of the range of valency constructions that all verbal LUs of a *semantic frame* occur in, in the form of the valency frame's constructional range.

participant. The constructional range includes all valency constructions attested in the syntactic analysis.[152] The constructional range of English Change verbs is given in Table 4.7.[153]

	Pattern	Example
T2[154]	**C _ U**	Pat changed Sam.
T3a	**C _ U into F**	Pat changed Sam into a frog.
T3b	**C _ U to F**	Pat turned Sam to stone.
T3c	**C _ U F.CP**	Pat changed it to do something different.
T4a	**C _ U from O into F**	Pat changed Sam from a person into a frog.
T4b	**C _ U from O to F**	Pat changed Sam from a prince to a frog.
I1	**U _**	Sam changed.
I2a	**U _ into F**	Sam changed into a frog.
I2b	**U _ to F**	Sam turned to stone.
I3a	**U _ from O into F**	Sam turned from a prince into a frog.
13b	**U _ from O to F**	Sam turned from a prince to a frog.
TR3	**C _ U F.result**	Pat turned Sam blue.
IR2	**U _ F.result**	Sam turned blue.

Table 4.7: Constructional range of the English Change valency frame

As noted above, the VCs comprising the constructional range of a valency frame often exhibit intricate interrelations, allowing them to be categorized along different parameters. I develop a formalized labeling system to classify the individual VCs (for the English and German Change verb data) and capture similarities among them (see Sections 5.3 for English Change and 6.2 for German Change). In addition to these labeling systems, I also propose that VCs of a given valency frame form an inheritance network, with VCs that provide more information about a given scenario (e.g. by overtly expressing more FEs) inheriting information from less specific VCs (e.g. which have fewer FEs). The networks also capture differences in the specific realizations of the same (set of) FE(s), as well as distinguishing permissible and impermissible combinations of FEs and realizations.[155]

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[152] Other constructions identified in the analysis but not listed in Table 4.7 include adjectival states (*from dark to light*), arguments realized as *wh-* phrases (*This changes how we do things*.), and clausal realizations of the Final_state argument (*I modified it to work better*.).

[153] The constructional range differs from the syntactic criteria Levin (1993) uses to define her classes. Specifically, Levin (1993) classification relies on intuitively determining the grammaticality of verbs in a set of pre-defined alternations. In this dissertation, the syntactic (valency) properties are not predetermined but identified through a corpus analysis of sentences containing the verb(s) in question.

[154] See Footnote 18 above for a brief description of the VC labels in this column. The labels are described in much more detail in Section 5.3.

[155] For more detail on the constructional networks in valency frames, see Section 5.4 for English Change.

The valency frame thus overcomes some issues with FrameNet frames addressed in Section 3.1.3. As the name indicates, valency frames provide an explicit and empirically grounded statement of the valency behavior of the class members. Valency frames thus improve on FrameNet frames, as one may only arrive at the potential valency behavior of verbs within a FrameNet frame by analyzing each verb's valency reports in detail, most of which are only supported by 10-20 annotated examples and thus may not include all potential valency constructions. Valency frames also more explicitly and systematically address the parameters along which individual verbs vary from one another semantically, whereas FrameNet entries provide only brief, informal prose definitions for verbs. Furthermore, valency frames identify which groups of verbs within a given class are more similar to one another. Finally, the data-based approach allows for a more dynamic characterization of verb classes that may capture facets of language change – specifically, the valency frame may be expanded or refined as more verbs are analyzed or if verbs undergo diachronic change in their syntactic or semantic behavior.

(Syntactic-semantic) sub-classes

The next level of information, the verb's syntactic-semantic sub-class, is not as systematic or coarse-grained as the frame information, but captures subtler similarities in the mapping of syntax and semantics among smaller groups of verbal LUs. A *(syntactic-semantic) sub-class* is a set of verbs within the class which share both an additional meaning component and some properties of valency behavior (e.g. tendency towards transitive or intransitive, preposition type for oblique arguments). The meaning components that are shared among verbs of sub-class are potential *grammatically relevant meaning components*, in that they influence the valency properties of the verbs they apply to.

The sub-class specification of a FBVE, as in the third row of Table 4.6, apply additional meaning components or restrictions on their verbs, and they restrict the number of constructions in the constructional range which the verbs can appear in. I arrive at syntactic-semantic sub-classes by comparing the semantic sub-classes based on the meaning analyses and the syntactic sub-classes based on the valency analyses. In the first step, the meaning component tables for each class are consulted to identify verbs which share detailed meaning aspects that vary from the frame's general semantics. Recall that semantic sub-classes are posited for each meaning component, and include all verbs which share the given component. For instance, one semantic sub-class of Change verbs includes verbs which denote 'minor' changes, namely *alter* and

modify. Another sub-class includes verbs which denote changes that are typically done with a 'purpose' in mind, namely *modify* and *transform*. In this case, *modify* belongs to two semantic sub-classes, as it shares the 'purpose' meaning component with *transform* and the 'subtle/minor' meaning component with *alter* (Table 4.8).[156]

Semantic sub-class	Meaning component	Members
Minor Change verbs	denote subtle changes	*alter, modify*
Purposive Change verbs	typically denote changes which are carried out to fulfill a specific purpose	*modify, transform*

Table 4.8: Portion of semantic sub-classes for English Change verbs

Based on the valency analysis, I formulate syntactic sub-classes, positing syntactic sub-classes for each (class of) valency construction(s) which include the verbs that are acceptable in that construction (Table 4.9). One such class includes Change verbs that appear in bare intransitive constructions without any prepositional/oblique phrases expressing the Original_state or Final_state, as in *John has changed/transformed.* This class only contains the verbs *change* and *transform*, as the other Change verbs do not appear in this valency construction. A more common valency construction is the simple transitive construction with no prepositional arguments, whose syntactic sub-class includes all analyzed Change verbs except for *turn*.

Syntactic sub-class	VC	Members
Simple intransitive VC	[NP.Undergo + verb] (John changed)	*change, transform*
Simple transitive VC	[NP.Cause + verb + NP.Undergo] (Mary changed John)	*alter, change, modify, transform*

Table 4.9: Portion of syntactic sub-classes for English Change verbs

The syntactic and semantic sub-classes shown in Tables 4.8-4.9 provide the basis for mapping the verbs' specific frame semantics to their constructional behavior with more accuracy. Comparing the syntactic and semantic sub-classes facilitates the identification of detailed meaning components which influence syntactic behavior. For instance, I show in Section 5.2.4 that English Change verbs which are semantically restricted to subtle or minor changes do not appear with prepositional phrases denoting the Original_state or Final_state arguments, thus showing a correspondence between the meaning component [+subtle change] and infelicity in the constructions(s) [NP V (NP) into PP)]. If a set of verbs contain (an) identical meaning

[156] Cross-classifying a single verb into different sub-classes is not a problem in a splitting, rather than lumping, approach to lexical semantics (Kilgarriff 1999).

component(s) and are subject to similar constructional constraints, then a new *(syntactic-semantic) sub-class*[157] is posited to capture this systematic correspondence. On the other hand, if verbs with shared meaning components do not exhibit similar syntactic behavior, then a sub-class is not posited. Again in Section 5.4, I posit a sub-class of "minor change verbs" which includes *modify* and *alter*, because the verbs differ from other Change verbs in that they share a grammatically relevant meaning component ("minor change") and typically do not appear with prepositional State arguments or in intransitive constructions: **Pat altered/modified (into a frog)*. The verb pair *modify* and *transform*, which share the 'purpose-oriented' meaning component, however, do not comprise a sub-frame, because their syntactic behavior is significantly different (i.e. *transform* can appear in intransitive constructions and is frequent with State arguments, which is not the case for *modify*).

Other categories of the FBVE

The next two levels of a frame-based verb entry include additional meaning components and additional syntactic properties that are not accounted for with reference to the verb's frame or sub-frame. The verb *modify*, for instance, is the only English Change verb with the meaning component "change in order to improve," so this must be listed specifically as an additional meaning component in the verb's frame-based verb entry. *Modify* also differs from other Change verbs with respect to its valency, for instance in that it occurs more frequently than other Change verbs in VCs expressing the Final_state in a purposive clause. The final level of information includes any additional restrictions on verb use that do not pertain specifically to its meaning or constructional behavior. These include domain-specific uses of the verb or pragmatic (e.g. genre, register) properties.

Table 4.10 shows a sample FBVE for the verb *modify*, with additional details specifying the content of its valency frame and sub-class.

[157] Sub-classes correspond roughly to Levin classes and FrameNet frames, but are much more fine-grained as they include only a sub-set of the verbal members of those classes which share additional meaning components and valency properties that are not shared among all verbs of the broader Levin and FrameNet classes.

Verb	*modify*
Frame	CHANGE *This provides the:*[158] *-General (shared) meaning of Change verbs* *-Constructional range (see Table 4.7)*
Sub-class	MINOR CHANGE *-contains* alter *and* modify *-denote subtle or minor changes (no drastic category changes)* *-specifies that these verbs rarely occur in intransitive VCs* *-specifies that these verbs rarely occur in VCs with Initial_state or Final_state in prepositional phrases*
Additional Meaning	--change in order to improve, make more acceptable, less extreme --change for a specific purpose
Additional Syntax	--Relatively frequent in: T3c *(i.e. transitive VCs with subordinate clauses describing the Final_state of the change, as in "He changed it so it would work better.")*
Other	--Special sense includes grammatical changes, as in adjectives modifying nouns.

Table 4.10: Frame-based verb entry for *modify*, along with details

The second row states that *modify* is a Change verb and thus has the same general semantics as other Change verbs, as well as the potential to appear in any valency construction in the constructional range of the Change valency frame. The third states that *modify* is a member of the "minor change" sub-class, which has the semantic repercussion that it does not refer to drastic, categorical changes and the syntactic repercussions that it rarely (if ever) appears in intransitive VCs or VCs with prepositional Final_state arguments. The remaining three rows specify information that is particular to *modify* and not shared with other verbs in the (sub-)class. Specifically, it has the additional meaning component of referring to changes involving a specific purpose, it appears in valency constructions that include clauses headed by *to* or *so (that)* which specify the result of the change. The final column specifies the pragmatic property of *modify* that it has a specific sense in the semantic domain of grammar/linguistics.

Summary

The frame-based verb entry can thus be seen as a very rich dictionary entry which captures numerous types of information about the verb at numerous levels of granularity,

[158] The italicized words are not part of the FBVE, but serve to clarify information in the FBVE that is specified at the more general valency frame or sub-class levels.

especially information pertaining to its meaning and valency behavior. The valency frame specification contains the general frame-semantics and constructional range that determines the possible configuration of Frame Elements for verbs within a given frame. It also provides the verb-class specific semantic roles and all possible syntactic configurations of these, thereby limiting the amount of syntactic information needed in individual verb entries by excluding all irrelevant constructions.[159] The sub-class information provides even more detail and captures subtler aspects of meaning and form that are not captured by existing verb classes, yet display systematic syntactic-semantic correspondences that result in highly predictive classes (albeit with a smaller number of verbs). For verbs that fall into sub-frames, very little additional idiosyncratic information is needed to capture all aspects of the verb's behavior. The categories of additional meaning components and additional syntactic properties then serve to describe any other idiosyncratic aspects of the verb's behavior which are not captured by the frame or sub-frame. For verbs with sub-class specifications, these categories generally do not require many additional stipulations, but are necessary for full accuracy in formulating verbal lexical entries. Finally, the "Other" category accounts for properties of the verb which do not directly relate to its syntax or semantics, but are nonetheless important for proper usage of the verb, such as register and formality constraints. The various levels of information about verbs found in frame-based lexical entries thus bridges the gap between approaches seeking minimal characterizations of broad-ranging generalizations over verb classes, such as Pinker (1989) or Rappaport-Hovav and Levin (1998), and those seeking a complete description of a verb's meaning and their full range of syntactic possibilities, as in the work of Valency Grammar (Herbst et al. 2004, Faulhaber 2011, Herbst 2014).

[159] My approach differs from the valency approach as seen in the VDE. Specifically, the constructional range of a valency frame provides a list of valency constructions which are likely to appear with a verb, given its semantic class membership. The VDE, however, does not account for the semantic class membership of a verb and thus has no "starting point" which would suggest potential valency constructions the verb could appear in based on its meaning. Instead, the VDE only describes the attested valency constructions and does not formulate generalizations based on related valency behavior among semantically related verbs (i.e. verb classes).

4.4. COMPARING VERB CLASSES ACROSS LANGUAGES AND SEMANTIC DOMAINS

4.4.1. Cross-linguistics comparison of verb classes

After carrying out the language-specific analyses in Chapter 5 and the beginning of Chapter 6, the English verb classes are compared with their German counterparts in order to assess similarities and differences in how the two languages express the same (or similar) events.[160] The cross-linguistic comparison applies to various aspects of the classes' characterization and largely follows the methodology outlined in Boas (2010b), as discussed in Sections 3.3 and 6.1.

I begin by comparing the meaning components observed for verbs in both languages in order to determine whether the verbs differ along the same semantic dimensions across languages or whether some meaning components or restrictions are only found with verbs of one language. This facilitates the identification of lexical gaps which may cause problems for language learners and translators. For instance, the German verb *abändern* does not have a clear equivalent in English. This verb is limited to minor changes in texts, particularly legal or other administrative texts. The closest English equivalents are *alter* and *modify*, which can both be used for minor changes in administrative texts. However, the English verbs can also apply to changes in a wide range of other types of entities. As such, it appears that there is a lexical gap (Lyons 1977, Geeraerts 2010: 56f.) in the English Change verb class, which contains no verbs that are restricted only to minor changes in texts.

Next, I compare the constructional range for the two classes. In particular, I determine whether the same constellation of Frame Elements is realized in the same way across languages. For instance, the English construction [C.NP.Sbj + verb + U.NP.Obj + F.intoPP.Obl] (as in (4.1) below) corresponds to at least two constructions in German, one in which the Final State PP is headed by *in* (4.2a) and one in which it is headed by *zu* (4.2b). Conversely, each of the German variants corresponds to only the single English construction.

(4.1) She transformed him into a frog.

(4.2) a. Sie verwandelte ihn in einen Frosch.
b. Sie verwandelte ihn zu einem Frosch.

[160] Section 6.1 offers as detailed review of contrastive and German-specific research on verb classification, verb meaning, and argument realization.

I also determine whether there are any systematic correspondences among constructions which do not clearly line up across languages, yet nonetheless describe very similar situations and relations. One such correspondence is between intransitive uses of Change verbs in English (4.3) and reflexive uses in German (4.4).

(4.3) He transformed into a frog.

(4.4) Er verwandelte sich in einen Frosch.

An area in which the languages differ more dramatically involves valency constructions that are highly infrequent or that occur with only one or two of the verbs within a class. Such VCs require a somewhat closer analysis than the more frequently occurring valency constructions. These include constructions such as the English resultative in which the Final_state appears in a bare adjective phrase; this construction tends to only appear with *turn* in English, but does not appear with Change verbs in German, but with semantically light verbs, such as *werden* ('become').

(4.5) It {turned/?changed/*transformed} red.

(4.6) Es {wurde/*veränderte} rot.

After comparing the two languages' constructional ranges in detail, I investigate the extent to which differences are idiosyncratic and the extent to which they result from differences in the grammatical structures available to each language, such as the rich case system of German or the strict word order constraints in English.

The detailed accounts of verb classes also enable comparisons of more systematic phenomena at the interface of syntax and semantics, specifically grammatically relevant meaning components and sub-frames. Having already identified such components for both languages, it is possible to determine whether the same meaning components influence syntax in similar ways across languages. This analysis leads to the comparison of sub-frames in German and English in order to determine the extent to which sub-frames are cross-linguistically valid. In particular, I determine whether the sub-frames are associated with the same meaning components and whether they are subject to similar syntactic constraints/possibilities. For example, the "subtle change" verbs in both languages tend not to appear with Original_state or Final_state arguments. This type

of contrastive analysis enables us to identify cross-linguistic regularities which can be tested on a wider range of languages in order to determine the extent to which they are "universal."

4.4.2. Cross-class comparison: Theft verbs and Change verbs

In Chapter 7, I compare the detailed findings for the English and German Change verbs with a cursory analysis of a semantically unrelated verb class, namely Theft verbs (e.g. *steal*, *snatch*, *shoplift*, *embezzle*). In this chapter, the primary research question surrounds the comparability of different semantic classes, both within and across languages. I specifically seek to determine whether the same number and types of meanings (including general/shared meaning and additional meaning components) and valency constructions apply to verbs of different semantic classes, particularly classes of varying levels of verb descriptivity (Snell-Hornby 1983; see Sections 6.1, and 7.1).

To do this, I briefly present the results of the semantic and syntactic analyses of Theft verbs in both German and English, following the methodology outlined in Section 4.2. I then summarize the base/core meanings and additional meaning components and compare them with those identified for the Change verbs. This will allow me to determine which, if any, meaning components appear in both verb classes. For instance, many Theft verbs include restrictions on the specific types of objects (i.e. stolen Goods) with which they may occur, with *embezzle* limited to abstract financial goods and *snatch* limited to concrete goods that are typically small in size. This is in contrast to Change verbs, which are highly flexible with respect to the types of objects (or intransitive subjects; i.e. Undergo_change arguments) with which they may occur.

Next, I summarize the valency constructions identified in the syntactic analyses, as well as the classes thereof, in order to assess the similarity of valency constructions across classes. I then determine how many of the VCs of Theft verbs share the same formal properties (constellations of phrase type and grammatical function) of VCs identified for Change verbs. For instance, while verbs of both classes appear in the same types of simple VCs, such as the simple transitive VCs of type [NP V NP], the VCs that include more than two arguments are much more different across the two classes.

Finally, I briefly compare the degree of cross-linguistic similarity of the different verb classes. Specifically, I test whether certain verb classes are more similar across languages than others. I begin by informally noting differences among the meanings and VCs of Theft verbs across German and English (following the methodology outlined in Section 4.4.1 above and in

more detail in Section 6.2). For instance, semantically, in the Theft semantic frame the two languages exhibit lexical gaps where no clear translation equivalents exist. German *klauen* is an informal, general Change verb with no clear counterpart in (American) English, and German has no verbal equivalent of English *shoplift* and must express this concept using verb-adverb combinations (e.g. *von einem Laden stehlen* 'steal from a store' or *Ladendiebstahl begehen* 'commit shoplifting'). With respect to valency constructions, the two languages differ in that German allows the victim of a theft event to be expressed as a dative object or within a *von* PP, whereas in English victims are only expressed in *from* PPs, and dative objects are interpreted as beneficiaries. I then compare the cross-lingusitic differences of Theft verbs with those identified for Change verbs in Chapter 6. Nearly all of the specific meaning components for Change verbs are found in individual verbs of both languages, and almost all of the VCs of Change verbs can be formally related across the two languages.

4.5. CONCLUSION

This section presented the methodology I employ in the various analyses of the following chapters. I began by introducing my methodology for choosing verbs and verb classes and for assessing the meanings and valency distribution of the individual verbs (Section 4.2). The next sections discussed how I tackle the major research questions of the dissertation. In Section 4.3, I described how I arrive at the general valency frame, low-level sub-classes, and verb-specific frame-based verb entries to capture both the shared and idiosyncratic behavior of verbs within a given class. In Section 4.4.1, I discussed how I compare the verb meanings and valency constructions for the verb classes across German and English. In Section 4.4.2, I presented my approach to comparing Change verbs with Theft verbs from both a language-specific and a contrastive perspective.

Chapter 5: English Change verbs

5.1. INTRODUCTION

In this chapter, I address the following research question surrounding the semantic and syntactic uniformity of verbs within a given verb class:

> **Research Question 2:** To what degree are verbs within a given class similar or different with respect to their meaning and argument realization? How can we account for regularities and variation within verb classes?

In order to address the first portion of Research Question 2, I conduct a comprehensive analysis of individual verbs within the class of Change verbs, first establishing their meanings in Section 5.2 and then assessing their valency behavior using corpus data in Section 5.3. This allows me to determine what aspects of meaning and valency are shared among all verbs of the class, as well as how individual verbs differ from one another. In Section 5.4, I tackle the second portion of Research Question 2. In particular, I formulate a novel approach to account for both the regularities and idiosyncrasies within verb classes by means of a valency frame and frame-based verb entries. Section 5.5 then assesses how well this approach captures the valency behavior of a previously unanalyzed verb based on its meaning. Before conducting this analysis, I first informally introduce Change verbs and describe their classification in Levin (1993) and FrameNet in the remainder of this section.

5.1.1. General overview of Change Verbs

Change verbs[161] describe situations in which an entity changes from one state or category to another, either on its own or due to the action of some agent or to some circumstance. This section provides a detailed investigation of the English Change verbs *alter*, *change*, *modify*,

[161] I use the term *Change verbs* to refer to this class rather than the terminology introduced by Levin (1993) or FrameNet. Levin's (1993: 177) term *Turn* verbs is slightly misleading, as *turn* is highly polysemous and its valency behavior in the 'change' sense is dissimilar from other Change verbs. FrameNet, on the other hand, posits two frames for these verbs, one each to account for transitive and intransitive uses (Cause_change and Undergo_change). Because those classes are established based solely on syntactic (Levin) or semantic (FrameNet) grounds, I choose to avoid any theoretical presumptions in formulating the verb class and simply select five verbs with closely related meanings to begin the analysis. Throughout the chapter, I demonstrate that the verbs are identical neither with respect to meanings or valency behavior and that verb classes can be defined at various granularity levels.

transform, and *turn*,[162] while Chapter 6 treats the German Change verbs *ändern, abandern, verändern, verwandeln,* and *wandeln*. The English verbs are listed in Levin's (1993) class of *Turn* verbs and in FrameNet's `Cause_change` and/or `Undergo_change` frames, as discussed in the following sub-section. Typical sentences exemplifying Change verbs are given in (5.1)-(5.2).

(5.1) The man changed from a prince into a frog. (cf. Levin 1993: 177)

(5.2) The witch changed the man into a frog. (cf. Levin 1993: 177)

Before introducing these verbs further, it is useful to apply labels to the participants associated with Change verbs. In (5.1)-(5.2), the entity that undergoes change is *the man*, which appears as the subject in the intransitive variant where no agent/cause is present (5.1) and as the object when it is present (5.2). I will refer to the entity which changes as Undergo_change or U.[163] The subject of the second sentence, *the witch*, brings about the change in the Undergo_change argument. I refer to this argument as Cause_change or C. The state of U before the change is realized in a *from* PP (*from a prince*) in (5.1), and I refer to this argument as Original_state or O. Finally, I refer to the state of U after the change (*into a frog*) as Final_state or F. In Section 5.2.1., I describe how and why these Frame Element labels differ from the more elaborate set of FEs than those found in FrameNet. Table 5.1 lists these (revised) Frame Element labels.

Revised FE name	**Abbreviation**	**Example (relevant FE in bold)**
Cause_change	C	**The witch** changed the man from a prince into a frog.
Undergo_change	U	The witch changed **the man** from a prince into a frog.
Original_state	O	The witch changed the man **from a prince** into a frog.
Final_state	F	The witch changed the man from a prince **into a frog**.

Table 5.1: Revised Frame Elements and labels for Change verbs

[162] These five English verbs all appear in Levin's *Turn* class and FrameNet's Cause_change frame, while only *change* and *turn* appear in FrameNet's Undergo_change frame. The end of this chapter includes a comparison of these five verbs with *metamorphose*, which is not found in FrameNet but is included in Levin's class of *Turn* verbs. The following sub-sections also list other Change verbs in those classes (e.g. *convert, make, plummet, reshape, shift, swing, transmute, vary, veer*) that I do not investigate in detail in the present analysis.

[163] To distinguish my set of FEs for Change verbs from those posited by FrameNet, I write the FrameNet FEs in small capital letters but my revised FEs in normal font. As the current section serves only as a brief introduction to the verb class, the definitions for revised FEs presented here are only cursory, but are expounded on in the following sections.

Change verbs can be used to describe a wide variety of actual change events. In (5.2), the U participant undergoes a complete change in category (from prince to frog). However, some change events do not involve a complete transformation of U, but merely a change of one of its attributes (e.g. color, demeanor). In (5.3), for instance, the paper does not turn into something else completely, but only changes in one of its attributes (its color).

(5.3) The weather changed the paper from white to yellow.

In yet other cases, such as those involving mass or multiplex themes, Undergo_change does not change its category or any specific attribute, but is given a different shape or form, as in (5.4).

(5.4) The sculptor transformed the ball of clay into a beautiful statue.

Cause_change participants can also vary in their type, ranging from intentional human agents, such as *the witch* in (5.2), to inanimate states of affairs, such as *the weather* in (5.3). A similar division can be made for Undergo_change arguments: *the paper* in (5.3) does not play any part in bringing about the change. However, in other cases, particularly in intransitive uses, the U can be interpreted as actively changing itself. In (5.1) for instance, *the man* can be viewed as both bringing about and undergoing the change. Another interesting aspect of Change verbs is that certain of these verbs, especially when used in contexts which do not specify the O or F arguments (e.g. *The man changed*), are vague with respect to the exact type of change that is undergone (e.g. whether it is categorical or subtle, internally or externally caused). Further, Change verbs frequently appear with abstract or metaphorical uses, as in phrases such as *change one's mind*. In summary, these few examples demonstrate that Change verbs are highly diverse with respect to the types of change events that they can describe.[164]

Another interesting aspect of Change verbs is that they seem to exhibit subtle semantic differences and are not completely interchangeable, as informally demonstrated in the preceding chapters. In (5.5a), *modify* and *alter* are not acceptable with the meaning of a witch changing a

[164] The general semantics of the Change verbs discussed here, and more specifically their vagueness as to the exact type of change (e.g. increasing, improving, decomposing, building), sets Change verbs apart from the much broader class of "change-of-state" verbs (Levin 1993: 26f., Rappaport Hovav and Levin 2002).

man into a frog, and (5.5b) shows that *transform* is not acceptable with the subtle change of a paper weathering.

(5.5) a. The witch {changed/turned/transformed/?modified/*altered} the man into a frog.
b. The weather {changed/modified/altered/?transformed} the color of the paper.

Such differences in acceptability also apply to the valency constructions the verbs may appear in. (5.6) shows that *change*, but not *turn*,[165] can appear in an intransitive construction without any arguments specifying the O or F argument, but the reverse holds for resultative constructions such as those in (5.7).

(5.6) The man {changed/*turned}.

(5.7) The paper {turned/??changed} yellow.

There are also interesting cross-linguistic differences among Change verbs, which are addressed in detail in Chapter 6. For one, the intransitive construction in (5.1) does not correspond to an intransitive construction in German. Instead, when the C argument is not expressed, German requires that the U appear as a nominative Subject and is repeated as a reflexive accusative pronoun.[166]

(5.8)

Der Mann	hat	sich	verändert.
The man	has	himself	changed.

'The man (has) changed.'

Furthermore, German Change verbs often consist of a root (e.g. *-änder-* or *–wandel-*) along with a German verbal prefix (e.g. *ver-*, *ab-*, *um-*),[167] opening up the question whether verbs with similar

[165] While the lexeme *turn* is felicitous in intransitive constructions (e.g. *He turned*), the meaning associated with such uses does not correspond to the Change semantics discussed here, but has a meaning of 'join the other side (e.g. in a conflict)'.

[166] While many German transitive verbs employ a reflexive pronoun to mark inchoative uses, this is not always the case. For instance, the intransitive use of German *brechen* does not occur with a reflexive pronoun, but with a verbal prefix *zer-*.

[167] The verbal roots roughly correspond to English *change*, as will be made apparent in the following chapter. The verbal prefixes do not allow for a direct translation into English, as they are highly

roots or prefixes may influence the base verbs' syntax or semantics in some uniform way. Such differences are important for our understanding of the extent to which verbs and constructions in different languages correspond to one another and the extent to which they vary from language to language.

In the following, I investigate the semantics and valency behavior features of Change verbs, in order to determine the extent to which their shared basic meaning determines their syntactic behavior. The remainder of this chapter focuses on the English-specific analysis of Change verbs, while Chapter 6 investigates German Change verbs and compares them with the English data.

5.1.2. Existing cassifications of English Change verbs

5.1.2.1. *Turn* verbs in Levin (1993)

I first discuss how Change verbs are treated in existing verb classifications, particularly Levin (1993) and FrameNet (Ruppenhofer et al. 2010). This section introduces Levin's classification and largely parallels the discussion in Section 2.2. In Levin's (1993) alternation-based classification of English verbs, Change verbs are found in her *Turn* class, which is a sub-class of her broader category of Verbs of Creation and Transformation, which also includes *Build* verbs, *Grow* verbs, Verbs of Preparing (e.g. *bake*), and Performance verbs (e.g. *paint a picture*), among others. The verbs in the *Turn* class are listed in Figure 5.1.[168]

alter, change, convert, metamorphose, transform, transmute, turn

Figure 5.1: Levin's *Turn* verbs (1993: 177-178)

The syntactic criteria for the formulation of this class are found in the alternations and syntactic patterns in (5.9)-(5.15), taken directly from Levin (1993: 177-178).

(5.9) The witch turned him from a prince into a frog.

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polysemous and have different interpretations depending on the verb they combine with (Motsch 1999, Lüdeling 2001, Section 6.4).

[168] Many of Levin's (1993) classes include references to relevant literature dealing with that class (or some of its members). However, no specific citations are included for the *Turn* class. Levin (1993: 172) provides references for the broader set of classes that include her *Turn* verbs, namely "Verbs of Creation and Transformation", but these sources deal more with traditional "change of state" verbs (Rappaport Hovav and Levin 2002) rather than the more limited set of *Turn* verbs.

(5.10) **Total Transformation Alternation (transitive)**
a. The witch turned him into a frog.
b. The witch turned him from a prince into a frog.

(5.11) **Total Transformation Alternation (intransitive; most verbs)**
a. He turned into a frog.
b. He turned from a prince into a frog.

(5.12) **Causative/Inchoative Alternation (most verbs)**
a. The witch turned him into a frog.
He turned into a frog.
b. The witch turned him from a prince into a frog.
He turned from a prince into a frog.

(5.13) ***Material/Product Alternation (transitive)**
a. *The witch turned him from a prince.
b. The witch turned him into a frog.

(5.14) ***Material/Product Alternation (intransitive)**
a. *He turned from a prince.
b. He turned into a frog.

(5.15) *The witch turned him.

In describing the semantics of this class, Levin simply states that the verbs "describe a complete transformation" (1993: 178). The class description also contains some information about the syntactic expression of roles (see Section 2.2).

As discussed in Section 2.2, Levin's classification leaves a number of questions open. The first set of issues relates to the use of syntactic criteria for classification. For one, Levin notes that only "most" but not all verbs participate in certain alternations (e.g. (5.11)-(5.12)) that are definitive of the class. Even when Levin does not mention this, there are other patterns that she lists in which her *Turn* verbs vary in acceptability, such as the simple transitive construction in (5.15). Levin lists this construction as unacceptable with *Turn* verbs through the inclusion of an asterisk. However, verbs other than *turn* are completely acceptable in this transitive construction without the O or F argument, as illustrated in (5.16).

(5.16) The witch {changed/transformed/*turned} him.

Furthermore, there are a handful of valency constructions in which (some) *Turn* verbs occur, but are not included as criteria for Levin's class. These include a simple intransitive construction (5.17) and the resultative construction (5.18). Note, however, that individual *Turn* verbs vary in their acceptability in these patterns, as the following examples illustrate.

(5.17) The man has {changed/??turned/*altered}.
(5.18) The man {turned/??changed/*altered} red.

The varying acceptability of Levin's *Turn* verbs in such patterns demonstrates that Levin's approach needs to take a broader range of patterns into account and rely on empirical data rather than intuition in order to arrive at more accurate classifications. Further, it shows that semantically related verbs do not always behave identically with respect to argument realization. Apart from these syntactic issues with Levin's *Turn* class, her semantic definition of the class ("describe a complete transformation") does not seem to apply to all of Levin's *Turn* verbs, particularly *alter* or *modify*, which generally describe more subtle changes (see Section 5.3 below).

In sum, these issues demonstrate the need to rethink Levin's (1993) classification of Change verbs in particular and her criteria for verb classification in general. Specifically, syntactic differences such as those in (5.16)-(5.18) and semantic differences among verbs within Levin classes show that form-meaning correspondences in verb classes cannot easily be captured by relying solely on alternating behavior without corpus data. Instead, one must first comprehensively account for the low-level behavior of individual verbs using empirical data before generalizing across verb classes.[169] Before undertaking my own re-classification of these verbs, I first introduce another classification of these verbs, namely that undertaken in FrameNet.

5.1.2.2. FrameNet's `Cause_change` and `Undergo_change` frames

In FrameNet (Ruppenhofer et al. 2010), Change verbs are found in two different frames: `Cause_change` and `Undergo_change`.[170] These frames differ in that `Cause_change`

[169] See Croft (2003), Iwata (2008), Boas (2008a, 2011a), and Section 2.2 for similar arguments.
[170] See Section 3.1 for a discussion of FrameNet's treatment of Change verbs.

applies to transitive uses of Change verbs with a C argument, as in (5.19), while `Undergo_change` applies to intransitive, inchoative uses as in (5.20).

(5.19) [$_{\text{Agent}}$ Sam] changed [$_{\text{Entity}}$ Pat] [$_{\text{Final\_state}}$ into a frog]. (`Cause_change`)
(5.20) [$_{\text{Entity}}$ Pat] changed [$_{\text{Final\_state}}$ into a frog]. (`Undergo_change`)[171]

The definitions and verbal LUs of the two FrameNet frames are found in Table 5.2, with the Frame Elements[172] listed in bold in the definitions.

Frame	Definition	(Verbal) LUs
`Cause_change`	An **Agent** or **Cause** causes an **Entity** to change, either in its **category** membership or in terms of the value of an **Attribute**. In the former case, an **Initial_category** and a **Final_ category** may be expressed, in the latter case an **Initial_value** and a **Final_value** can be specified.	alter, change, convert, transform, turn, make, modify, reshape, vary
`Undergo_change`	An **Entity** changes, either in its **category** membership or in terms of the value of an **Attribute**. In the former case, an **Initial_category** and a **Final_ category** may be expressed, in the latter case an **Initial_value** and a **Final_value** can be specified.	change, plummet, shift, swing, turn, veer

Table 5.2: Frame Definitions and Lexical Units for `Cause_change` and `Undergo_change` frames[173]

[171] Recall that it is FrameNet practice to label FE names of arguments in sub-script set off by square brackets.

[172] Below are the definitions for the FEs of the Cause_change frame. The FEs for Undergo_change are, for the most part, identical to those of Cause_change, with the exception that AGENT and CAUSE are not core FEs of the Undergo_change frame.

Agent: The sentient entity that effects a change in the Entity.
Cause: An event that causes a change in the Entity.
Entity: The abstract or concrete thing or situation that the Agent causes to change.
Attribute: A characteristic of the Entity for which a value can be assigned or determined by calculation, measurement, or observation.
Initial_category: The category of which the Entity is a member before the Agent causes a change.
Final_category: The category that the Entity belongs to after it has undergone the change.
Initial_value: The value that the Attribute has before the change takes place.
Final_value: The value that the Attribute assumes as a result of the change that the Entity is caused to undergo.

[173] The FrameNet characterization of the Undergo_change frame was changed during the final phases of this dissertation's preparation. The new formulation of the frame appears to address several of the issues discussed in this section (and may have been prompted by conversations between the author and the FrameNet team). Unfortunately, an analysis of the revised frame must be put off for future work. The definition now reads as follows: *An Entity changes, either in its category membership, its situation, or in terms of the quality of an Attribute. In the first case, where category membership is changing, an Initial_category and a Final_category may be expressed. In the second case, where a situation as a whole*

Because FrameNet splits lexemes into separate senses based on semantic grounds, the set of FEs and verbal LUs in either frame is not identical. With respect to the FEs, the `Cause_change` frame has an additional pair of core FEs, namely AGENT and CAUSE, which correspond to the C argument in my terminology. The set of verbal LUs in each frame is also quite different, as FrameNet only includes verbs that appear in transitive constructions in the `Cause_change` frame and verbs that appear in intransitive constructions in the `Undergo_change` frame, so verbs that only appear in one or the other type of construction are not cross-listed in both frames.[174] For instance, as pointed out in Section 3.1., the LU *make* is included in the `Cause_change` frame, but not in the `Undergo_change` frame, because it occurs in transitive (resultative) VCs with Change semantics, but not in intransitive uses.

(5.21) a. […] [$_{\text{Agent}}$ we] want to MAKE [$_{\text{Entity}}$ Dubai] [$_{\text{Final\_category}}$ a new trading center]. (`Cause_change`) (FN)[175]

b. *[$_{\text{Entity}}$ Dubai] made [$_{\text{Final\_category}}$ (into) a new trading center]. (`Undergo_change`)

Conversely, the LU *plummet* is listed in `Undergo_change` but not in `Cause_change`, because it can only appear intransitively with Change semantics.

(5.22) a. [$_{\text{Entity}}$ Anna] […] PLUMMETED [$_{\text{Initial\_value}}$ from fury] [$_{\text{Final\_value}}$ to weeping]. (`Undergo_change`) (FN)

b. *[$_{\text{Agent}}$ Joe] plummeted [$_{\text{Entity}}$ Anna] [$_{\text{Initial\_value}}$ from fury] [$_{\text{Final\_value}}$ to weeping]. (`Cause_change`)

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is changing, an Initial_situation and a Final_situation can be present. And in the last case, where some characterization of the Entity is changing, an Initial_ quality and a Final_quality can be specified. (Ruppenhofer et al. 2010)

174 FrameNet captures the semantic similarity of the two frames by linking the frames with the Causative-Inchoative frame-to-frame relation.

175 Examples followed by "(FN)" are taken from FrameNet, and examples followed by "(COCA)" are from the Corpus of Contemporary American English. Otherwise, the examples are invented.

Thus, FrameNet's splitting approach leads to a very different classification of English Change verbs than that of Levin. This emphasis on fine-grained semantic analysis results in a more uniform semantic fit among verbs in the same class.[176]

In the present analysis, I eschew FrameNet's distinction between the `Cause_change` and `Undergo_change` frames, and investigate both transitive and intransitive uses of the five verbs under analysis. As will be emphasized in Sections 5.3 and 5.4 below, analyzing both uses reveals that individual verbs may show a strong preference for one use or the other. For instance, *alter* is not currently listed as a LU of the `Undergo_change` frame, but the corpus analysis includes several intransitive uses of this verb. Using FrameNet methodology, we must therefore list *alter* as a LU of the `Undergo_change` frame, because it can describe change scenarios in which the cause of the change is not mentioned. However, closer analysis shows that transitive uses of *alter* greatly outnumber intransitive uses (over 90% of its corpus attestations are transitive), and simply listing *alter* as a LU of both frames would fail to account for this discrepancy. Thus, by analyzing both transitive and intransitive uses, it is possible to make the same observations as in FrameNet (e.g. that *alter* evokes both frames) while also accounting for finer-grained aspects of valency behavior (e.g. that *alter* is much more frequent in transitive constructions).

While I argued for the advantages of frame-semantic verb classification in Section 3.1., I also showed that this approach can be improved to capture more fully each LU's semantic and syntactic behavior and to identify finer-grained classes which capture subtler nuances in the relation between meaning and form. Here, I point out some issues with FrameNet's characterization of Change verbs in order to justify my approach. The definitions of the `Cause_change` and `Undergo_change` frames are relatively straightforward and enable one to recognize intuitively which verbs should belong in the frame(s).[177] One minor issue with the definition is that it may not be sufficiently constrained, as more specific "change of state" verbs such as *deepen*, *lengthen*, or *color* (the verb) also describe situations in which "An Agent or Cause causes an Entity to change, either in its category membership or in terms of the value of an Attribute." Judging from the LUs listed as evoking these frames, it appears that the `Cause_change` and `Undergo_change` frames are actually reserved for those words which

[176] See Section 3.1.3.1 for more on comparisons between FrameNet and Levin's (1993) verb classes.

[177] For discussions of how semantic frames are more consistent with native speaker intuitions than other characterizations of word meaning, see Fillmore (1982), Baker and Ruppenhofer (2002), and Boas (2010b).

describe such changes more generally or vaguely, rather than with reference to a specific attribute or category. The addition of such a restriction in the definition would remedy this issue.

A more complicated issue is found in the set of Frame Elements associated with the frames. Table 5.3 shows the Revised Frame Elements introduced at the beginning of this chapter and their correlating FEs in FrameNet.

Revised FE	**Abbrev.**	**FrameNet FE**
Cause_change	C	AGENT / CAUSE
Undergo_change	U	ATTRIBUTE / ENTITY
Original_State	O	INITIAL_VALUE / INITIAL_CATEGORY
Final_State	F	FINAL_VALUE / FINAL_CATEGORY

Table 5.3: Revised Frame Elements for Change verbs compared with FrameNet Frame Elements

FrameNet makes a distinction between changes in category and changes in the value of an attribute and posits FEs accordingly. The entity that changes (U) is labeled an `Entity` in FrameNet when it changes from an `Initial_category` to a `Final_category`, and as an `Attribute` when only one of its features changes from an `Initial_value` to a `Final_value`. The examples provided for each FE on FrameNet's Frame Description pages present cases where the changed U is clearly either an `Entity` changing its `Category` (5.23) or an `Attribute` changing its `Value` (5.24).

(5.23) a. [$_{\text{Cause}}$ The radical message of the cross] […] CHANGED [$_{\text{Entity}}$ him] [$_{\text{Initial\_category}}$ from a persecutor of Christians] [$_{\text{Final\_category}}$ to a tender believer]. (FN)

b. [$_{\text{Entity}}$ The viccar] [*sic*] CHANGED [$_{\text{Initial\_category}}$ from a professional clergyman] [$_{\text{Final\_category}}$ into an anti-ecclesiastical activist]. (FN)

(5.24) a. [$_{\text{Agent}}$ We] CHANGED [$_{\text{Attribute}}$ the size] [$_{\text{Initial\_value}}$ from 8 1/2x11] [$_{\text{Final\_value}}$ to a larger 11 x 17] and gave it a complete graphical makeover. (FN)

b. [$_{\text{Agent}}$ We] CHANGED [$_{\text{Attribute}}$ the price] [$_{\text{Initial\_value}}$ from $1.26] [$_{\text{Final_value}}$ to $1.27] per pint. (FN)

In (5.23), the U arguments (*him; the vicar*) are clearly entities in the world, and the O and F arguments (e.g. *professional clergyman; ecclesiastical activist*) are indeed categories and not values of an attribute. [178] In (5.24), the U arguments are in fact names of typical attributes (*size, price*) of entities, and the O and F arguments are numeric values (e.g. *11x17*; *$1.26*). Given such examples, it appears intuitively simple to determine how to label the arguments with FEs, giving support to the division of FEs according to attribute vs. category change.

However, these distinctions become more problematic when it comes to natural corpus data. For one, many example sentences do not overtly provide the context necessary to determine whether the change is attributive or categorical. In (5.25), taken from the entry for *change* in `Undergo_change`, the only FE expressed is the U *very little*, with no mention of either Original_state or Final_state.[179]

(5.25) The impression of the visitor today will be that [$_{\text{Attribute}}$ very little] has CHANGED. [$_{\text{Value\_range}}$ INI] (FN)

In FrameNet, the *very little* argument is annotated as an ATTRIBUTE, but given the lack of context, it could just as likely refer to an ENTITY FE, or more specifically, a set of multiple ENTITY FEs. For instance, if the "visitor" is visiting a historical city, then "very little changing" could imply that most old workshops and marketplaces in town, namely entities rather than attributes, have not been demolished or repurposed as other types of institutions such as banks or shopping malls. Under this interpretation, the referents denoted by *very little* are not attributes which have undergone a change in values, but rather entities which have (not) changed in categories. However, because FrameNet annotation reports rely only on single-sentence

[178] Further supporting my argument that the Attribute-Category distinction in FrameNet is difficult to test empirically, one may even question whether the change described in (5.23) is, in fact, categorical. Specifically, while a *persecutor of Christians* and a *tender believer* are indeed very different, they may both be subsumed under a single category, such as 'humans' or 'humans with respect to religious beliefs.' If we take the second category, we may posit various values such as [+ Christian] and [- Christian] and argue that the sentence in (5.23) describes a change in Attribute rather than in Category.

[179] In this example, FrameNet also annotates a core-unexpressed FE, namely VALUE_RANGE, as INI (see Section 3.1). I do not discuss the issue of null-instantiation in detail here: as shown in this section, many judgments required to classify an omitted argument as definitely or indefinitely null-instantiated are based solely on intuition rather than empirically testable criteria, which leads to inaccurate or inconsistent labeling of omitted arguments.

examples, it is impossible to determine with certainty what type of change the sentence describes and thus whether to annotate *very little* as an ENTITY or an ATTRIBUTE FE.[180] As many example sentences lack the relevant (linguistic or extra-linguistic) context necessary for labeling an argument as either ENTITY or an ATTRIBUTE, the simpler Revised FE Undergo_change (U) is used here. This label accurately captures the semantics of the argument, namely that *very little* has undergone a change, but does not require judgments as to its finer semantic classification when the context does not provide the information necessary for such judgments.

A similar situation is demonstrated in (5.26), also taken from *change*.v in `Undergo_change`. Again, the only realized FE is the U, *the landscape of the valley*, which is annotated as an ENTITY in FrameNet.[181] In this case, it is interpreted as undergoing a categorical change, e.g. from a natural landscape into an industrial complex. However, a more likely interpretation would require interpreting the U as an ATTRIBUTE (e.g. *of the valley*), which undergoes a change in value, such as going from mountainous to flat or from wooded to farmland.[182]

(5.26) [$_{\text{Entity}}$ The landscape of the valley] CHANGED [$_{\text{Degree}}$ dramatically] over the next 200 centuries. (FN)

Thus, data such as (5.23)-(5.26) show that the fine-grained FEs posited by FrameNet are highly problematic when the determination of arguments as either ENTITY or ATTRIBUTE, or as CATEGORY or VALUE, relies on information that is not provided in the surrounding context. This is one reason for employing the simplified FEs given in Table 5.3.

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[180] A further issue with the annotation of *very little* as an ATTRIBUTE is seen in the FrameNet definition of this FE, which reads: *A characteristic of the ENTITY for which a value can be assigned or determined by calculation, measurement, or observation*. In sentences such as (5.25), it is difficult to determine what types of calculation, measurement, or observation would allow one to determine the values of the argument *very little*, especially when compared with attributes such as *size* or *price* in the invented examples in (5.23)-(5.24).

[181] Interestingly, this example contains no FEs which were labeled as null-instantiated. However, if an entity undergoes change, it is typically understood that the entity was first in an INITIAL_CATEGORY and changed to a FINAL_CATEGORY. It is unclear why these FEs are not labeled INI, particularly because they are Core FEs, and because a similar FE was labeled INI in (5.25) above.

[182] In a somewhat inverse situation from the previous example, it may be possible to label *landscape of the valley* as an ATTRIBUTE, because there are characteristics of landscapes that can be measured along a range of values, such as altitude, precipitation, foliage, etc.

A further difficulty with deciding between categorical and attributive changes when there is not enough context to make well-grounded decisions involves the annotation of null-instantiated material. Examples (5.27)-(5.29) describe changes involving the same verb (*modify*) and quite similar Undergo_change arguments (*tax framework, GDP, budget allocations*, each of which are abstract legal or financial entities). However, in (5.27), *tax framework* is annotated as an ENTITY, while the other two (5.28)-(5.29) are annotated as ATTRIBUTE FEs.

(5.27) [Role As Chancellor of the Exchequer], [Agent Nigel Lawson] [Degree considerably] *MODIFIED*Target [Entity the tax framework in which life assurance and pensions schemes operated], [Event_description removing for instance the tax relief on life insurance premiums]. [Final_category INI][Initial_category INI] (FN)

(5.28) [Agent We] will *MODIFY*Target [Attribute GDP] [Means by incorporating measurements of pollution and resource depletion] [Purpose to create a figure for national income]. [Final_value INI][Initial_value INI][183] (FN)

(5.29) [Time On Aug. 14] [Agent the government] *MODIFIED*Target [Attribute budget allocations] [Purpose to give greater priority to improving living standards in the poorest regions] and on Aug. 19 issued guidelines to curb "unnecessary spending". [Final_value INI][Initial_value INI] (FN)

It is unclear here what differences between *tax framework* on the one hand and *GDP* and *budget allocations* on the other hand would qualify them to be labeled as different FE types.

This discussion has shown that, while the distinction between attributive changes of values and categorical changes of entities is quite clear in some instances, the single-sentence examples employed in FrameNet annotation reports and in the present study frequently lack the necessary information for deciding whether arguments reflect the former or latter type of change. (5.25) - (5.26), showed that one must rely on non-empirical intuitions to determine the FE type in sentences that explicitly mention only the U argument. Further, (5.27) - (5.29) show that null-instantiated FEs also require annotators to make intuition-based subjective judgments as to

[183] (5.28) and (5.29) reveal a further difficulty with labeling null-instantiated arguments using the complex set of FEs in FrameNet. Specifically, these two sentences only involve one Core FE, the ATTRIBUTE, and label both INITIAL_VALUE and FINAL_VALUE as INI. In (5.25) above, however, which also only overtly realizes the ATTRIBUTE FE, the FE that is labeled INI is VALUE_RANGE. However, it is unclear why two sets of sentences which are overtly nearly identical (in terms of FE configuration) should be associated with different types of null-instantiated FEs.

whether the non-overt FE refers to attributive or categorical changes, a decision which is often not empirically grounded. I therefore use the simplified set of four Frame Elements presented in Table 5.3 rather than the more complicated system employed in FrameNet.[184]

Yet another issue with the organization of the Cause_change and Undergo_change frames involves the set of hierarchical frame relations described in 3.1.2. While the topic of frame-to-frame relations is not crucial for the present analysis, it is nonetheless worth mentioning. As discussed at the beginning of this subsection, the general Change verbs in Cause_change and Undergo_change differ from more specific verbs involving a change of state. These include *lengthen*, which evokes Cause_expansion, *cool* which evokes Cause_temperature_change, and *increase* which evokes Cause_change_of_position_on_a_scale. Such verbs appear to share the general semantics of Change verbs, as they involve an agent who causes a change in some entity or attribute, yet they differ from Change verbs in that they specify the attribute (and often its relative value, e.g. increase/decrease) which is changed. As such, it would be expected that the frames containing these verbs would stand in an Inheritance relationship to the Cause_change frame. Similarly, the intransitive/inchoative uses of many of these verbs (e.g. *the days lengthen as spring arrives*) should be listed in frames which inherit from the Undergo_change frame. However, at present, only a small set of such frames are placed in an Inheritance relation to the Change verb frames. In particular, the only Inheritance daughters of Cause_change are Change_event_duration, Change_event_time, and Exchange_currency, and only one frame (Nuclear_process) is listed as a daughter of Undergo_change. Because these frames are more specific instantiations of the more general Cause_change and Undergo_change frames with more detailed FE types, FrameNet could capture this similarity by positing Inheritance relations between the more general and more specific frames. This would lead to a more accurate organization of the FrameNet frame hierarchy and allow researchers to draw on this hierarchy to determine the extent to which more detailed daughter frames differ from more general mother frames. Van Valin and Osswald (2014) also argue for a re-organization of

[184] I do not deny the distinction between categorical and attribute changes, but given the complications associated with making this distinction when important information is not provided in context, as well as the focus of this work on valency constructions and verbal semantics, a more detailed investigation of these fine-grained FEs must be reserved for future work.

the FrameNet frame hierarchy in order to account for these and other relationships more systematically.

In addition to these issues specifically related to the frames of Change verbs, FrameNet also encounters some more general problems which must be addressed before carrying out the detailed analysis of Change verbs, most of which were pointed out in Section 3.1. First, as frame semantics is the primary criterion for classification in FrameNet, the project makes no claim as to what (range of) syntactic patterns a verb of a given frame should be expected to appear with.[185] That is, by listing a verb as a LU of `Undergo_change`, we may infer that the verb's meaning corresponds to the definition listed in Table 5.2, yet there is no explicit statement about how the FEs are syntactically expressed.

However, FrameNet does offer syntactic data in the form of corpus sentences in which the grammatical realization of FEs is annotated and documented. While such annotated data is useful to gain a general understanding of some aspects of the LUs' valency behavior, it is unfortunately not exhaustive enough to make accurate claims about the verbs' full range of valency behavior. For instance, the valency description of the LU *turn*.v in `Undergo_change` only includes a single annotated sentence at this point (22 February 2016).[186] The example is listed in (5.30) and the annotation report for the LU is provided in Table 5.4.

(5.30) But [$_{\text{Entity}}$ Jamaica] is not simply TURNING blindly [$_{\text{Final\_category}}$ into a small version of its bigger brother]. (FN)

Number Annotated	**Patterns**			
1 TOTAL	Entity	Final_category	Manner	Manner
(1)	NP Ext	PP[into] Dep	AVP Dep	AVP Dep

Table 5.4: Annotation report for *turn.v* in `Undergo_change`

185 It is worth emphasizing here that FrameNet's goal is solely lexicographic, namely to describe the English lexicon according to frames, and that the project does not strive to identify syntactic principles that predict argument realization from verbs' frame semantics. However, my research seeks such generalizations and would benefit from a more comprehensive account of verbal valency patterns in the FrameNet database.

186 *Turn* is also listed in the Becoming frame, which contains 14 annotated examples. The distinction between this frame and Undergo_change is not made explicit in FrameNet.

If one were to take the annotation reports listed in the Lexical Entries in FrameNet as an indicator of a verb's valency behavior, one would be led to believe that the only valency pattern available to *turn* is that found in (5.30), where the ENTITY (or U) is a nominal subject and the FINAL_CATEGORY (or F) is a PP headed by *into*. However, this sense of *turn* can appear in a variety of other constructions, such as those expressing an INITIAL_CATEGORY (or O), as in *The river was turning from blue to a color somewhere between slate and sapphire* (COCA). Because FrameNet valency reports are not exhaustive, it is necessary to carry out a more thorough corpus analysis manually to get a more complete picture of the argument realization behavior of English Change verbs.[187]

With respect to verb meaning, I have argued (above and in Section 3.1) that FrameNet classes are semantically more uniform than those found in Levin (1993). However, subtle semantic differences can often be observed among verbs evoking the same frame, some of which have repercussions for argument realization (see Boas 2008a for Self_motion, Croft 2009 for Ingestion, and Dux 2011 for Theft). With respect to Change verbs, individual verbs exhibit subtle semantic distinctions which influence their valency behavior in systematic ways, as will be shown in the remainder of this chapter and in the following chapters. Such meaning distinctions are important for our understanding of how individual verbs construe the frame's semantics in different ways and enable a more detailed analysis of the relationship between verb meaning and valency behavior. However, these finer-grained meaning components are not captured by FrameNet's frame definition. If these meaning components are accounted for in FrameNet at all, then they can be found in the brief prose definitions of individual LUs, which are written by the FrameNet team or taken from the *Concise Oxford English Dictionary*. The current analysis emphasizes these subtle distinctions among verbs within the same frame and investigates their potential impact on the verbs' valency behavior. In order to identify all potential meaning components which may set verbal LUs of the same frame apart from each other, I carefully

[187] This type of analysis is carried out in Section 5.3 for English Change verbs and in the following chapters for German Change verbs and German/English Theft verbs. While those analyses draw on a much larger number of examples than FrameNet, it is likely impossible to gain a fully "complete" picture of a verb's (or verb class's) precise valency distribution. This can only be achieved by analyzing all instances in which each verb has been used and accounting for diachronic change in valency behavior of a given verb and the coining of new verbs. However, given the advances in computing and corpus linguistics, the insights of this dissertation can be implemented to arrive at highly accurate characterizations of valency behavior.

examine definitions of the verbs in question in a variety of dictionaries in Section 5.2. Such an analysis allows me to provide a more detailed semantic characterization of the LUs and to identify grammatically relevant meaning components at a finer-grained level.

So far, I have shown that existing classifications of English Change verbs in Levin (1993) and FrameNet do not offer comprehensive accounts of the verbs' meanings and valency behavior or any possible differences of these among individual verbs within the proposed classes. In the following sections, I analyze in detail the meaning components (based on dictionary definitions) and valency behavior (based on COCA corpus data) of five English Change verbs, in order to establish the extent to which verbal syntax is predictable from meaning, and vice versa, and to improve existing classifications of English Change verbs accordingly.

5.2. MEANING COMPONENTS OF ENGLISH CHANGE VERBS

In this section, I analyze dictionary definitions of English Change verbs in order to identify the meaning components which are shared by all verbs and those which set individual verbs apart from one another. Following the methodology described in Chapter 4, I use dictionary definitions to get a general idea of the meanings of each verb. Because dictionaries do not always arrive at the same definitions and sense distinctions (Fillmore and Atkins 2000, Atkins 2002), I combine the definitions from three different dictionaries: the *Collins-Times English Dictionary and Thesaurus*, 2nd Edition (CT), the *American Heritage Dictionary of the English Language*, 5th Edition (AH), and the online version of the *Merriam-Webster Dictionary* (MW; http://www.merriam-webster.com; accessed on 9 June 2014). By including three different dictionaries, I aim to identify meaning components that may have been overlooked by a single dictionary. The presentation here only includes definitions of the relevant Change senses for each of these verbs, but excludes any senses that evoke frames other than the Change frames described above (e.g. 'rotate' for *turn*, or 'replace' for *change*) or idiomatic verb-noun collocations that do not evoke the Change frame (e.g. *change clothes*, *turn heads*).[188]

I begin with a characterization of the more general Change verbs, *change* and *turn*, in order to get a better picture of the general Change semantics and how it is treated in dictionaries. I then proceed to those with more detailed semantics, *alter*, *modify*, and *transform*, to show how these

[188] Appendix A1 contains the full dictionary entries for each verb. In this section, I only include the entry portions that characterize the verbs' relevant Change senses.

verbs involve further specifications of or restrictions to the general Change semantics. This approach allows me to identify meaning components which distinguish the verbs' meanings from one another, in order to assess the verbs' semantic weight and degree of descriptivity. It also informs the discussion in the remainder of this section, in which I draw connections between individual verbs' fine-grained meaning components and their detailed valency behavior.

Change

Table 5.5 shows the relevant ('Change' sense) definitions for *change* in the three dictionaries.[189]

MW	AH	CT
: to become different : to make (someone or something) different : to become something else Full Definition of CHANGE **transitive verb** 1 a : to make different in some particular : alter <never bothered to change the will> b : to make radically different : transform <can't change human nature> c : to give a different position, course, or direction to 2 […] d : to undergo a modification of <foliage changing color> […] **intransitive verb** 1 : to become different <her mood changes every hour> 5 : to undergo transformation, transition, or substitution <winter changed to spring> […]	*tr.* 1a. To cause to be different: *change the spelling of a word.* b. To give a completely different form or appearance to; transform: *changed the yard into a garden*. […] - *intr.* 1. To become different or undergo alteration: *He changed as he matured*. 2. To undergo transformation or transition: *The music changed to a slow waltz*. […]	*vb* 1 to make or become different; alter […] 3 (sometimes foll. by *to* or *into*) to transform or convert or be transformed or converted. […]

Table 5.5: Relevant dictionary definitions for *change*

[189] In addition to senses relating to the Cause_change and Undergo_change frames that I am analyzing, definitions of *change* also include senses involving exchanging one thing for another or those involving replacing one thing for another. These senses should be treated separately from the Change sense because they do not exhibit the same number or types of participants. FrameNet captures these differences by positing different frames for each sense: *change* is listed in the Exchanging frame, in which two agents reciprocally giving and taking two themes, and in the Replacing frame, in which an agent removes one object and substitutes it for another. The dictionaries also mention domain-specific senses and collocations. While I include uses involving the Change senses of the verbs, as with someone's voice changing (e.g. during puberty) or the seasons changing, I omit from the analysis collocations evoking different non-Change senses, such as *change clothes*, *change planes*, or *changing the bed*, which evoke frames of Exchanging or Replacing.

Almost all of the definitions include language such as *make different*, *cause to be different*, or *become different*, with the first two referring to transitive and the latter referring to intransitive uses (i.e. the `Cause_change` and `Undergo_change` frames, respectively, in FrameNet terms). These definitions seem to get at the general meaning of *change* as a verb, and the Change verb class in general.[190] While these meaning components appear to apply to all Change verbs, it is important to determine how individual verbs may further specify this meaning, i.e. whether they contain additional meaning components in addition to the general *make/become different* meaning identified here.

The definitions lead me to characterize *change* as a highly general verb with few (if any) semantic restrictions.[191] The definitions refer to both transitive and intransitive uses, either as separate senses, as in MW and AH, or by using different base verbs within the definitions, as with *make or become different* in CT. Thus, *change* does not appear to be restricted with respect to transitive or intransitive uses.

Change is also highly general in that it may describe both minor and drastic changes. Specifically, the dictionaries tend to include two senses for *change* which are differentiated on the basis of how drastic the change event is. The MW definition, for instance, includes two sub-senses for their first sense entry for *change*. The first definition (transitive 1a in Table 5.5) reads *to make different in some particular*, suggesting a subtle or attributive change, while the second (transitive 1b) reads *to make radically different*, suggesting a drastic or categorical change.[192] Similar definition splits are found in AH and CT. While at first glance it seems unclear why the dictionaries posit separate senses for these different change types, these sense distinctions appear to help in associating *change* with other Change verbs, which may be restricted to only one half of the subtle-drastic continuum. This is seen in the listing of other change verbs in each sub-definition, namely *alter* for the subtle definition in (1a) and *transform* for (1b) in MW. In fact, the

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[190] Such simple definitions may be viewed in terms of decompositional approaches such as that of Pinker (1989), Rappaport Hovav and Levin (1998), or Levin and Rappaport Hovav (2005), as defining the basic event structure of Change verbs. Specifically, this event structure corresponds to the root of 'internally caused accomplishment' or 'externally caused accomplishment' for intransitive and transitive uses, respectively, in the classification proposed by Rappoport Hovav and Levin (1998).

[191] The generality of *change* will become clearer in the following analyses of other verbs, such as *alter* or *transform*, which share the general semantics of *change* but include further restrictions on or specifications to the types of changes they may denote..

[192] Of course, the distinction between a "subtle" and a "drastic" change is often subjective. At the end of this sub-section, I discuss some criteria for classifying verbs/events as subtle or drastic changes.

subtle-drastic distinction is one of the major ways in which Change verbs differ from one another semantically, as will be shown throughout this chapter.

Further evidence pointing towards the classification of *change* as semantically general pertains to the types of entities involved in utterances with *change*. While it may be expected that *change* is limited to changes of certain types of entities, this does not appear to be the case. Specifically, the definitions provide examples of changes to very different types of entities. These include changes to *a will* (MW), *human nature* (MW), *foliage* (MW), *the spelling of a word* (AH), *the music* (AH), or people (*he*, AH). These dictionary components thus demonstrate that *change* is not restricted to a certain type of Undergo_change entity, but may refer to changes to entities of all ontological categories, whether concrete or abstract, human or inanimate, or any other type of distinction.

The definition analysis thus demonstrates that *change* is highly general, as it does not exhibit any relevant (additional) meaning components or restrictions that distinguish it from the base/core Change semantics. Specifically, *change* can refer to caused (transitive) and undergone (intransitive) changes, it can refer to subtle and drastic changes, and it can refer to changes in entities of any ontological type. I now proceed to the semantic characterization of *turn*, which I will show is also a general Change verb. After that, I discuss *alter*, *modify*, and *transform*, each of which will be shown to involve additional meaning components.

Turn

The definitions for *turn* are presented in Table 5.6. The dictionaries provide ample evidence to classify *turn* as a Change verb. Specifically, each of the dictionaries uses the verb *change* or adjectival participle *changed* in at least one of their definitions of *turn*. The MW definition (#5a) uses the phrase *become different*, a phrase that was also frequently found in the definitions of *change*. The definitions also list other verbs such as *alter* or *transform*, which are also classified as Change verbs in the resources discussed above. Beyond the Change meaning, *turn* is also highly polysemous and associated with other frames such as `Change_direction` or `Contingency`, which are not included in these definitions. Additionally, *turn* definitions list numerous collocations, including *turn color* (e.g. of leaves, of face), *turn age*, and *food turning*

bad, as well as collocations which do not evoke the Change frame and are thus excluded from Table 5.6.[193]

MW	AH	CT
[…] *transitive verb* […] **6** […] **b** (1) **:** <u>convert</u>, <u>transform</u> <*turn* defeat into victory> […] **c :** to cause to become of a specified nature or appearance<*turned* him into a frog> <embarrassment *turned* her face red> […] *intransitive verb* […] **5 a :** to become changed, altered, or transformed <the weather *turned*>: as (1) *archaic* **:** to become different (2) **:** to change color <the leaves have *turned*> (3) **:** to become sour, rancid, or tainted <the milk had *turned*> (4) **:** to be variable or inconstant […] **b** (1) **:** to pass from one state to another **:** <u>change</u> <water had *turned* to ice> (2) **:** <u>become</u>, <u>grow</u> <his hair had *turned* gray> <the weather *turned* bad> <just *turned* twenty> (3) **:** to become someone or something specified by change from another state **:** change into <*turn* pro> <doctors *turned* authors> (4) **:** to change by the passage of time <days *turned* into weeks and months> […]	*tr*. […] 20a. To cause to take on a specified character, nature, identity, or appearance; change or transform. Used with *to* or *into*: *water that had been turned to ice; turn a rundown house into a show place*. b. To affect or change the color of: *Autumn turns the green leaves golden*. […] 21. To exchange; convert. Used with *to* or *into*: *turns her singing talent into extra money*. - *intr*. […] 16a. To change so as to be; become: *His hair turned gray. I am a lawyer turned novelist*. b. To change; become transformed. Used with *to* or *into*: *The sky turned to pink at dawn. The night turned into day*. c. To change color: *The leaves have turned*. […]	*vb* […] 9 (when *intr*, foll. by *into* or *to*) to change or convert or be changed or converted. 10 (foll. by *into*) to change or cause to change in nature, character, etc.: *the frog turned into a prince*. 11 (*copula*) to change so as to become: *he turned nasty.* 12 to cause (foliage, etc.) to change colour or (of foliage, etc.) to change colour. […]

Table 5.6: Relevant dictionary definitions for *turn*

[193] Such non-Change uses and collocations of *turn* include the following: rotate, change direction, knobs/dials (volume, heat), twist out of shape (ankle), ponder in thought, reverse sides (collar, pancake), disturb, change course of (turn the tide), employ [a skill] (turn his skills to X's service), change sides (turn against), spoil food, leaves change, shape (turn a phrase, turn the heel), make money (turn a profit), prostitution (trick), make giddy (head), be a decisive factor (the fate turns on X), turn s.o. out of the house, turn to our advantage, etc.

Beyond the general Change verb meaning, the dictionary definitions provide evidence that *turn* is a general, low-descriptivity Change verb with no additional restrictions or specifications of the base/core 'make/become different' meaning, similar to the verb *change* discussed above. For one, each definition lists both transitive and intransitive uses for *turn*, either explicitly as in MW and AH, or with special phrasing, as with the CT definition *to change […] or be changed*. As such, *turn* is capable of evoking both the `Cause_change` and `Undergo_change` frames, in FrameNet terms.

Secondly, definitions for *turn*, like those for *change*, suggest that it is also not restricted to either subtle or drastic changes. Although this distinction is not as clearly explicated in the *turn* definitions as with *change*, the language of the definitions implies that *turn* is neutral with respect to how drastic of changes it can refer to. Specifically, some definitions mention specific, subtle changes, as with *become of a specified nature* (MW), while others refer to more drastic types of changes, as with *from one state to another* (MW) or *become transformed* (AH). That *turn* can apply to both types of changes is also evidenced by the examples in the definitions: the AH definition includes the phrase *Autumn turns the green leaves golden*, which is typically not viewed as a drastic change because only the color of the leaves change. On the other hand, the CT definition includes the example *the frog turned into a prince*, which is clearly a drastic change in which an entity changes into a completely different type of being.

A third type of evidence for classifying *turn* as a general Change verb relates to the types of changes it can refer to and the types of arguments it may appear with. The definitions list a wide range of types of changes in their definitions, including changes in *nature* (MW, AH, CT), *appearance* (MW, AH), *identity* (AH), and *character* (AH, CT). The examples provided in the definitions also provide evidence for the generality of *turn*. With respect to the changed entities and the changes they undergo, examples include diverse types such as *the frog into a prince* (CT), *her face turned red* (MW), *water turned to ice* (AH), *her singing talent into extra money* (AH), or *the weather turned bad* (MW). Further, the participants which bring about the change are also quite diverse, ranging from humans over emotions (*embarrassment;* MW) to seasons (*autumn*; AH). Given these meaning components and examples, it is clear that *turn* can apply to a wide range of change scenarios.

In summary, the definitions show that *turn*, like *change*, is a general Change verb with no restrictions or further specifications to the base/core 'make/become different' meaning.

Specifically, it is not restricted with respect to transitivity, to the subtle-drastic distinction, or to any specific types of changes. I now move on to *alter*, *modify*, and *transform*, which differ from *turn* and *change*, in that they are not general, but add further restrictions and specifications to the general Change meaning.

Alter

Table 5.7 provides the relevant definitions for *alter*.

MW	AH	CT
: to change (something) : to make a change to (a piece of clothing) so that it will fit better […] *transitive verb* **1:** to make different without changing into something else **[…]** *intransitive verb* **:** to become different	*tr.* 1. To change or make different; modify: *altered my will*. 2. To adjust (a garment) for a better fit. […] - *intr.* To change or become different.	*vb* 1 to make or become different in some respect; change. […]

Table 5.7: Relevant dictionary definitions for *alter*

The definitions clearly show that *alter* is a Change verb, as each of the definitions include the word *change*, as well as the decomposed definition *make/become different*.[194] Like *turn* and *change*, the dictionaries suggest that *alter* is also associated with both transitive (i.e. `Cause_change`) and intransitive (i.e. `Undergo_change`) uses, and these are listed either as separate senses (MW, AH), or through the phrasing *make or become different* (CT).

However, unlike *change* and *turn*, the definitions for *alter* show that it is restricted to subtle changes only, as evidenced by various adverbial phrases that further specify the base/core meaning. The CT definition mentions that to alter is to *make or become different in some respect* and the MW definition specifically states that the entity becomes different, but *without changing into something else*. As such, we can say that *alter* only refers to changes on the subtle end of the subtle-drastic distinction.[195]

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[194] Unlike *change* and *turn*, *alter* does not evoke other frames but only refers to Change events.

[195] That the basic meaning of *alter* is associated with subtle changes is evidenced by the types of adverbs that frequently appear with it. A search in COCA for the strongest collocations of *alter* (within four words to the left or right of it) reveals that four of the top five collocations are adverbs that denote some type of dramatic change: *radically* (strongest collocation), *significantly* (2nd strongest collocation), *fundamentally* (3rd strongest collocation), and *dramatically* (5th strongest). If *alter*, in its basic meaning, were associated with drastic rather than subtle collocations, then such adverbs would be redundant and not appear as frequently with the verb.

The only other relevant meaning component identified in the definitions is that *alter* has a specific sense in which it refers to changes in clothing with the purpose of making the clothing fit better (MW, AH). However, *alter* may also refer to other types of changes, as evidenced by the example in AH (transitive definition #1), *altered my will*, which shows that *alter* may refer to changes in entities drastically different from clothing.[196] Thus, other than the meaning component of 'subtle' or 'non-drastic' change, and the 'alter clothing' sense, no other notable meaning components were identified for *alter* in the dictionary definitions.

In sum, the dictionary definitions show that *alter* is a Change verb, but differs from the general verbs *change* and *turn* in that it is associated with additional meaning components that further specify the basic Change sense. Specifically, *alter* is restricted to subtle, rather than drastic changes, and it is used (though not exclusively) to describe situations in which one changes clothing so that they fit better. I now describe the definitions of *modify*, which is also a subtle change verb like *alter*.

Modify

The definitions for *modify* are given in Table 5.8.

MW	AH	CT
: to change some parts of (something) while not changing other parts […] **Full Definition of MODIFY** *transitive verb* **1 :** to make less extreme**:** moderate […] **3 a :** to make minor changes in **b :** to make basic or fundamental changes in often to give a new orientation to or to serve a new end <the wing of a bird is an arm *modified* for flying> *intransitive verb*: to undergo change	*tr.* 1. To change in form or character; alter. 2. To make less extreme, severe, or strong: *refused to modify her stand on the issue*. […] - *intr.* To be or become modified; change.	*vb* **modifies, modifying, modified.** (*mainly tr*) 1 to change the structure, character, intent, etc., of. 2 to make less extreme or uncompromising […] 5 (*intr*) to be or become modified.

Table 5.8: Relevant dictionary definitions for *modify*

Again, the definitions show that *modify* is a Change verb, as the first definition of each dictionary includes the verb *change*. Each dictionary also lists both transitive and intransitive uses of *modify*,

[196] In fact, only one of the 79 analyzed corpus examples of *alter* exhibited this "alter garment" readings. The low frequency of this special sense demonstrates that *alter* can describe changes to many other entity tapes, in addition to clothing.

thus implying that it evokes both the `Cause_change` and `Undergo_change` frames. However, the CT definition mentions that *modify* is *mainly tr[ansitive]*.

The definitions also demonstrate that *modify* can refer to a wide semantic range of change types. This is shown in the CT definition (#1), which lists several diverse types of attributes which may be changed, namely *structure, character*, and *intent*. This generality is also seen in the two example phrases in the other dictionaries, which include changes to both a concrete entity (*the wing of a bird*; MW) and an abstract notion (*her stand on the issue*; AH). These data suggest that *modify* is not restricted with respect to the type of entity which undergoes change.

As for the subtle-drastic distinction, *modify* shares the 'subtle' change meaning component with *alter*, as its definition includes phrases such as *make minor changes in*, as well as *change some parts but not other parts* (MW). AH also lists *alter*, which was found to be a subtle Change verb, as a synonym for *modify*. While AH and CT do not directly mention this meaning component, other dictionaries corroborate that *modify* refers to subtle changes. The Cambridge on-line dictionary (http://dictionary.cambridge.org/us/dictionary/american-english) mentions *slightly* and Dictionary.com (http://dictionary.reference.com) mentions *somewhat* and *alter partially* in their definitions of *modify*. These components show that *modify* is a subtle change verb, like *alter* and unlike the general verbs *change* and *turn*.

Additionally, the dictionary definitions suggest that the change signified by *modify* is often carried out with a specific purpose in mind. Specifically, the MW definition reads *often to give a new orientation or serve a new end*, the AH definition reads *to make less extreme, severe, or strong*, and the CT definition reads *to make less extreme or uncompromising*. It is likely that these three definitions are related, with the AH and CT definitions pointing to a more specific type of purpose mentioned in the MW definition, particularly that of softening or simplifying something so that it is more suitable for its users/audience. This meaning component of 'for a purpose, especially to make less extreme' is an optional meaning component, as evidenced by the adverb *often* in MW and the separation of this sense from the general 'change' sense in AH and CT.[197]

[197] The purposive meaning component of *modify* is also evidenced by the examples found in the corpus analysis. The following sentences with *modify*, taken from COCA, specifically mention the purpose of the modification: *I took an 8x10 sheet film holder, and modified it to accept 6 1/2x8 1/2, traditional full sized plates*. (COCA); *Recent work aims to modify existing instrumentation so that logs are either more amenable to various kinds of analysis* [...] (COCA).

Finally, *modify* is also associated with the domain-specific sense used in grammar and linguistics, such as when an adjective 'modifies' a noun. However, only one example among the 95 analyzed examples involves this special sub-sense of *modify*. Apart from this specific sub-sense, the remainder of the examples involved changes in a wide variety of semantic domains. *Modify* also does not evoke other frames, but only refers to Change events.

This discussion has shown that *modify* is a Change verb that may evoke both the `Cause_change` and `Undergo_change` frames and may refer to a wide variety of changes to different types of entities. Like *alter*, *modify* is a subtle Change verb that is limited to minor changes in attributes of entities. It is also associated with an optional meaning component, namely that changes referred to by *modify* are carried out to fulfill a particular purpose, particularly for making something less extreme.

Transform

I now describe the meaning of *transform*, whose definitions are presented in Table 5.9.

MW	AH	CT
: to change (something) completely and usually in a good way **Full Definition of TRANSFORM** *transitive verb* **1 a :** to change in composition or structure **b :** to change the outward form or appearance of **c :** to change in character or condition **:** convert […] *intransitive verb* **:** to become transformed **:** change	*tr*. 1. To change markedly the appearance or form of: "*A thick, fibrous fog had transformed the trees into ghosts and the streetlights into soft, haloed moons*" (David Michael Kaplan). 2. To change the nature, function, or condition of; convert: *A steam engine transforms heat in to mechanical energy*. […] *intr*. To undergo a transformation.	*vb* 1 to alter or be altered in form, function, etc. 2 (*tr*) to convert (one form of energy) to another form. […]

Table 5.9: Relevant dictionary definitions for *transform*

The dictionaries show that *transform* is also a Change verb, as many of the MW and AH definitions include the word *change*, and the CT definition lists other Change verbs, namely *alter* and *convert*.[198] The dictionaries also provide definitions for both transitive and intransitive uses

[198] Although I do not analyze *convert* in this study, it is also listed both in Levin's (1993) *Turn* class as well as the Cause_change frame in FrameNet. That *alter* is listed in the CT definition of *transform* is rather misleading, as *alter* was shown to refer only to subtle changes, whereas *transform* refers to drastic changes.

(explicitly in MW and AH; through phrasing *alter or be altered* in CT), showing that *transform* may evoke both the `Cause_change` and `Undergo_change` frames.

Transform also appears to be unrestricted with respect to the types of changes it may refer to. Each of the dictionaries lists multiple attributes whose changes can be referred to with *transform*, such as appearance, form, condition, or character. Most of the dictionary entries associate different attributes with different senses of *transform*. For instance, the MW definition posits three sub-senses for *transform*, one for changes *in outward form or appearance*, one for changes *in composition or structure*, and one for changes *in character or condition*. The examples provided in the AH definitions also demonstrate that *transform* may involve different types of agents/causes (*a thick, fibrous fog; a steam engine*) and changed entities and final states (*trees into ghosts; heat into mechanical energy*). These types of definitions suggest that *transform* may refer to a wide variety of change scenarios.

With respect to the subtle-drastic distinction, the verb *transform* differs from *modify* and *alter* in that it refers to drastic rather than subtle changes. This is evidenced by phrases such as *completely* (MW) and *markedly* (AH) which modify the base verb *change* in the dictionary definitions. That *transform* refers to drastic, categorical changes is also demonstrated by the examples in the AH definition, in which the changed entity and final state are very different types of categories (*trees into ghosts; heat into mechanical energy*). These data lead me to classify *transform* as a drastic Change verb. Further support for this classification is found in the corpus sentences listed in the following section.[199]

A further meaning component for *transform* is seen in the definition from MW, which reads *usually in a good way*. It is unclear exactly how to interpret this meaning component, as it involves subjective judgment as to what it means to change something "in a good way" (i.e. whether the change is successful, whether it is carried out in a proper manner, whether it is judged positively by society, etc.). Further, this meaning component is more than likely an optional component, because of the adverb *usually* and the fact that AH and CT do not mention this component. This meaning component is included in the analysis as an optional meaning

[199] Corpus sentences from COCA demonstrating that *transform* refers to drastic changes include the following: […] *when he transformed the mask from a protest of youth into a gentle romantic whimsy*. (COCA); *the hippo regius labyrinth transforms the motif from a visual game to something more like a physical event*. (COCA).

component and listed as "positive change."[200] Domain-specific senses of *transform* include scientific uses as seen in the fields of electricity, mathematics, linguistics, and biology. No non-Change senses were identified for *transform*.

The definitions for *transform* characterize it as a Change verb that may appear transitively or intransitively that can occur with a wide range of participants and refer to various types of changes. Unlike the verbs discussed above, *transform* is a drastic change verb, in that it refers to significant and categorical changes, such as those in which an entity becomes something else entirely. Further, *transform* is associated with changes that are deemed positive in some respect.

5.2.2. Summary of English Change verb meanings

I now summarize the analysis of English Change verb meanings and compare the verbs according to the meaning components observed in the dictionary definitions. Table 5.10 illustrates the findings by showing the meaning components in the left column and specifying whether the component applies to individual verbs with a "+" in the relevant cell. The final row lists the total number of meaning components, including the base/core 'make/become different' meaning, identified for each verb.

Component	***Alter***	***Change***	***Modify***	***Transform***	***Turn***
Make/become different	+	+	+	+	+
Subtle Change	+		+		
Drastic Change				+	
Change for a purpose			+		
Change to make less extreme			+		
Change in a good way				+	
TOTAL	2	1	4	3	1

Table 5.10: Summary of meaning components of English Change verbs

All of the verbs are associated with the meaning component 'make/become' different, thus justifying their shared inclusion in the class of Change verbs. This component is characterized in dictionary definitions in various ways. Nearly all definitions for the verbs besides *change* mention the word "change," supporting grouping these verbs together within a semantic class. In some of

[200] Corpus sentences demonstrating that *transform* refers to positive changes include the following: *Here are ways they TRANSFORMED those challenges into opportunities*. (COCA); *Venice TRANSFORMED from a city only the elite could visit to a much more accessible destination* [...] (COCA).

the definitions, this component is paraphrased as *make different* or *(cause to) become different*, but no further decomposition of this meaning component was identified in the dictionaries, suggesting that this is the base/core meaning of the English Change verb class.

Although all verbs share the 'change' or '(cause to) become different' meaning component, entries for some of the verbs revealed additional components which set that individual verb off from the others. The first such meaning component is a binary/scalar component referring to the difference between minor, subtle changes on the one hand and more drastic and significant changes on the other, listed separately in the third and fourth rows of Table 5.10.[201] These meaning components characterize the semantics of *alter*, *modify* and *transform*, with the former two associated with subtle changes and the latter associated with drastic changes. The subtle meaning component is characterized in definitions for *alter* using phrases such as "to make different without changing into something else" (MW) and "to make or become different in some respect" (CT). Definitions for *modify* also include phrases such as "to change some parts of (something) while not changing other parts" (MW) and "to make minor changes in" (MW). As for the drastic meaning component, definitions for *transform* characterize the significance of the change with phrases such as "to change (something) completely […]" (MW) and "to change markedly the appearance or form of" (AH). These verbs thus exhibit meaning components which restrict their application to the full set of scenarios which may be described by the general verbs *change* and *turn*, suggesting that they are not general but more descriptive. These distinctions will apply later in this section when semantic and syntactic sub-classifications of Change verbs are proposed.

While the subtle/drastic distinction is easily established with reference to the dictionary definitions, it is not always clearly measurable in terms of linguistic data. This situation often arises because many corpus sentences do not specify the exact type of change but allow it to be determined from context and world knowledge. For instance, *This city has changed* can refer to many different types of changes, ranging from its appearance, its economy, its population/demographics, its economy, or any other aspect of the city. It also does not specify how drastically it has changed: if the sentence is interpreted as a change in the city's appearance,

[201] While Table 5.11 separates the drastic/subtle distinction into two separate meaning components, it is equally acceptable to include it as a single component and have the individual verbs specify its relative value, i.e. drastic for *transform* and subtle for *alter* and *modify*.

it still does not specify whether the change is due simply due to a few new skyscrapers being built (a subtle change) or due to urban decay in which previously popular downtown areas now consist of run-down buildings with barred up windows (a more drastic change).

At the same time, some linguistic criteria can be used to classify verbs (or examples) as referring to drastic or subtle changes. One such criterion is the types of adverbs they appear with. In the discussion of *alter*, I noted that it appears very frequently with adverbs such as *radically* or *dramatically*, despite being characterized as a subtle change verb in its definitions. The high frequency of such adverbs suggests that drastic changes are not part of the core meaning of *alter*, but are nonetheless compatible with it, i.e. the adverbs coerce the verb into a drastic change meaning. On the other hand, the only adverb in the top 10 collocations for *modify* is *slightly*, suggesting that *modify* is strictly a subtle change verb that cannot be coerced into a drastic change reading. Moreover, *transform* is also relatively infrequent with adverbs suggesting drastic changes (only *radically* appears at #5 among its top 10 collocations), probably because it is already associated with a drastic change meaning component, thus rendering the addition of such adverbs redundant. Another such criterion is the frequency with which the verbs appear with nouns that refer specifically to attributes, such as *size* or *color*. A search of the noun *size* within four words of the target verbs shows that it appears much more frequently with *alter* (0.34% of all occurrences of *alter*), *modify* (0.19%), and *change* (0.14%), than it does with *transform* (0.00049%) or *turn* (0.00013%), further supporting my claim that *transform* and *turn* are drastic change verbs, as they occur less frequently with nouns specifying an attribute that typically change only subtly (i.e. one cannot change a size into something else, but only e.g. from small to large). A final criterion for distinguishing between subtle and drastic change verbs is to test their ability to refer to changes which are indisputably subtle or drastic. For instance, native speaker intuitions strongly suggest that *change, turn,* and *transform,* but not *alter* or *modify,* can be used to describe the situation of a witch turning a prince into a frog, whereas *alter, modify, change,* and *turn,* but typically not *transform*, can be used to describe the situation of leaves changing their color from green to yellow. In sum, while it is not always trivial to distinguish between subtle and drastic (uses of) Change verbs, a close analysis of adverbial collocations, specific attribute noun

collocations, and the acceptability to describe specific change scenarios provide criteria for classifying such verbs as subtle or drastic.[202]

In addition to the subtle/drastic change distinction which applied to multiple Change verbs, the definitions also mention components which are associated with only one of the verbs under investigation. Such meaning components only apply to *modify* and *transform*. (*Alter* is only restricted by being "subtle" on the subtle/drastic distinction.) For *modify*, two such components can be identified. The first such meaning component, "change for a purpose," is listed in the fifth row of Table 5.10. This component is identified in the MW definition of *modify*, which reads "to make basic or fundamental changes in often to give a new orientation to or to serve a new end," suggesting that *modify* may refer to changes which serve some purpose. The corpus data for *modify* discussed in the following section provide further evidence for this meaning component, as a significant number of examples with *modify* include subordinate clauses that describe the specific purpose of the modification.

The next meaning component, "change to make less extreme," also only applies to *modify*. It is identified in the AH definition of this verb with the phrasing "to make less extreme, severe, or strong" and in the CT definition "to make less extreme or uncompromising." Thus, *modify* may be used for purpose-oriented changes, especially when the purpose is to improve something.

The final meaning component, "in a good way," was identified only for the verb *transform*. Specifically, a portion of its definition in MW reads "to change (something) completely and usually in a good way," suggesting that changes referred to by *transform* may be deemed as positive.[203]

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[202] A detailed investigation of such factors remains a desideratum.

[203] Apart from the polar major-minor change distinction and the individual-verb components which apply to *alter, modify*, and *transform*, most of the English Change verbs also exhibit domain-specific senses such as the use of *modify* in linguistics, *transform* in mathematics or biology, or *alter* in the sense of changing the size or fit of clothing. There are also certain collocations in which a noun that is changed appears more frequently with a certain Change verb, as with *mind* or *seasons* with *change* or numbers for ages and face colors for *turn*. Finally, the lexemes *change* and *turn* are also used to describe scenarios (i.e. evoke frames) that are different than Change, particularly scenarios of Replacing, Exchanging, or Change_direction. While these aspects of meaning may be relevant for the verbs' valency behavior, they are not treated in detail here.

5.2.3. Implications of meaning analysis

This discussion of English Change verb meanings reveals that, while the verbs all share a base/core meaning of '(cause to) become different', individual verbs vary in the types of additional meaning components that further specify the base/core semantics. In fact, no two verbs have the exact same set of additional meaning components (while *turn* and *change* are both general, they differ in their collocational behavior and, as shown in the following sub-section, valency behavior), further supporting the notion that true synonymy does not exist (Quine 1951; Cruse 1986: 270). These subtle differences in meaning also have implications for verb classification approaches, such as FrameNet and Levin (1993). The classes proposed in these resources are suggested to be semantically uniform, and fine-grained semantic differences among individual verbs are treated unsystematically (as in FrameNet)[204] or ignored altogether (as in Levin 1993). However, close analysis of the detailed semantics and syntax such verb classes may reveal that such fine-grained meaning components influence argument realization patterns and thus enable a more comprehensive understanding of the relation between verb meaning and valency behavior, as shown in the following sections.

5.2.4. Descriptivity of English Change verbs

Based on the preceding discussion, the verbs can now be categorized according to their level of verb descriptivity ('semantic weight'; Snell-Hornby 1983). The present analysis follows that of Boas (2008a) and Dux (2011), as presented in Section 3.2.2. Specifically, individual verbs of a given frame are classified according to the number of meaning components which further specify the base/core meaning of the verb class. Verbs with a higher number of (additional) meaning components are said to be high-descriptivity (high semantic weight), while those with few components are low-descriptivity (low semantic weight).[205] Boas (2008a) and Dux (2011) showed that verbs of the `Self_motion` and `Theft`, respectively, appear in a wider range of valency patterns when they have a lower degree of descriptivity, and vice versa. Here, I discuss the descriptivity level of English Change verbs in order to determine whether the same syntactic

[204] As one example, the FrameNet entry for *transform* in the Undergo_change frame lists as its meaning: *to undergo an alteration*. This definition is not only circular (i.e. by employing the nominal near-synonym *alteration*), but it fails to recognize the two additional meaning components revealed in the dictionary analysis, namely that *transform* refers to drastic or complete changes, especially ones that are viewed as positive.

[205] The low- vs. high-descriptivity distinction is, of course, a continuum, and verbs can also have medium- or medium-high descriptivity, etc.

generalization (i.e., inverse correspondence between descriptivity level and range of valency patterns) applies to English Change verbs as well.

Table 5.11 summarizes the level of descriptivity for the five verbs discussed above.[206]

Level	# of components	Verbs
High	2+	*modify* (4), *transform* (3)
Medium	1	*alter*
Low	0	*change*, *turn*

Table 5.11: English Change Verbs according to level of descriptivity

At the lowest level are *change* and *turn*, which are associated with no relevant additional meaning components or restrictions. The medium-descriptivity level contains only *alter*, which is associated with only one additional meaning component, namely that it refers to subtle rather than drastic changes.[207] *Modify* and *transform* are high-descriptivity, as they are associated with two or more additional meaning components. *Modify* is restricted to subtle changes and optionally refers to changes with a specific purpose in mind, particularly that of making something more acceptable or less extreme. *Transform* is restricted to drastic changes and optionally refers to changes that are judged positively. Given this classification according to descriptivity and Boas's (2008a) and Dux's (2011) findings for other verb classes, one may hypothesize that low-descriptivity *change* and *turn* will appear in the widest range of valency patterns, *modify* and *transform* will appear in the narrowest range of patterns, and *alter* will fall somewhere in between.[208] After presenting the syntactic analysis, I test this prediction at the end of the following section.

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[206] This classification does not account for the influence of collocations or domain-specific senses (e.g. *alter* with clothing) on descriptivity, but these may play a role in weighing verb meaning.

[207] It may not be the case that all native speakers agree with the separation of *alter* as a medium-descriptivity verb from *modify* and *transform*, because the additional components of the latter two may not apply in all cases. Further, it may be inappropriate to classify *modify* and *transform* as high-descriptivity, as they are only associated with two and three additional components, respectively, all of which are only optional and do not apply in all cases. This situation stands in contrast to Dux's (2011) analysis of verbs in the Theft frame, some of which are associated with more and semantically richer meaning components than the Change verbs discussed here. As such, the present classification of Change verbs should be seen as a relative classification of these verbs against one another rather than a general classification for the entire English verbal lexicon.

[208] The descriptivity of English Change verbs also compared with that of Theft verbs in Chapter 7.

In this section, I described the meanings of English Change verbs and identified various meaning components which set the individual verbs apart from one another. I now proceed to the valency analysis of these verbs and then determine which of these meaning components, if any, can be connected to systematic aspects of valency behavior for these verbs.

5.3. VALENCY OF ENGLISH CHANGE VERBS

5.3.1 Corpus data and valency construction types

In order to assess the valency behavior of English Change verbs, I consulted the Corpus of Contemporary American English (COCA; Davies 2008-) and documented the number and types of valency constructions occurring with each Change verb in a sample of approximately 100 examples per verb. I first conducted a search of COCA for all verbal instances of each Change verb, using the lemmatizing and part-of-speech search functions (e.g. "[change].[v*]"). I extracted 1,000 instances each for *change* and *turn*, and 500 each for *alter*, *modify*, and *transform*, because *change* and *turn* are highly polysemous and thus return many examples with undesired non-Change senses of the lemmas. As the corpus includes only data from 1990-2011, the dates of the search were not limited. After filtering the data as described in the following paragraphs, a total of 549 example sentences were analyzed, approximately 100 for each verb, as summarized in Table 5.12.[209]

Verb	**# of examples analyzed**
alter	79
change	134
modify	95
transform	109
turn	132
TOTAL	549

Table 5.12: Number of COCA corpus examples analyzed

[209] The number of examples analyzed here strikes a balance between the lexicographic orientation of Valency Grammar (Herbst et al. 2004, Faulhaber 2011) and FrameNet (Ruppenhofer et al. 2010), which seek to describe a verb's full range of complementation patterns and thus list every valency construction attested regardless of its frequency, and the big data orientation of other work in corpus linguistics which involves automated analysis of a much more specific, predetermined aspect of valency behavior based on much larger amounts of data (Lapata 1999, Gries and Stefanowitsch 2004). While a larger number of examples is desirable, this amount of data has been employed in other comparative analyses of verbs within a semantic class (e.g. Engelberg 2014, Meliss 2014).

After extracting the full list of hits from COCA, I filtered out undesired examples as I analyzed the data. Examples were excluded if they exhibited non-Change senses of the verbs. Such cases were relatively frequent for *turn* and *change*, but less frequent for *alter*, *modify*, and *transform*. Examples of such sentences are found in (5.31), where *turn* is used in the 'motion' sense, or in (5.32), where *change* is used in the sense of 'exchanging (means of transportation)'.

(5.31) He turned to the door […] (COCA)

(5.32) We took a late flight and changed in Atlanta. (COCA)

I also excluded sentences involving valency-changing constructions such as passives or imperatives. Some sentences including relative clauses, infinitival clauses, gerundial clauses or adjectival uses of the verbs were excluded if they exhibited long-distance dependencies between verbal arguments or were otherwise difficult to interpret clearly, as in (5.33)-(5.36), respectively.

(5.33) there will be a macro-setting that is difficult for any one state to alter decisively (COCA)

(5.34) The essence of our enterprise is to alter the data which have formed, so far, the basis of his research. (COCA)

(5.35) […] and vice chairman John Meriwether were not involved in altering documents (COCA)

(5.36) Crops modified to fend off viral diseases could double food production of the continent. (COCA)

However, I included examples of these verbs where the dependencies are shorter and relations between individual arguments could clearly be deduced. Such instances are exemplified in (5.37)-(5.39). (5.37) shows a relative clause, in which the C (*bacteria*) is the head of the relative clause, and the verb and U (*water quality*) are easily identifiable in the subordinate relative clause. In (5.38), the verb is in a gerundial form because it is modified by an aspectual modal (*be finished V-ing*). Apart from the intervening modal, it is straightforward to assign phrase types and grammatical functions to the arguments clearly and consistently. (5.39) is an interrogative

construction in which the core arguments have their normal realization and the *wh*-word only replaces a non-core FE.

(5.37) […] bacteria that modified downstream water quality of a high-flow pulse […] (COCA)[210]

(5.38) Schaechter and Cosworth were finished modifying the car […] (COCA)

(5.39) How shall we modify grandeur? (COCA)

After filtering these data, I then documented the valency construction of each example, specifically the grammatical functions and phrase types of the four refined core FEs (C, U, O, F).[211] For instance, (5.40a) exemplifies an active, transitive use of *turn* in its Change sense. The C (*we*) is a nominal subject, the U is a nominal direct object (*that outflow*), and the F is realized in an oblique prepositional phrase headed by *into* (*into inflow*). This valency construction is schematized in (5.40b) and associates each role with its phrase type and grammatical function.[212]

(5.40) a. […] We can turn that outflow into inflow […] (COCA)
b. [C.NP.Subj + verb + U.NP.Obj + F.PP*into*.Obl]

A further example is (5.41), which shows a transitive use of *modify* in which the F is not expressed in a PP, but as a purposive clause headed by *to*. The C (*officials*) again appears as a nominal subject, the U (*the military's organization and structure*) is a nominal direct object, and

[210] I use the labels "Subj" and "Obj" in parallel to how FrameNet employs the labels "Ext" and "Obj", respectively (Ruppenhofer et al. 2010). This labeling is unproblematic when both arguments appear in the same (main) clause. However, for relative clauses, the subject or object (or even oblique arguments) may head the relative clause and appear outside of it. In these cases, I label the arguments as though they were in the same main clause. For instance, in the sentence *the man that the witch changed*, I label *the man* as object in spite of its occurrence outside of the relative clause, because it would be the object if the relative clause were reformulated as a main clause.

[211] The method for documenting valency constructions was introduced in Chapter 4. In some cases, oblique phrases typically associated with non-core FEs (i.e. adjuncts) are used to express core FEs. For instance, the F argument, normally expressed in an *into* or *to* PP, may be expressed using an additional clause headed by *so that* or *to*, as in the following sentence: *I took an 8x10 sheet film holder, and modified it to accept 6 ½ x 8 1/2, traditional full sized plates*. (COCA)

[212] In Chapter 4, valency constructions (VCs) were defined as verb- and verb-class-specific pairings of semantic roles (i.e. FEs), grammatical functions, and phrase types.

the purposive F (*to increase interforce rivalry*) is realized as a clause headed by *to*. Again, the valency construction is schematized in (5.41b).

(5.41) a. […] officials modify the military's organization and structure to increase interforce rivalry. (COCA)
b. [C.NP.Subj + verb + U.NP.Obj + F.*to*CP.Obl]

Having described the data and method for identifying valency distribution, I now move on to the description of English Change valency constructions and their distribution with Change verbs.

5.3.2. Introducing the English Change valency constructions

Before describing the results of the corpus analysis in the following sub-section, I preview the valency constructions (VCs) attested in the corpus analysis and provide labels to each VC in order to simplify the presentation of each verb's valency behavior. I first introduce the general VCs with default realizations of the core FEs (e.g. NPs for subject C and U and object U) before briefly describing subtle variations in the phrase types associated with the general VCs (e.g. gerundial VP subjects, as in *Learning German changed my life*.).

In order to capture relationships among the individual VCs, I employ a labeling system that specifies syntactic features of the VC, or their "valency features." The VC labels consist of three (sub-)labels that capture a specific feature: the first alphabetical label distinguishes transitive (T), intransitive (I), and resultative (TR/IR) uses, the second numerical label (ranging from 1-4) refers to the total number of core FEs occurring in the VC, and the final label (ranging from a-c) distinguishes specific phrase-type realizations of the core FEs, which is necessary when multiple realizations are possible for VCs with the same number of core FEs.

One of the major differences among common VCs involves transitivity, or the causative-inchoative distinction (Levin 1993: 26f.), which is captured in FrameNet through the distinction between the `Cause_change` and `Undergo_change` frames. The transitive/causative patterns realize C as subject and U as direct object, while the intransitive/inchoative patterns realize only U as subject and no C is mentioned. The first part of the label of transitive VCs is "T", while that of intransitive VCs is "I".

The next major distinction among VCs found with English Change verbs involves the number of core FEs in the VC. The simple transitive pattern (which only realizes C and U) is thus labeled "T2" as it is transitive and includes two FEs, while the simple intransitive pattern is

labeled "I1" as it is intransitive and includes only one FE (U). (5.42) - (5.43) demonstrate these two VCs, respectively, on the basis of simple invented examples.

(5.42) **T2: Simple Transitive**
ex: The witch changed the man.
[C.NP.Subj + verb + U.NP.Obj][213]

(5.43) **I1: Simple Intransitive**
ex: The man changed.
[U.NP.Subj + verb]

VCs that realize the F argument in addition to U (for intransitive VCs) or to C and U (for transitive VCs) differ with respect to the formal realization of the F argument. The most common realization of F is in a prepositional phrase headed by *into* or *to*. Some examples realize the F in a subordinate clause headed by *to* or *so (that)* that expresses the purpose or result of the change; such examples are only found with transitive VCs. These different formal realizations of F require a third specification in the VC labels: VCs introducing F in an *into* PP carry the letter "a" as the third part of the label, those introducing F in a *to* PP are labeled "b", and those with the clausal F are labeled "c".[214] (5.44)-(5.48) demonstrate each of these VCs using simple invented examples.

(5.44) **T3a: Transitive with F as *into* PP**
The witch changed the man into a frog.
[C.NP.Subj + verb + U.NP.Obj + F.intoPP.Obl]

(5.45) **T3b: Transitive with F as *to* PP**
The witch changed the man to stone.
[C.NP.Subj + verb + U.NP.Obj + F.toPP.Obl]

[213] The fully specified formalization of the VC at the bottom of these examples shows the default phrase-type realization of the FEs, namely as NPs, but some examples differ subtly in the exact phrase-type realization, as discussed below.
[214] The examples below do not include the I2c VC (intransitive with a clausal F realization), because this VC was not attested in the main corpus data.

(5.46) **T3c: Transitive with purposive clause F**
Pat changed the man {so that he looked like a frog/to look like a frog}.[215]
[C.NP.Subj + verb + U.NP.Obj + F.to/soCP.Obl]

(5.47) **I2a: Inransitive with F as *into* PP**
The man changed into a frog.
[U.NP.Subj + verb + F.intoPP.Obl]

(5.48) **I2b: Transitive with F as *to* PP**
The man changed to stone.
[U.NP.Subj + verb + F.toPP.Obl]

The next set of VCs include both the O and the F arguments. (No examples were found realizing only the O but not the F argument.) The O argument is always realized in a *from* PP, so no additional label is required. These VCs are thus largely parallel to those listed above in (5.44-5.48) and differ only with respect to the number of arguments, except that no VCs were found with both the O argument and a clausal realization of F (i.e. no T4c or I3c VCs). They are listed and exemplified in (5.49)-(5.52) below.

(5.49) **T4a: Transitive with O as *from* PP and F as *into* PP**
The witch changed the man from a prince into a frog.
[C.NP.Subj + verb + U.NP.Obj + O.fromPP.Obl + F.intoPP.Obl]

(5.50) **T4b: Transitive with O as *from* PP and F as *to* PP**
The witch changed the man from flesh to stone.
[C.NP.Subj + verb + U.NP.Obj + O.fromPP.Obl + F.toPP.Obl]

(5.51) **I3a: Inransitive with O as *from* PP and F as *into* PP**[216]
The man changed from a prince into a frog.
[U.NP.Subj + verb + O.fromPP.Obl + F.intoPP.Obl]

(5.52) **I3b: Transitive with O as *from* PP and F as *to* PP**
The man changed from flesh to stone.
[U.NP.Subj + verb + O.fromPP.Obl + F.toPP.Obl]

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[215]As these examples only serve to exemplify the VCs and do not focus on the semantics of the arguments, some of the example may sound unusual.

[216] The limited corpus analysis did not exhibit any VCs of type I3a, but such VCs can be found through a more rigorous search of the corpus.

Finally, two VC types appear only in the corpus data for the verb *turn*. These are resultative constructions in which the F argument is realized as a bare adjective (or, in one example, a bare noun) not introduced in a PP. Both transitive and intransitive versions of this VC were found, and these carry the labels "TR3" and "IR2" respectively. They are exemplified in (5.53)-(5.54).

(5.53) **TR3: Transitive resultative**
The fall weather turned the leaves red.
[U.NP.Subj + verb + F.Adj.Result]

(5.54) **IR2: Inransitive resultative**
The leaves turned red.
[C.NP.Subj + verb + U.NP.Obj + F.Adj.Result]

The VCs described above are summarized in Table 5.13. The left-hand column lists a brief prose description of the pattern, and the two other columns specify the realization of the transitive and intransitive versions of the pattern. The phrase type specifications (e.g. NP) in the table refer to the default realization found in the overwhelming majority of instances of the given VC, but some slight phrase-type differences occur, as discussed below.

	TRANSITIVE	**INTRANSITIVE**
Simple	T2: C.NP _ U.NP	I1: U.NP _
F as *into* PP	T3a: C.NP _ U.NP into F	I2a: U.NP _ into F
F as *to* PP	T3b: C.NP _ U.NP to F	I2b: U.NP _ to F
F as purposive CP	T3c: C.NP _ U.NP F.to/soCP	
O and F as *into* PP	T4a: C.NP _ U.NP from O into F	I3a: U.NP _ from O into F
O and F as *to* PP	T4b: C.NP _ U.NP from O to F	I3b: U.NP _ from O to F
Resultative	TR3: C.NP _ U.NP F.Result	IR2: U.NP _ F.Result

Table 5.13: Valency Constructions for English Change verbs

Table 5.14 summarizes the major features that distinguish the common VCs from one another and lists the labels of the specific VCs that exemplify the distinction. The first major distinction is that between transitive/causative and intransitive/inchoative VCs. VCs also differ with respect to their realization of State arguments, distinguishing between those with no states, those with only the Final (F) state, and those with both Original (O) and Final (F) states. A further distinction among valency patterns pertains to the specific realization of the F argument: the F argument can be realized as an *into* PP, as a *to* PP, as a purposive clause headed by *to* or *so (that)*,

or as a resultative phrase. These valency features aid in making generalizations about the valency behavior of individual verbs, as shown below.

Valency Feature	**Options**	**Valency Constructions**
Transitivity	Transitive/Causative	T2, T3(a-c), T4(a-b), TR3
	Intransitive/Inchoative	I1, I2(a-b), I3(a-b), IR2
State realization	No states	T2, I1
	Only F	T3(a-c), I2(a-b), TR3, IR2
	both O and F	T4(a-b), I3(a-b)
F realization	intoPP	T3a, T4a, I2a, I3a
	toPP	T3b, T4b, I2b, I3b
	to/so (that) CP	T3c
	Resultative	TR3, IR2

Table 5.14: General distinctions among common valency constructions for English Change verbs

Phrase-type changing constructions

I now briefly mention some deviations from the most frequent "default" formal realizations of the general VCs described above. For the most part, such deviations are minor and infrequent, and I thus subsume these as sub-types of the more general VCs described above. First, while C and U arguments in common VCs appear as NPs, in some instances the C or U arguments appear as gerundial VPs (5.55) or finite clauses headed by an interrogative *wh*- word (5.56).[217] The corpus also includes one example in which the C argument is in a clausal infinitival subject of the type *for N to V* (5.57).

(5.55) **C as gerundial VP**
Did *growing the Ted Ray mustache* change your life? (COCA)[218]
[C.VPing.Subj + verb + U.NP.Obj]

(5.56) **C or U as wh-CP**
she refused to change *how she worked*. (COCA)
[C.NP.Subj + verb + U.whCP.Obj]

[217] It is also likely that these arguments may be realized in finite clauses headed by *that*, as in *That his car is broken changes our vacation plans*. However, no such instances were found in the main corpus analysis.
[218] The remainder of the examples in this section are from the COCA corpus. The argument with non-default realization is in italics.

(5.57) **C as for-to CP**
for such a lease not to be taken would significantly alter the balance of nuclear capability between India and Pakistan. (COCA)
[C.for-toCP.Subj + verb + U.NP.Obj]

One notable non-default realization of VCs includes the realization of U as a reflexive object. Specifically, the corpus results for the verb *transform* include a relatively high number of examples in which the U argument in transitive patterns is a reflexive object that identifies the U argument with the C argument, as seen in (5.58).

(5.58) **U as reflexive object**
When Daisy transformed *herself* from a so-so librarian into a seductress (COCA)
[C.NP.Sbj + verb + U.NPself.Obj + …]

Such realizations are only found with *transform* in the main corpus and appear to occur much more frequently with this verb than with other Change verbs, [219] thus constituting a unique aspect of valency behavior for *transform*.

The corpus also revealed four deviations from the default realization of F as a single PP containing a NP. The first type involves a *wh*-clause that stands for the nominal F argument that is typically embedded within an *(in)to* PP, as seen in (5.59). The second is similar to this, but realizes a direct quotation within the *in(to)* PP (5.60). Third, some examples include multiple prepositional (i.e. *in(to)* PP) F arguments that refer to multiple changes to the same entity, as in (5.61). Finally, some examples realize an adjective within the PP rather than a noun (5.62).

(5.59) **F as wh-CP within (in)to PP**
you don't want to have anything turn into *where NASCAR does have to police things*
[U.whCP.Obj + verb + F.into-whCP.Obl] (COCA)

(5.60) **F as Direct Quote within (in)to PP**
when cocktail-party chatter turned *to "Why haven't you ever married?"* (COCA)
[U.whCP.Obj + verb + F.intoCP.Obl]

[219] Of course, the occurrence of reflexive objects is not restricted to *transform*. COCA includes several examples of reflexive objects with other Change verbs, such as *change*, as in […] *his mother sat him down and he grew up, he changed himself* (2009, NEWS, Denver), and *alter*, as in […] *you're trying to alter yourself physically and emotionally.*(2010, NEWS, USA Today).

(5.61) **Multiple prepositional F arguments describing multiple changes**
The wheel turns girl *to woman to widow to girl*. (COCA)
[C.NP.Sbj + verb + U.NP.Obj + O.fromPP.Obl + F.toPP.Obl + F.toPP.Obl + F.toPP.Obl]

(5.62) **F as adjective within (in)to PP**
He […] changed the sport from shamateur *to professional*.
[C.NP.Subj + verb + U.NP.Obj + O.fromPPadj.Obl + F.toPPadj.Obl]

Finally, two other deviations from the default realizations were found. The first includes O arguments that are realized as an adjective rather than the default noun within a *from* PP (5.63). The second includes resultative constructions in which the resultative phrase expressing the F argument is a noun, rather than the expected adjective (5.64).

(5.63) **O as adjective within from PP**
ultraviolet radiation can […] transform […] chemicals *from nontoxic* to a toxic form.
[C.NP.Subj + verb + U.NP.Obj + O.fromPPadj.Obl + F.toPP.Obl]

(5.64) **Resultative noun**
Has Bill turned *gamester* on top of everything else? (COCA)
[C.NP.Subj + verb + F.NP.Result]

As noted above, apart from the relatively high frequency of reflexive objects with *transform*, these non-default realizations of the more general VCs are rare, occurring at most three times with a given verb. Therefore, I treat these as instances of the more general VCs described above and only mention their occurrence in footnotes in the following presentation of the corpus analysis. However, these types of constructions will come into play in the comparison with Theft verbs in Chapter 7.

5.3.3. Results of corpus analysis

I now summarize the results of the corpus analysis, describing for each verb its distribution across the VCs defined above. For the first two verbs, *alter* and *change*, I discuss in detail how the present analysis improves upon their treatment in existing resources such as Levin (1993), FrameNet, and the VDE. After summarizing each verb's valency behavior based on the corpus data, I synthesize the findings in the formulation of the English Change valency frame and of frame-based verb entries for each of the verbs under investigation.

This sub-section contains a table for each of the verbs summarizing its precise valency distribution, followed by a discussion of its precise valency distribution and then a summary of its general valency behavior. In the tables, the left-most column shows the VC label as defined in the preceding sub-section, the next column shows number of patterns that exhibit a given VC for the verb, while the third column shows the VC's frequency among all examples annotated for the verb. The fourth column lists the actual VC, specifically the combination of FE, grammatical function, and default phrase type (VCs exhibiting non-default phrase types are mentioned in footnotes). The right-most column lists one actual example of the VC from the COCA corpus.

Alter

Table 5.15 summarizes the valency behavior of *alter*.

VC	Freq.	%[220]	Pattern[221]	Example[222]
T2	71	90%	[C.NP.Subj + verb + U.NP.Obj][223]	(5.65) Again I say, <u>you</u> could ALTER **your mission**.
T3c	2	3%	[C.NP.Subj + verb + U.NP.Obj + F.CP.Obl][224]	(5.66) Program for New Americans urges <u>teachers of newly immigrated students</u> to ALTER **this activity** as necessary *to fit their students' language fluency and education levels*
I1	6	8%	[U.NP + verb]	(5.67) **Our tastes, abilities, and needs** all ALTER with time.

Table 5.15: Valency distribution of *alter*

[220] Because I rounded the percentages of examples exhibiting a given VC to the nearest whole number, the full percentages do not always add up to exactly 100%.

[221] In these tables, VCs of type T precede those of type I. VCs with fewer arguments precede those with more arguments. VCs of type "a" (with *into* PP realization of F) precede those of type "b" (*to* PP for F), which precede those of type "c" (clausal F). For *transform*, an additional column is included at the bottom to show the frequency of VCs which include reflexive U objects.

[222] For clarity's sake, FEs are annotated in the examples as follows: C is underlined, U is in bold font, F is in italics, and O is marked with dotted underlines. The target verb is in capital letters.

[223] The corpus data for *alter* include four examples of the simple transitive (T2) valency construction in which the arguments have non-default expressions. Two examples include a gerundial VP as the subject C argument, as in: *For Melissa, appearing on the show […] altered the course of her life.* One example includes a *for N to V* phrase as the subject C argument: *[…] for such a lease not to be taken would significantly alter the balance of nuclear capability between India and Pakistan.* Finally, one example includes a *wh*-clauses as the object U argument: *[…] the tragedy […] alters what the Proviso means as a constraint on appropriations of land.*

[224] Of the two instances of the T3c valency construction which expresses F in a purposive clause realizations, one introduces the clause with *to* (as in 5.66) and one introduces the clause with *so that*, as in: *Israeli building projects in East Jerusalem have permanently altered the demographic landscape, so that […] the previously clear-cut continuous dividing lines […] can no longer be said to exist*.

Valency distribution

I begin by describing the verb's valency distribution – the exact set of VCs it occurs in and its precise frequency in each of those VCs (based on the analyzed corpus). Of the 79 sentences analyzed for *alter*, 71 (90%) exhibit the simple transitive VC (T2) without any mention of Original or Final_state arguments (5.65).[225] Two sentences exhibit transitive VCs with purposive clause F arguments (T3c; 5.66). The remaining six sentences exhibit simple intransitive VCs without any state arguments (I1; 5.67).

Valency behavior

Based on this precise valency distribution, we can make more general claims about the verb's valency behavior – its tendencies to appear or not appear in given VCs or VC types. The corpus analysis for *alter* suggests that this verb shows a strong preference for transitive/causative patterns over intransitive/inchoative patterns (92.5% transitive to 7.5% intransitive). It also reveals that *alter* has a very strong tendency to appear in valency constructions without State arguments (i.e. it does not appear in T3a, T3b, T4a-b, I2a-b, I3a-b), as the corpus analysis revealed no VCs with prepositional state arguments.[226] However, two examples included purposive clauses that describe the Final State of the change in more general terms.

Comparing the present analysis of alter *with existing accounts*

I now briefly discuss how the present corpus analysis of *alter*'s valency behavior improves over its treatment in existing accounts. Levin (1993) classifies *alter* with other Change verbs such as *turn, change,* and *modify*, based on the verbs' ability to participate in various argument structure alternations (see 2.2 and 5.2.1.1). Her approach, however, does not incorporate frequency information that specifies the relative frequency with which a verb appears in one alternation variant or another. That is, individual verbs of the same class are not differentiated from one another in any way, suggesting that each verb appears equally frequently in each of the patterns used to characterize the class. However, the present analysis of a large number of corpus examples reveals that *alter* has a much narrower distribution across VCs than

[225] Examples referred to in this section can be found in the right-most "Examples" column in the tables summarizing the verb's valency patterns.

[226] Although none of the analyzed active examples include any state arguments, one of the unanalyzed passive sentences from COCA realizes the F argument in an *into* PP, demonstrating that such patterns may not be entirely infelicitous with *alter*: *[…] she could swallow a magic potion and be altered into a different person with a different life.* (COCA)

Levin (1993) suggests. For instance, transitive uses of *alter* greatly outweigh intransitive uses, and VCs with state arguments are rarely found with *alter*, if at all. These findings show that *alter* is not just another Change verb, but has its own unique distribution across VCs which differs from that of other semantically similar verbs, as will be shown in the remainder of this section.

Although FrameNet improves on Levin (1993) as it bases its valency reports on corpus data and does not treat each verb in its `Cause_change` and `Undergo_change` frames as though they are equally felicitous in the same range of VCs, the current analysis reveals some areas of improvement that should be integrated into FrameNet. FrameNet lists *alter* as a LU of the `Cause_change` frame, but not the `Undergo_change` frame. However, the COCA data show that *alter* does in fact appear in intransitive patterns that characterize the `Undergo_change` frame (albeit with a much lower frequency than transitive patterns).[227] While this issue could be resolved by simply adding *alter* to the list of LUs for the `Undergo_change` frame, this would not capture the large discrepancy between its high frequency in transitive patterns and its low frequency in intransitive patterns. Ideally, FrameNet could be modified to specify that LUs evoking different frames that are related, e.g. through the Causative/Inchoative Inheritance link, may be more central to one of these frames than the other.[228]

Another advantage of the present approach involves the amount and types of annotated corpus examples that form the basis of verbal valency descriptions. For *alter*, FrameNet identifies nearly 20 different valency constructions. This number is significantly higher than the four common VCs identified in the present analysis. There are two reasons for this discrepancy: first, FrameNet annotates sentences that have been purposefully excluded from this analysis, such as imperatives and passives, and secondly, FrameNet annotates non-core FEs and null-instantiated FEs (with significant inconsistencies, as described in 3.1.2.3. and 5.2.1.2). The current methodology, however, can easily be scaled up to provide a full-scale analysis of all construction types, including passives, actives, and those involving null-instantiation. On the other hand, while

[227] In fact, the annotated sentences for *alter* in the Cause_change frame include (at least) one instance of an inchoative use, which must have been overlooked by the FrameNet annotators: *Jamaicans are aware that [$_{Attribute}$circumstances] can suddenly ALTER^{Target} [$_{Degree}$dramatically]* (FN).

[228] That certain Change verbs appear much more frequently in either transitive or intransitive VCs while still being acceptable in either VC type suggests that there is a prototypical use of these verbs. This prototypicality could be captured in terms of Prototype Theory (Rosch 1973) or Idealized Cognitive Models (Lakoff 1987).

FrameNet identifies a wide range of VCs, each VC is associated with no more than two annotated examples. As such, FrameNet, like Levin (1993), does not provide insight as to which of the nearly 20 VCs are most likely to occur with *alter*, as is the case in the present analysis.

Finally, the VDE does not offer much to compare with the current analysis of *alter*, as this verb is not included among the verbs it documents. A comparison with the VDE will be taken up below, following the description of the corpus analysis of *change*.

Change

Table 5.16 summarizes the valency distribution of the 134 sentences analyzed for *change*.

VC	Freq.	%	Pattern	Example
T2	74	55%	[C.NP.Subj + verb + U.NP.Obj][229]	(5.68) Barbed wire would CHANGE **everything**, […]
T3b	1	1%	[C.NP.Subj + verb + U.NP.Obj + F.toPP.Obl]	(5.69) Should Canada CHANGE **its clocks** *to the American standard*?
T4b	2	1%	[C.NP.Subj + verb + U.NP.Obj + O.fromPP.Obl + F.toPP.Obl][230]	(5.70) He […] CHANGED **the sport** from shamateur *to professional*.
I1	56	42%	[U.NP.Subj + verb]	(5.71) […] **the plans** have CHANGED [...]
I2a	1	1%	[U.NP.Subj + verb + F.intoPP.Obl]	(5.72) At six, **it** CHANGED *into "One Man's Family."*

Table 5.16: Valency distribution of *change*

Valency distribution

77 of the analyzed examples exhibit transitive/causative VCs ((5.68)-(5.70)), 74 of which do not realize any State arguments (T2; 5.67). One other transitive example realizes only an F in a *to* PP (T3b; 5.68), while two other transitive examples realize both the O as an adjective in a *from* PP and the F as an adjective in a *to* PP (T4b; 5.69). The remaining 57 sentences exhibit intransitive VCs ((5.71)-(5.72)). Only one of these intransitive sentences realizes an F argument in an *into* PP (I2a; 5.71), while the other 56 realize no State arguments (I1; 5.72). [231]

[229] The corpus examples of *change* in the T2 valency construction include three non-default realizations. Two of these include gerundial VPs for the subject C argument: *Did growing the Ted Ray mustache change your life?* ; *[…] how has listening to crooners and writing about crooners changed the kind of performing you're doing on your own?* The other non-default realization expresses the object U argument in a *wh*-clause: *[…] she refused to change how she worked.*

[230] Note that these examples does not exhibit the default realization for the T4b valency construction, as the phrases within the *from* and *to* PPs are adjectives rather than the expected nouns.

[231] It was unclear what VC to assign to one example from COCA: *It's changed a whole lot after Bobby visited here.* This could be interpreted as either a transitive or intransitive pattern due to the ambiguity of the phrase *a whole lot* between a nominal or adverbial interpretation. I have classified this as an intransitive VC with an adverbial interpretation of *a whole lot*: with *it* as the only core FE (Cause_change), and *a whole lot* being an adverbial phrase modifying the intensity of the change.

Valency behavior

The data for *change* show that it has a rather different valency distribution than that of *alter*, discussed above. For one, *change* shows no strong preference for transitive or intransitive VCs, as 58% of the examples are transitive and 42% are intransitive. Similar to *alter*, *change* strongly prefers VCs that do not include State arguments. However, this tendency is not as strong for *change* as for *alter*, as such VCs did occur in the data, albeit it at a very low rate (3%). The actual realizations of State arguments are formally diverse, involving both adjectival and nominal states that occur with either *to* or *into* PPs for F arguments.

Comparison of the present analysis of change *vs. existing resources*

Many of the same conclusions apply to the comparison of the present analysis of *change* with its treatment in Levin (1993) and FrameNet. To reiterate, Levin (1993) treats all verbs in her *Turn* class as though they behave similar with respect to the alternation variants (i.e. VCs) used to characterize the class, but the data here show that *change* is much more frequent in VCs without O or F arguments than in VCs with such arguments. On the one hand, FrameNet accurately classifies *change* as a LU of both the `Cause_change` and `Undergo_change` frames, given its relatively equal occurrence in transitive and intransitive VCs. On the other hand, FrameNet does not adequately describe the distribution of *change* (including its relative frequency) in all VCs, as its valency reports are based on a mere 34 examples (18 for `Cause_change`, 16 for `Undergo_change`[232]). It is thus unclear which VCs *change* is most likely to occur in. Furthermore, the inconsistencies with the annotation of null-instantiated FEs and FrameNet's detailed semantic divisions of core FEs (discussed in 5.2.1.2 above) also apply to the valency reports for *change*.

As *change* is one of the two Change verbs (along with *turn*) whose valency behavior is documented in the VDE, I may compare my treatment of *change* with that of the VDE.[233] One difference between the two analyses is that the VDE identifies a total of 12 VCs for *change*, while my analysis identifies only five common VCs (a figure that would be higher if the present

[232] The FrameNet data here is slightly problematic, as eight of the 16 annotated examples for *change.v* in Undergo_change consist of only two sentences, each of which was annotated four times (and not always consistently). (This data accessed on 15 August 2015.)

[233] The present discussion does not address issues with the VDE's semantic characterization of verbs and arguments or how it does not observe similarities among related verbs and verb classes. These were discussed in 3.3.

analysis included passive, imperative, and other "non-canonical" sentence types). This discrepancy arises from differences in the methodologies of the two approaches, as the VDE seeks out specific VCs to identify all possible VCs for a given verb, while my approach analyzes a set of randomly selected corpus examples to identify a verb's valency distribution, or the range of VCs it occurs with and its relative frequency in each of these VCs. As I only analyzed 134 examples for *change*, it is almost certain that other VCs would be identified as the number of corpus examples analyzed increases. However, 134 examples suffice to give a good idea of how a verb behaves and revealed that *change* is much more frequent in VCs without state arguments than those with state arguments. The VDE's presentation of valency properties, however, suggests that *change* is equally frequent in both of these VC types,[234] which is inaccurate and would be misleading for language learners using this dictionary (and the VDE explicitly states that it is intended for language learners). In sum, while VDE offers a broader picture of what VCs are potentially possible for a given verb, my corpus-based frequency analysis provides a more accurate picture of what VCs are the most common or expected for the verb.

Having exposed various issues with verb classification and valency description resources such as Levin (1993), FrameNet, and the VDE, on the basis of *alter* and *change*, I leave further comparisons with these resources for the concluding chapter, so as to not clutter the description of valency behavior that is at the heart of this section. I now turn to the valency behavior of the three remaining Change verbs under analysis, *transform*, *turn*, and *modify*.

[234] Specifically, the introduction to VDE states that, where relevant, valency patterns are categorized according to their frequency. However, the VDE did not include any such frequency information for its *change* entry.

Transform

Table 5.17 summarizes the valency distribution of *transform*.

VC	Freq.	%	Pattern	Example
T2	52	48%	[C.NP.Subj + verb + U.NP.Obj] [235]	(5.73) The energy boom of the 1970s TRANSFORMED **the North Slope landscape**.
T3a	38	35%	[C.NP.Subj + verb + U.NP.Obj + F.intoPP.Obl]	(5.74) Here are ways they TRANSFORMED **those challenges** *into opportunities*.
T3c	1	1%	[C.NP.Subj + verb + U.NP.Obj + F.toCP.Obl]	(5.75) special cells […] have […] TRANSFORMED **themselves** within the pigs' hearts *to form new, healthy tissue*
T4a	7	6%	[C.NP.Subj + verb + U.NP.Obj + O.fromPP.Obl + F.intoPP.Obl][236]	(5.76) […] when he TRANSFORMED **the mask** from a protest of youth *into a gentle romantic whimsy*.
T4b	2	2%	[C.NP.Subj + verb + U.NP.Obj + O.fromPP.Obl + F.toPP.Obl][237]	(5.77) The Hippo Regius labyrinth TRANSFORMS **the motif** from a visual game *to something more like a physical event*.
I1	3	3%	[U.NP.Subj + verb]	(5.78) **The landscape** TRANSFORMED.
I2a	5	5%	[U.NP.Subj + verb + F.intoPP.Obl]	(5.79) […] as if **it** had TRANSFORMED *into a huge bug*.
I3b	1	1%	[U.NP.Subj + verb + O.fromPP.Obl + F.toPP.Obl]	(5.80) **Venice** TRANSFORMED from a city only the elite could visit *to a much more accessible destination* [...]
T2 w/ rflxv. U	(11 total reflexive objects)	10%	[C.NP.Subj + verb + U.NPreflexive.Obj + …]	(5.81) […] to think that in two weeks you can TRANSFORM **yourself** physically.

Table 5.17: Valency distribution of *transform*

[235] Of the 52 instances of the T2 valency construction, one involves a non-default realization, expressing the object U argument in a *wh*-clause: *[…] for modern technology to transform how they manage educational enterprises.*

[236] Of the seven instances of the T4a VC with *transform*, two involved non-default realizations, specifically realizing the O and F arguments as adjectives (rather than nouns) within the *from* PP and *to* PPs, respectively, as in: *A dusting of cocoa powder and a fresh shaving of semi- or bittersweet chocolate transform this special dessert from plain to fancy [...]*.This VC is particularly unusual, as the PPs introducing O and F arguments govern phrases of different types (here an adjectival O and a nominal F). This discrepancy may be licensed due to the high degree of similarity between the two arguments, as they even include the same word, *toxic*. The entire English corpus data only included one other VC with such a mismatch in the phrase types of the *from* and *to* PPs, which was found with the verb *turn*.

[237] One of the two instances of the T4b VC with *transform* involves a non-default realization in which the O argument is expressed as an adjective within a *from* PP, while the F argument maintains the default realization ofa noun within a *to* PP: *[…] ultraviolet radiation can […] transform […] chemicals from nontoxic to a toxic form.*

Valency distribution

Of the 109 total active sentences analyzed for *transform*, 100 exhibit transitive VCs ((5.73)-(5.77)). 52 of these are of the simple transitive type T2 (5.73). The remaining 48 transitive VCs realize State arguments. Of these, 38 only realize the F argument in an *into* PP (T3a; 5.74), seven realize O in a *from* PP and F in an *into* PP (T4a; 5.76), and two realize O in a *from* PP and F in a *to* PP (T4b; 5.77). Finally, one other transitive VC included only a clausal purposive F introduced by *to* (T3c; 5.75). Of the nine attested intransitive VCs, three are of the simple intransitive type (I1; 5.78), five realize the F argument in an *into* PP (I2a; 5.79), and one realizes O in a *from* PP and F in a *to* PP (I2b; 5.80).

Transform is unique among English Change verbs in that several attestations express the U argument in a reflexive pronoun that refers back to the subject. The data include 11 instances of reflexive objects, comprising slightly over 10% of all patterns. Six of these are found in the simple transitive VC T2, as demonstrated in (5.81). Two other instances of reflexive U objects are found with the transitive plus F as *into* PP (T3a),[238] two with the transitive plus O as *from* PP and F as *into* PP (T4a),[239] and one with the purposive *to* clausal F argument (T3c; 5.78). While COCA includes examples of reflexive objects with other Change verbs (see fn. 48 above), none of the analyzed examples for other English Change verbs show reflexive objects. This high frequency of reflexive objects is unique to *transform*, and given that *transform* exhibits the 'positive change' and 'drastic change' meaning components which were not found with other verbs in the analysis in the preceding section, there is reason to believe that the high frequency of reflexives may be triggered by one of these meaning components (see 5.2.5 below for evidence that it is linked to the 'positive change' meaning component).

Valency behavior

These data show that, with respect to common VCs, *transform* has a strong tendency to appear in transitive/causative VCs, as nearly 92% of the analyzed sentences are transitive. In this respect, *transform* behaves similar to *alter*, which also strongly prefers transitive VCs, but differently from *change*, which appear almost as frequently in both transitive and intransitive VCs. Unlike *change* and *alter*, however, which rarely appear in VCs involving State arguments, *transform*

238 *[…] the parasites transform themselves into tiny creatures called mcrozoites […]*
239 *When Daisy transformed herself from a so-so librarian into a seductress […]*

appears to be equally frequent in VCs with and without States, as 50% of the analyzed examples realize no States and 50% realize States.

Transform stands out from other English Change verbs in that it exhibits a relatively high frequency of reflexive U object pronouns expressing that the C argument brings about a change in itself. As noted above, this valency behavior may arise from the meaning component specifying that *transform* refers to changes that are deemed positive, such as changes involving self-improvement or changing one's self to become better.

Also worth noting is that *transform* appears with an O argument 10 times in 109 examples (> 9%). This is relatively frequent compared to the other English Change verbs, as the O argument only appears 17 times total in the analyzed examples of all English Change verbs (i.e. 10 times with *transform*, and only seven times with other four verbs combined). This aspect of its valency behavior may possibly relate to the meaning component specifying that *transform* refers to drastic (categorical) changes, [240] as the combination of O and F arguments typically implies a fairly drastic change from one state or category to another, and such arguments are not found with 'minor' change verbs (see valency behavior of *alter* above and *modify* below).

Turn

Table 5.18 below summarizes the valency distribution of *turn* in 132 examples.

Valency distribution

With respect to transitivity, 58 of the 132 analyzed sentences exhibit transitive VCs, while 74 are intransitive. Of the 58 transitive VCs, 50 realize only the F in an *into* PP (T3a; 5.82), three realize only the F in a *to* PP (T3b; 5.83), and one realizes both the F in an *into* PP and the O in a *from* PP (T4a; 5.84). The remaining four transitive sentences exhibit resultative patterns in which F is realized as a bare adjective (TR3; 5.88).

The intransitive VCs found with *turn* are more diverse. Of the 74 intransitive patterns analyzed, 43 involve prepositional State arguments and 31 are resultative VCs. Among the prepositional-state VCs, 32 realize only the F in an *into* PP (I2a; 5.85), while seven examples realize only the F in a *to* PP (I2b; 5.86). The remaining four prepositional-state sentences realize the O in a *from* PP and the F in a *to* PP (I3b; 5.87).

[240] At the end of this chapter, I test this hypothesis through a comparison with another 'drastic' Change verb, *metamorphose*.

VC	Freq.	%	Pattern	Example
T3a	50	38%	[C.NP.Subj + verb + U.NP.Obj + F.intoPP.Obl]	(5.82) The incarcerated have a nasty habit of TURNING **everything** *into a weapon*, including traditional toothbrushes.
T3b	3	2%	[C.NP.Subj + verb + U.NP.Obj + F.toPP.Obl][241]	(5.83) […] that I had to TURN **that shirt** *to rags*.
T4a	1	1%	[C.NP.Subj + verb + U.NP.Obj + O.fromPP.Obl + F.intoPP.Obl]	(5.84) […] and TURNED **it** from a sluggish, neglected enterprise *into a fairly thriving one*.
I2a	32	24%	[U.NP.Subj + verb + F.intoPP.Obl][242]	(5.85) […] and now **this** is TURNING *into a disaster*
I2b	7	5%	[U.NP.Subj + verb + F.toPP.Obl][243]	(5.86) […] **the lush opium of the island** slowly TURNED *to powder*, […]
I3b	4	3%	[U.NP.Subj + verb + O.fromPP.Obl + F.toPP.Obl][244]	(5.87) […] **the warm moist air from the conditioned interior** will […] TURN from water vapor *to water* [...]
TR3	4	3%	[C.NP.Subj + verb + U.NP.Obj + F.Adj.Result]	(5.88) The prospect of sharp cuts in 2011 have TURNED **the economists** *downright gloomy*.
IR2	31	23%	[U.NP.Subj + verb + F.Adj.Result][245]	(5.89) **A mild January** had TURNED *venomous*.

Table 5.18: Valency distribution of *turn*

Turn is unique in that it is the only Change verb under investigation that appears in resultative VCs in which the Final_state is introduced without a preceding preposition. The data include a total of 35 resultative VCs, comprising nearly 27% of all *turn* examples. Four examples include transitive VCs with resultative F arguments in adjectival form (TR3; 5.88). A total of 31 examples exhibit the intransitive resultative VC (IR2; 5.89). These data suggest that intransitive

241 One of the three instances of the T3b valency construction exhibits a non-default realization. It includes three *to* PPs expressing multiple Final_states in a series of consecutive changes: *The wheel turns girl to woman to widow to girl.*

242 Two of the 32 instances of the I2a valency construction expresses the F argument as a *wh*-clause within an *into* PP, as in: *[…] you don't want to have anything turn into where NASCAR does have to police things, […]*.

243 One of the four instances of the I2b valency construction expresses the F argument as a direct quotation within a *to* PP: *[…] when cocktail-party chatter turned to "Why haven't you ever married?" […]*.

244 Three of the four instances of the I3b valency construction exhibit non-default realizations. Two of these express the O and F arguments as adjectives (rather than the expected nouns) in a *from* PP and *to* PP, respectively, as in: *The leaves are turning from red to blue.* One of these express the O as an adjective rather than a noun in a *from* PP and the F as the expected noun within a *to* PP, as in: *The river was turning from blue to a color somewhere between slate and sapphire [...]*.

245 One of the 31 instances of the intransitive resultative construction (IR2) realizes the F argument as a resultative noun rather than as the expected adjective: *Has Bill turned gamester on top of everything else?* While I only classified this one example as a nominal resultative argument, many other resultative arguments can be interpreted as either adjectives or nouns, such as *human, rust,* or *powder*.

resultative VCs are more frequent for the verb *turn* than transitive resultative VCs, as resultative VCs comprise 7% of all transitive VCs, while they comprise nearly 42% of all intransitive VCs.

Valency behavior

The data show that *turn* behaves somewhat differently than the other English Change verbs. For one, it exhibits the greatest diversity of VCs among the verbs, with a total of eight different VC types. It is also the only verb that requires the F argument to be overtly expressed, as all attested VCs with *turn* include this argument. Furthermore, it is the only English Change verb that is used in resultative VCs in which the F argument appears as a bare adjective (or noun, in at least one case) without a preceding preposition.[246] Resultative VCs comprise roughly 27% of all analyzed examples, and 42% of intransitive examples.

More generally, the data show that *turn*, like *change*, shows no particular preference for transitive or intransitive VCs, as 55% of the examples are intransitive and 45% are transitive. The realizations of the F argument are also fairly diverse, as they appear as adjectives and nouns and are introduced by both *to* and *into* PPs, in addition to the resultative realizations.

Modify

Table 5.19 summarizes the valency behavior of *modify* in 95 examples.

VC	Freq.	%	Pattern	Example
T2	78	82%	[C.NP.Subj + verb + U.NP.Obj][247]	(5.90) [...] Armstrong could MODIFY **the trio of drugs used in a standard testes chemo treatment**.
T3c	17	18%	[C.NP.Subj + verb + U.NP.Obj + F.CP.Obl][248]	(5.91) I took an 8x10 sheet film holder, and MODIFIED it *to accept 6 1/2x8 1/2, traditional full sized plates*.

Table 5.19: Valency distribution of *modify*

Valency distribution

Modify exhibits the most uniform valency distribution of the English Change verbs, as all 95 of the analyzed corpus attestations involve transitive VCs that do not express the F in a prepositional

[246] In this respect, *turn* behaves similar to the verb *make* in the Cause_change sense, which also appears in resultative VCs (*She made Pat angry*) and requires overt expression of the F argument (*She made Pat into a frog* ~ **She made Pat*). However, *turn* differs from *make* in that it may be used in both transitive and intransitive resultative VCs, while *make* only allows transitive resultative VCs (**Pat made angry*).

[247] Of the 78 instances of the T2 valency construction, two examples realize the object U argument as a *wh*-clause, as in: *It modifies how people experience themselves and how they see other people*.

[248] Of the 17 instances of the T3c valency construction which expresses F in a purposive clause realizations, 14 introduce the clause with *to* (as in 5.91) and three introduce the clause with *so that*, as in: *Recent work aims to modify existing instrumentation so that logs are either more amenable to various kinds of analysis or [...]*.

phrase. 78 of the 95 examples exhibit simple transitive VCs with only the C and U arguments (T2; 5.90). The other 17 examples exhibit transitive VCs with the F argument realized in a purposive clause (T3c; 5.91).

Valency behavior

The data show that *modify* exhibits a strong preference for transitive over intransitive VCs. Native speaker intuitions suggest that *modify* is ungrammatical in intransitive patterns, although a more rigorous corpus analysis is needed to verify this claim.[249] *Modify* also seems to be highly adverse to VCs with prepositional F arguments, and it shows the highest frequency of clausal F arguments. Given this distribution, *modify* is very similar to *alter*, whose examples included a low frequency of intransitive VCs and no VCs with prepositional F arguments.

The relatively high frequency of purposive F clauses describing the purpose or result of the change likely corresponds to the meaning component 'change for a specific purpose', identified in the dictionary analysis of *modify*. This correspondence underscores the idea that a verb's meaning is defined by its valency behavior and, conversely, its valency behavior is shaped by its meaning components.

Having described the valency behavior of each verb based on corpus data, I now briefly summarize the general trends in the distribution across VCs for individual and sub-sets of English Change verbs, as well as their implications for research on verb classification and valency description. The syntactic sub-classes resulting from the following summary informs the identification of grammatically relevant meaning components and the formulation of syntactic-semantic sub-classes in the following section.

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[249] I thank John Beavers for pointing out that a Google search for *modify into* and *alter into* returns thousands of results, which suggests that these verbs do in fact occur in VCs with prepositional F arguments. Of course, given the size of the Web as a corpus, it is not surprising that such uses are found. However, the use of Google as a corpus is problematic for several reasons, including the lack of lemmatization and part-of-speech tagging, limitations on search syntax, the inclusion of language from non-native speakers, and the fact that it returns pages rather than the search words (see Kilgarriff 2007). Nevertheless, I conducted a Google search for each verb in its past tense form (e.g. *modified*) and with the additional words *it into* (e.g. *modified it into*) in order to get a rough picture of the relative frequencies of each verb with *into* F VCs. The search corresponded largely to the data found here. For instance, there were 560,000,000 total hits for *modified*, but only 160,000 hits for *modified it into*: that is, only 0.02857% of *modify* uses were followed by *it into*. This is, in fact, the lowest percentage of all verbs. As expected based on the present data, *change* (0.04379%) and *alter* (0.18778%) were also highly infrequent with *it into* compared to *transform* (1.66007%) and *turn* (0.00425%).

5.3.4. Summary of corpus valency analysis

5.3.4.1. General summary of valency behavior tendencies

This sub-section begins with a general summary of the valency distribution and trends for argument realization of Change verbs based on the above analysis. I then discuss verb descriptivity as introduced in the Section 5.2, where I hypothesized that the higher-descriptivity verbs (*transform, modify*) would occur in a lower range of VCs than the low descriptivity verbs (*change, turn*). Finally, I discuss the implications of this analysis for other approaches to verb classification and verb valency. Table 5.20 summarizes the corpus valency analysis by organizing the verbs according to their general tendencies for valency distribution. The left-hand column introduces the general VCs, beginning with transitive, then intransitive and then resultative VCs. This column also provides a schematized representation of the VCs, listing only the proper order of FEs (with the verb represented by an underscore) and any prepositions that introduce them, while phrase type information is omitted (except for the CP label in pattern T3c and the "result" label for resultative realizations of F). The remaining columns show the percentage of examples for each verb in the given VC. For instance, 90% of the *alter* examples are of the T2 (simple transitive) VC, while only 1% of them are of the T3b type (transitive with *to* PP introducing F).

VC	***alter***	***change***	***modify***	***transform***	***turn***
T2: C _ U	90%	55%	82%	48%	
T3a: C _ U into F				35%	38%
T3b: C _ U to F	1%	1%			2%
T3c: C _ U F.CP	1%		17%	1%	
T4a: C _ U from O into F				5%	1%
T4b: C _ U from O to F		1%		4%	
I1: U _	8%	42%		3%	
I2a: U _ into F		1%		5%	24%
I2b: U _ to F					5%
I3a: U _ from O into F					
I3b: U _ from O to F				1%	3%
TR3: C _ U F.result					3%
IR2: U _ F.result					23%

Table 5.20: Distribution of corpus examples for each verb across VCs

This table clearly demonstrates the rampant variation in valency behavior among these semantically closely related verbs. For instance, there are no VCs that occur with every one of the five verbs analyzed. The most common VC is the simple transitive T2 pattern, which appears

with all verbs except *turn*. However, the frequency with which it appears with the four other verbs differs, with it being highly frequent with *alter* and *modify* (90% and 82% of all their analyzed examples, respectively), but less frequent with *change* and *transform* (55% and 48%, respectively). There are also several patterns that appear with only one verb (e.g. I2b, TR3, and IR2 with *turn*) or with only two of the five analyzed verbs (e.g. T4b with *change* and *transform*, and I3b with *transform* and *turn*).

Despite the drastic variation in the valency behavior of the analyzed English Change verbs, some generalizations can be made to describe the verbs' valency behavior in more general terms, as summarized in Table 5.21. The left-hand column lists valency features, or properties that characterize a set of VCs (e.g. transitive vs. intransitive), while the middle column lists the specific value of that feature as it pertains to verb valency behavior. For instance, the fourth row shows that *change* and *turn* appear with (nearly) equal frequency in transitive and intransitive VCs. The groups of verbs in the right-hand column can thus be seen as syntactic sub-classes (defined in Chapter 4), which are groups of verbs that behave similarly (e.g. are grammatical or ungrammatical) with respect to a given VC.

Here, I only briefly and informally summarize the behavior of the verbs, relating the specific VCs to more general features which characterize them (cf. Table 15 above). The table below also describes "unique behavior" of three of the verbs that is not directly captured by the VC classification. The following sub-section discusses the data in more detail.

Valency Feature	Category	Verbs
Transitivity	only Transitive	*modify*
	almost only Transitive (> 90%)	*alter, transform*
	both Trans. and Intrans. (40-60%)	*change, turn*
States	requires States	*turn*
	prefers no prepositional States	*alter, change, modify*
	may occur with or without States	*transform*
Unique behavior	Resultative patterns	*turn*
	frequent reflexive object	*transform*
	frequent O arguments	*transform*
	frequent purposive clause States	*modify*

Table 5.21: Tendencies for valency behavior of English Change verbs (syntactic sub-classes)

There are two primary distinctions in the verbs' valency behavior: the first relates to transitivity and the second relates to the overt expression of State arguments, particularly F. Another area in

which individual Change verbs differ is with respect to VCs or specific argument types that occur with only one verb or more frequently with one verb than all the others.

With respect to transitivity, *alter, modify,* and *transform* each show strong preferences for transitive VCs. 100% of the analyzed *modify* examples are transitive VCs, and intuition suggests that this verb is not felicitous in intransitive VCs. The valency distribution of *alter* and *transform* also exhibits an overwhelming frequency (but not exclusivity) of transitive VCs, as 92% of the analyzed examples for both verbs are transitive VCs. *Change* and *turn*, on the other hand, are relatively equally frequent in both transitive and intransitive VCs. *Change* examples showed a slight tendency towards transitive VCs (54%) over intransitive VCs (43%), whereas *turn* is the only analyzed verb with a higher frequency of intransitive VCs (56%) than transitive VCs (44%).

With respect to the realization of State arguments, the data suggest that *turn* requires the F argument to be realized, as 100% of its analyzed examples include this argument. The formal realization of F with the verb *turn*, however, is highly diverse, as it occurs as both nouns and adjectives and both within PPs and in resultative constructions. *Transform* is the only analyzed verb that occurs equally frequently with (prepositional) F arguments and without such arguments, with each type of VC comprising 50% of the analyzed examples. F arguments with *transform* are also highly diverse in their formal realization, but do not include resultative realizations. The remaining verbs, *alter, change,* and *modify,* rarely if ever appear with prepositional F arguments. For *alter* and *modify*, no analyzed examples include VCs with prepositional F arguments. While such arguments appear intuitively to be unlikely to occur with these verbs, some examples are indeed attested in the COCA corpus.[250] *Change* is less adverse to, but still very infrequent in VCs with prepositional F arguments, as only 4 of the 132 analyzed examples (< 3%) exhibit VCs with such arguments.

Finally, three verbs exhibit valency behavior that sets them apart from the other verbs in the class. As noted above, *turn* is the only verb that occurs in resultative constructions in which the F argument is expressed as a bare adjective (or noun) that is not introduced with a preposition. Resultative VCs comprise roughly 27% of the analyzed examples for *turn*. *Transform* sets itself apart from the other verbs due to its relatively high frequency in VCs with reflexive object (U) arguments. Such cases comprise just over 10% of the analyzed examples for *transform*. While

[250] Such examples include: *[…] I used the pencils to **alter** the mouth **into** a soft, reassuring smile*. (COCA); *Morrison later **modified** that two-person rowboat **into** a solo design […]* (COCA).

reflexive objects are subject to more general syntactic processes (e.g. anaphora) and can thus theoretically appear with any transitive verb, their frequency with *transform* and their absence in all analyzed examples of other Change verbs is indeed noteworthy. Another unique feature of *transform* is its relatively high frequency of VCs which include O arguments, as 10 such VCs were found for *transform* and a total of seven other instances of such VCs were found with the other four analyzed verbs. Finally, *modify* exhibits an unusually high frequency of VCs which include subordinate clauses headed by *to* or *so (that)* that describe the resulting state of the change. While such clauses were also identified in two examples of *alter* and one example of *transform*, 17 of the 95 examples (18%) for *modify* include purposive/result F clauses.

5.3.4.2. Verb descriptivity and valency behavior

In the previous section, I classified the Change verbs according to their level of descriptivity (see Tables 5.10 and 5.11 in Section 5.2). There I claimed that *change* and *turn* have low descriptivity as they do not exhibit any additional meaning components that further specify the general Change semantics. I also claimed that *alter* has medium descriptivity as it has only one additional meaning component, whereas *modify* and *transform* are high-descriptivity because they exhibit four and three additional meaning components, respectively. Based on Boas's (2008a) study of the constructional behavior of verbs evoking the `Self_motion` frame, I hypothesiezed that the higher-descriptivity verbs (*transform, modify*) would occur in a lower range of VCs than the low descriptivity verbs (*change, turn*), with medium-descriptivity *alter* falling in between these verbs with respect to the number of VCs attested with it. It is now possible to test this hypothesis by comparing the number of VCs attested with the number of meaning components identified above for each verb.

	# of meaning components	**# of VCs attested in corpus**
change	1	5
turn	1	8
alter	2	4
transform	3	8
modify	4	2

Table 5.22: Descriptivity level and number of attested VCs for English Change verbs

Beginning with the low-descriptivity verbs that showed no additional meaning components beyond the general Change meaning, we see that *change* occurs in five different VCs in the

analyzed data (of the 13 possible VCs identified above). Low-descriptivity *turn* appears in eight different VCs. Medium-descriptivity *alter*, which exhibits the "subtle change" additional meaning component, occurs in four different VC types. The high-descriptivity verbs differ rather greatly in the number of VCs they occur with, as *modify* was found in only two VCs while *transform* appeared in eight different VCs.

This data thus does not clearly support the hypothesis of an inverse correlation between descriptivity level and range of VCs. Although the verb with the most meaning components (*modify*) appears in the narrowest range of VCs (two) and one of the verbs with only the general Change meanings (*turn*) appears in (tied for) the widest range of VCs (eight), the data for the other verbs is less clear. Specifically, it was shown that *transform* is of high-descriptivity, but it also occurs in eight different VCs – tied with *turn* for the most of any of the analyzed verbs. While *change* occurs in five different VC types, *alter* appears in only one fewer VC type at four. If descriptivity were a clear indicator of valency behavior, we would expect a greater difference in the number of VCs found with these two verbs, as *alter* has higher descriptivity than *change*.

While these data suggest that verb descriptivity does not influence valency behavior, a few observations are in order that call into question the present analysis. For one, because of the low number of examples analyzed (relative to all uses of these verbs), it is highly likely that these verbs may appear in a wider range of VCs than shown here. In fact, many of the VC-verb combinations that were not found in the present analysis can easily be found by conducting more detailed corpus searches (as in Footnote 84 above). Furthermore, recall that the present analysis focuses only on valency constructions in the active voice, and an analysis of a wider range of constructions (e.g. passive, relative clause, ditransitive) would likely yield different results. A more comprehensive valency corpus analysis is thus required before discarding the hypothesis altogether.

Another reason that verb descriptivity seems to play no role in the present data may relate to the semantic nature of the Change verb class. As noted in the preceding section, even the high-descriptivity Change verbs have extremely general meanings compared with other verbs, such as the specific change-of-state verbs like *narrow*, *marginzalize*, or *break*. While the Change verbs can be organized according to descriptivity level when compared only against one another,

assessing their descriptivity with respect to the entire English verbal lexicon would reveal that all of the Change verbs are of extremely low descriptivity.[251]

5.3.4.3. Implications of valency analysis

I now turn to the implications of my corpus-based valency analysis. The valency analysis of English Change verbs based on empirical data from the COCA corpus gives a very different picture of verbal valency and, in turn, verb classes, than that found in Levin (1993), FrameNet, and Valency Grammar. The corpus reveals that individual Change verbs exhibit significant differences in their valency distributions: they each appear in a different set of VCs and with varying frequencies. The main parameters of variation in valency behavior of individual verbs pertains to their appearance in transitive vs. intransitive VCs, in VCs with vs. without (Final) State arguments, and in specific VCs or with specific argument realization types that are only frequent with one verb within the class. These findings differ from Levin's (1993) formulation of verb classes, in which verbs of the same class all have the same status with respect to their occurrence in alternation variants (i.e. VCs). FrameNet also does not differentiate verbal LUs of a given frame based on their valency behavior: for instance, although FrameNet lists each of the five analyzed verbs as a LU of the `Cause_change` frame, the corpus shows that even their behavior in transitive (i.e. `Cause_change`) VC types differ significantly from one verb to the next (e.g. some verbs allow prepositional states in transitive patterns, while others do not). Work within Valency Grammar (such as Faulhaber 2011 and Herbst 2014) emphasizes the verb-specific nature of valency distribution, but Valency Grammar resources such as the VDE lack the frequency information to state explicitly what VC types are most central to a given verb.

At the same time, while individual verbs differ in their valency distribution, there is nonetheless a great deal of overlap in the VCs occurring with the set of Change verbs analyzed here. Although the similarities in valency behavior across the verbs should not be overstated, there are general trends among these verbs that set them apart from verbs evoking other semantic frames. More specifically, almost all VCs in the corpus fall into a set of 13 general VC types (i.e. simple transitive, simple intransitive, transitive with *to* PP, transitive with *into* PP, intransitive with *to* PP, etc.), as laid out in the following section. In this respect, the class-based approaches of

[251] In Chapter 7, I tackle this issue in much greater detail, as I demonstrate the generality of Change verb meanings compared to Theft verb meanings and investigate the number of valency constructions for two classes of verbs with differing descriptivity levels.

Levin (1993) and FrameNet offer broader generalizations that account for the similarity of Change verbs with respect to VCs, which is not accounted for by Valency Grammar.

5.4. THE ENGLISH CHANGE VALENCY FRAME AND FRAME-BASED VERB ENTRIES

With a detailed investigation of the semantics and syntax of English Change verbs in hand, this section applies the findings to the definition of the English Change valency frame in both semantic and syntactic terms, the formulation of syntactic-semantic sub-classes of English Change verbs, and the positing of frame-based verb entries for each of the five verbs investigated. In defining the Change valency frame's semantics, I refer to the FrameNet characterization of the `Cause_change` and `Undergo_change` frames, applying the modifications mentioned in Section 5.2.1.2. The syntax of the Change valency frame is then formulated by specifying its constructional range, or the full set of valency constructions that occur with (at least one) Change verb. I then formulate frame-based verb entries to account for the full range of syntactic and semantic behavior for the individual Change verb investigated. Next, I propose a sub-classes of Minor Change verbs, which accounts for similarities in valency distribution and detailed aspects of verb meaning among a sub-set of the verbs analyzed. In Section 5.5, I then test the extent to which the valency frame and a potential Drastic Change sub-class predict the meaning and valency behavior of a "novel" verb, on the basis of the verb *metamorphose*.

5.4.1 Motivation for valency frame

Before describing the valency frame and frame-based verb entries of English Change verbs, I situate my approach within the broader research on verb valency and classification, specifically Levin (1993), Valency Grammar (Herbst et al. 2004, Herbst 2014), Frame Semantics (Fillmore 1982, Fillmore and Baker 2010, Ruppenhofer et al. 2010), and Construction Grammar (Goldberg 1995, 2006). My analysis aims to synthesize these approaches in order to account for both idiosyncratic behavior of individual verbs and generalizations of shared behavior among the entire class. The data discussed in the previous sections showed that, semantically, English Change verbs all share the general meaning of '(cause to) become different', but each verb exhibits subtle restrictions on or construals of this general meaning. Syntactically, all observed valency constructions fall into a set of roughly a dozen types (abstracting away from subtle differences in phrase types and in the expression of peripheral, non-core arguments), suggesting a high degree of uniformity in the valency behavior of English Change verbs. At the same time,

individual verbs vary (sometimes significantly) in the exact set of these VCs they occur with and in their frequency of occurrence in each VC. The approaches mentioned above each account for only a portion of the data: they differ in their emphasis on semantics or syntax, in their aim to establish broad-ranging generalizations or accurate descriptions of item-specific idiosyncrasies, and methodologically in their use of corpus and frequency data. My approach, however, seeks to account for both generalizations and idiosyncrasies in both semantics and syntax (i.e. valency) through the analysis of corpus data.

I now reiterate the strengths and weaknesses of each approach (see also Section 2.2 for Levin (1993) and Chapter 3 for the other approaches). Levin's (1993) approach is heavily syntax-oriented, as she formulates verb classes based on verbs' occurrence in argument structure alternations and only secondarily assumes some shared meaning component that is responsible for this syntactic behavior. This approach focuses more on generalizations and frequently overlooks subtle differences, even in alternating behavior, between verbs of a given class. The syntactic alternation judgments which form the basis for Levin's classes also exhibit several shortcomings: they are based on intuition rather than corpus data and are thus not always accurate, and they often rely on only a handful of well-documented alternations rather than the full set of valency constructions available to a given verb (or class of verbs). The secondary status of meaning also occasionally results in classes that are semantically incoherent or vaguely defined, and subtle semantic differences between verbs of a given class are not addressed at all.

Valency Grammar is also relatively syntax-oriented, but emphasizes the idiosyncrasies in the valency behavior of individual verbs, rather than seeking generalizations across verb classes. This approach results from Valency Grammar's refutation of a strict correspondence between verb meaning and argument structure, which is based on data showing that only some aspects of a verb's valency behavior are predictable from their meaning (Faulhaber 2011). The syntactic descriptions of Valency Grammar, specifically in the VDE, are quite accurate for the most part, as they are based on corpus attestations (but see Section 3.3), but frequency (of a verb in each VC) is not systematically addressed. Thus, Valency Grammar descriptions only describe what is possible for the valency behavior of a given verb, but not what is most frequent or expected. The semantic description of verbs in the VDE also leaves much to be desired, as the verbs are only described informally using Cobuild-style definitions and the semantic roles associated with each verb are also only vaguely defined (i.e. as *something*, *someone*, etc.), if at all. Furthermore, the item-

specific focus of Valency Grammar limits valency descriptions to a simple listing of properties of individual verbs and precludes the identification of shared properties among verb classes.[252]

Frame Semantics lays a strong emphasis on verbal semantics and seeks both low-level and high-level descriptions using corpus data. The main organizing principle of Frame Semantics (and FrameNet) is that of the semantic frame, and while FrameNet frames are defined in relatively fine-grained terms,[253] subtle differences among individual (verbal) LUs of a given frame are only informally treated (i.e. with dictionary style definitions in the LU's lexical entry).[254] FrameNet only secondarily describes syntactic behavior, because Frame Semantics, like Valency Grammar, does not adhere to the strict view that verb meaning predicts syntactic form. However, each LU in FrameNet is associated with a valency report documenting how (combinations of) Frame Elements are realized (i.e. their phrase type and grammatical function) with a given LU, thus enabling generalizations about how frame semantics is mapped to syntactic form. While such annotation reports are based on corpus annotations, the examples are often hand-picked and rather sparse (around 10-20 examples per LU) and thus exhibit some gaps and do not systematically address the frequency of valency constructions. Furthermore, the discussion in Section 5.1.2 above discussed inconsistencies with the FrameNet annotations of Change verbs, particularly with examples including null-instantiated arguments or sets of arguments with fine-grained semantic distinctions.

Construction Grammar (CxG) is the sister theory of Frame Semantics and seeks to account for both syntactic and semantic features of constructions (see Section 3.2). While existing work in CxG primarily emphasizes syntactic analysis and refers to Frame Semantics for corresponding semantic analyses, CxG has nonetheless produced much fruitful work on verb classification and the combination of verbs with argument structure constructions (ASCs; Goldberg 1995/2006, Croft 2003, Herbst 2014). Important insights from such research include the partial productivity of ASCs, which addresses how ASCs are not always compatible with all

[252] As discussed in Section 3.3, Herbst (2014) offers various proposals for making broader level generalizations in Valency Grammar through an integration of this theory with Construction Grammar.

[253] See, for example, the subtle semantic distinctions FrameNet identifies among verbs of Communication or verbs of Commerce.

[254] The lack of detailed analyses of individual verbs' semantics likely results from the methodological constraints of FrameNet, which must identify generalizations at some level of abstraction, and is not a theoretical shortcoming of Frame Semantics, in which, theoretically, each verbal LU (i.e. a verb in one of its senses) may evoke its own specific semantic frame (see Boas 2003).

members of sets of near-synonymous verbs (Barðdal 2008, Goldberg 1995: 120–140, Dux fc.), and constructional polysemy, which addresses how a given syntactic configuration may evoke different interpretations depending on the verb (class) it occurs with (Boas 2003, 2008b; Goldberg 1995: 31–39). While most research in CxG has focused on high-level ASCs such as the ditransitive, resultative, or *way* constructions, studies such as Croft (2003), Iwata (2008) and Boas (2008b, 2010c, 2011a) have emphasized that constructions must be defined at various levels, ranging from verb-specific instances over verb-class-specific constructions (i.e. one interpretation set of a polysemous construction) to broader ASCs. However, even such nuanced studies often analyze only one broad construction type across a range of verbs and verb classes. To this point, few CxG studies have taken verb classes as a starting point and analyzed the entire range of valency constructions the verbs of the class occur in, as well as their frequency with each construction, as in the present study.[255] The notion of constructional inheritance and the hierarchical organization of constructions have also played a major role in CxG accounts of ASCs and other syntactic constructions (Michaelis 2012, Goldberg 2013), and the present approach applies them to the analysis of verb classes and valency behavior. Specifically, I propose that the generalized information in the valency frame is inherited by individual verbs of a class, which in turn specify certain details of the valency frame (e.g. additional meaning components, exact range and frequency of VCs). I also show how the VCs associated with a given verb class can be organized in an inheritance network, with individual VCs specifying more or less semantic information.

My approach, which is fully compatible with Frame Semantics, Construction Grammar, and Valency Grammar, thus seeks to integrate various aspects of these theories and methodologies in order to account for both generalizations and idiosyncrasies in both the semantics and syntax of verb classes using empirical corpus data and appealing to the notion of frequency.[256] The contents of and relations between the valency frame, sub-classes, and FBVEs are represented in Figure 5.2. The arrow in the right-hand column denotes a continuum between

[255] A notable exception is Salkoff's (1983) detailed study of the productivity of verbs in locative alternation pairs. However, his study was conducted in the framework of Lexicon Grammar (Gross 1975, 1994) and thus not integrated into a CxG framework.

[256] While I focus on the class of Change verbs here, the methodology can be applied to virtually any (properly defined) class of verbs.

low-level observations about individual verbs at the bottom end of the spectrum and broader generalizations over verb classes at the top end.[257]

VALENCY FRAME (Generalizations over all verbs in class)	**Semantics** – FrameNet style definition, based on roles (FEs) and their interrelations. True "meanings" correspond to real-world entities and events and cannot be rigorously formalized. **Syntax** – All common VCs identified in corpus analysis (constructional range)	VERB-CLASS-LEVEL GENERALIZATIONS
(SUB-CLASSES (Generalizations over sub-set of verbs in class)	**Semantics** – additional meaning component shared by two or more verbs **Syntax** – similar distribution across and frequency in VCs	
FBVE (Idiosyncratic information for individual verbs)	**Semantics** – specific construal of semantics of valency frame, (here based on dictionary entries) in terms of additional meaning components, collocations, domain-specific senses, and pragmatic information. **Syntax** – exact set of VCs identified in corpus analysis and relative frequency with each VC.	VERB-SPECIFIC IDIOSYNCRASIES

Figure 5.2: Contents and level of granularity of valency frames, sub-classes, and FBVEs

At the most general level, the valency frame captures shared properties of all verbs of the class, specifying the general semantics (base/core meaning) and the full range of VCs identified for any verb (constructional range). The semantics of the valency frame is defined in terms of frame semantics, focusing on the roles (FEs) involved in the situation and their interrelationships.[258] The syntactic side of the valency frame, or its constructional range, consists of the set of VCs identified for at least one verb in the corpus analysis. The specification of a verb's valency frame thus gives a general idea of its meaning and the types of VCs it may appear

[257] Of course, the continuum can be extended at the top end to capture broader-level generalizations over larger classes of verbs, such as all change-of-state verbs. However, the current analysis does not go beyond the verb class level.

[258] The precise details of the semantics cannot be adequately formalized in mathematical or logical terms, because the meanings of verbs (and linguistic items in general) rely on significant amounts of world knowledge, typically expressed in prose frame-semantic descriptions.

in. This information is inherited by individual verbs within the class, which specify more detailed aspects of the general semantics and constructional range.[259]

Frame-based verb entries (FBVEs), on the lowest end of the continuum, further specify features of the valency frame to account for the idiosyncratic behavior of individual verbs. Semantically, FBVEs specify the exact construals of or restrictions on the base/core meaning inherited from the valency frame, as described in the discussion of additional meaning components in 5.2.2 (e.g. *modify* refers to changes with a specific purpose). Ideally, FBVEs also mention significantly frequent collocations for individual verbs (e.g. *alter clothing*), any domain-specific uses (e.g. *modify* in linguistics), or other pragmatic features (e.g. formal vs. informal, genre-specificity), but these semantic features are not addressed in detail in the present analysis. The syntactic side of FBVEs specify the verb's valency distribution: the exact set of VCs it occurs in as well as its relative frequency in each VC, as shown in the corpus analysis. The FBVE thus shows exactly which (types of) VCs the verb can occur in and gives a good idea of what VCs are most frequent (assuming that the analyzed corpus data reflect normal usage). The FBVE also lists any features that set apart individual verbs, e.g. that resultative VCs only occur with *turn* or that reflexive object U arguments are highly frequent for *transform*.

Finally, at an intermediate level between general valency frames and idiosyncratic FBVEs are (syntactic-semantic) sub-classes of verbs.[260] I postulate sub-classes when groups of two or more verbs exhibit significant similarities in both the semantic and syntactic portions their FBVEs. Specifically, members of a sub-class must share at least one additional meaning component and appear in the same types of VCs (including verb-limited and PT-changing VCs)

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[259] The valency frame can be understood in terms of a construction 'type' in Sign-based Construction Grammar (Sag 2012: 76f.) as it delimits the number and types of features specific constructions (i.e. individual verbs) exhibit. In SBCG, the use of 'types' rules out features such as case for verbs or infinitive vs. finite for nouns. Applying this notion to the description of verb classes and valency behavior, by saying that a verb is a member of the English Change valency frame, semantic questions that are only appropriate for verbs of other valency frames (e.g. such as 'what type of transfer: intended or actual' which is only valid for transfer verbs but not Change verbs) as well as syntactic questions about the verb's occurrence in VCs that are not part of the relevant valency frame (e.g. 'does it occur in VCs with expletive subjects' which applies to other verb classes but not Change verbs) may be ruled out.

[260] The sub-classes in this analysis differ from the levels of analysis employed by Croft (2003): Croft only proposes two levels of analysis, namely verb classes (or verb-class-specific constructions) and individual verbs (or verb-specific constructions). My analysis adds to Croft's proposals, as I not only capture verb-specific and (coarser-grained) verb-class-specific information, but I also propose sub-classes which account for small sets of (typically two to four) verbs within a broader class that exhibit behavior different from other verbs in the class.

with similar frequencies. The meaning component(s) shared among verbs in a sub-class is potentially a grammatically relevant (additional) meaning component, to the extent that the shared valency behavior of verbs in a sub-class can be connected to their shared meaning component(s).

5.4.2. Defining the English Change valency frame

5.4.2.1. English Change valency frame: semantics

In this sub-section, I first describe in general terms the semantics that are shared among all English Change verbs, which are inherited by individual verbs by default and can be further specified at the level of sub-classes and individual verbs. After describing the general semantics, I then discuss more detailed aspects of the Change semantic frame, including its generality with respect to other change-of-state verbs, the implications of grouping together transitive and intransitive uses of Change verbs, and the types and status of non-core arguments that specify peripheral aspects of the change scenario (i.e. peripheral FEs).

General inherited semantics shared among all English Change verbs

As discussed in 5.1 and 5.2.1.2, Change verbs share the semantic property of referring to events in which some entity undergoes a change from one state to another state. In some cases, an agent or cause which brings about this change is also expressed. The core (Refined) Frame Elements of this frame are thus the agent or cause that brings about the change, the entity undergoing the change, the initial state of the changed entity, and the final state of the entity after it has changed. The semantics of the English Change valency frame, along with definitions of the core (refined) FEs, are stated in Figure 5.3.

Semantics of the English Change valency frame
These verbs describe situations in which an entity (U) undergoes a change from one state (O) to another state (F). The change may be brought about by some agent or cause (C).

Core (R)FEs
C = Cause_change = agent or cause which brings about the change
U = Undergo_change = entity which undergoes the change
O = Original_state = state of the entity before the change
F = Final_state = state of the entity after the change

Figure 5.3: Semantics of the English Change valency frame

Change verbs set themselves apart from other verbs in the much broader set of "change of state" verbs (Levin 1993: 240f., Rappaport Hovav and Levin 2002, Osswald and Van Valin 2014) in that they are vague with respect to the exact type of change they describe and, consequently, the types of entities which can undergo such changes. For instance, the more specific change-of-state verbs *break* and *shorten* refer to changes which result in the loss of internal structure and the decrease of length, respectively, and are thus restricted to changes in entities which have internal structure and some length attribute (be it spatial or temporal), respectively. Change verbs proper (as analyzed here), however, are vague with respect to the type of change they describe. Specifically, when one *changes*, *modifies*, or *transforms* something, then it is not specified whether that thing is broken, shortened, colored, burned, or has undergone any other type of change.[261] The valency frame thus specifies that all Change verbs refer to situations in which an entity changes from one state to another, potentially due to some cause, and that they are vague with respect to the specific type of change that is undergone.[262]

Splitting vs. lumping: FrameNet's `Cause_change` *and* `Undergo_change` *frames*

As noted in Sections 3.1 and 5.2.1.2, FrameNet posits two separate frames for English Change verbs, one to account for transitive uses (`Cause_change`) and another for intransitive uses (`Undergo_change`). The present analysis, in contrast, conflates the two uses and analyzes both causative and inchoative uses for each verb, to the extent that they occurred in the corpus. I decided to group these uses together in order to get a more detailed look at their exact frequencies in one VC type or another.[263] FrameNet accurately includes all five of the analyzed verbs in the

[261] Individual instances of Change verbs vary along several parameters. For one, the type of change undergone by the changed entity ranges from subtle changes in a single attribute of this entity to more extreme changes in which the entity becomes something entirely different. This distinction is partially accounted for by the sub-classes posited later in this section, but more general verbs such as *change* or *turn* may be used to describe both types of changes. The type of entity that changes also varies across instances. It can be of nearly any ontological type, including concrete objects or people, semi-abstract entities such as texts or laws, or more abstract notions such as thoughts, behaviors, or states of affair. C arguments differ with respect to whether the entity that brings out a change is animate and sentient (i.e. Agent) or inanimate (i.e. Cause). While a closer analysis of such distinctions may reveal that these semantic factors may influence valency behavior, I do not address them in detail here because the data do not suggest that these distinctions are grammatically relevant.

[262] Osswald and Van Valin (2014) propose that the Cause_change and Undergo_change frames should be mothers in inheritance relations to frames including more specific change-of-state verbs.

[263] Of course, the present analysis is entirely capable of adopting the distinction between the Cause_change and Undergo_change frames of FrameNet. Such an analysis would involve drawing from a lower number of verbs and identifying a lower number of VCs for each class. However, by conflating the two frames it is

Cause_change frame, which corresponds to the present analysis showing that each of the verbs appear in transitive VCs. However, of the five analyzed verbs, FrameNet only lists *change* and *turn* as LUs of the Undergo_change frame, because the FrameNet annotated data included only intransitive VCs of these verbs but not the other three verbs.[264] This (lack of) classification contrasts with the data analyzed here, which reveals that *alter* and *transform* also appear in intransitive VCs (in about 8% of their examples). FrameNet should thus include these as LUs of the Undergo_change frame as well as the Cause_change frame, because they can express agentless change scenarios. However, by simply listing them as LUs of both of these frames, FrameNet is unable to capture the verbs' overwhelming frequency of occurrence in transitive VCs over intransitive VCs. [265] By combining both transitive and intransitive uses of Change verbs and providing detailed analyses of the valency behavior of each verb, my analysis can account for both the occurrence of verbs such as *alter* and *transform* in intransitive patterns, but at the same time it acknowledges that these uses are highly infrequent in comparison with transitive uses. As such, the present approach offers a more accurate account of the actual valency behavior of individual verbs than that of FrameNet, while not losing sight of the fact that some Change verbs but not others may be used in intransitive (Undergo_change) contexts.

Peripheral FEs that further specify the Change frame

A number of examples include additional arguments beyond those in the common VC that are not in the set of refined core FEs, but nonetheless closely pertain to the Change event described in the sentence. Such arguments refer to the general direction of the change (e.g. *for the better*), the degree of the change (e.g. *beyond recognition*), a related entity which changes in correlation with the core U argument (e.g. *according to X*), an external or indirect cause of the change (e.g. *with the arrival of X*), an entity that embodies the change (e.g. *in his work, he changes something*), or the result of the change (e.g. *so drastically that* …).[266] While I do not

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possible to capture the frequency with which individual verbs evoke one or the other of the two FrameNet frames.

[264] One exception is the incorrectly analyzed example with the verb *alter* mentioned in footnote 62 above.

[265] It must be reiterated that it is not a goal of FrameNet to describe the frequency of specific argument realization patterns nor is frequency a deciding factor in its decisions to posit LUs of a given frame.

[266] Note that clausal, purposive F arguments headed by *so (that)* or *to* are included among the set of common valency constructions due to their frequency with *modify* and occurrence with other Change verbs. The peripheral FE valency constructions described here are much less frequent and more formally diverse

account for the characterization and distribution of these peripheral FEs in the main analysis here, Appendix C describes in some detail how such FEs appeared in the corpus data.

Domain-specific senses, collocations, and null-instantiation

Another interesting aspect of English Change verbs relates to special senses and collocations of individual verbs. The dictionary definitions and corpus examples revealed instances in which the verb is used without an object argument. At times, this argument is understood generically as with *He has changed*, where the change may refer to the subject's looks, personality, behavior, or any other property. In other cases, the dropped argument is interpreted as a specific type of entity, as with *He changed before leaving the house*, where the omitted argument is interpreted as clothing, or with *The wine turned*, which implies that the quality of the wine turned from good to spoiled. Furthermore, certain specific types of changes show strong preferences for specific Change verbs. For instance, *alter* is used for changes to the size or fit of clothing, *modify* is used in linguistic terminology (e.g. adjectives modify nouns), and *transform* is used for changes in electrical currents.[267]

5.4.2.2. English Change valency frame: valency constructions

The syntactic corpus analysis of English Change verbs allows me to describe the *constructional range* of the English Change frame, which lists each valency pattern attested in the corpus analysis of English Change verbs. The constructional range of the English change valency frame is provided in Table 5.23, along with simple, invented examples of each VC.

than the purposive clausal F arguments included in the set of common constructions for English Change verbs.

[267] Apart from mentioning these collocations in the semantic characterization of the verbs, I did not undertake a detailed investigation of such constructions. However, future research should analyze the relative frequency of such uses, their historical development from a usage-based perspective, and the influence of such uses on the verbs' argument realization behavior.

	Pattern	Example
T2	**C _ U**	Pat changed Sam.
T3a	**C _ U into F**	Pat changed Sam into a frog.
T3b	**C _ U to F**	Pat turned Sam to stone.
T3c	**C _ U F.CP**	Pat changed it to do something different.
T4a	**C _ U from O into F**	Pat changed Sam from a person into a frog.
T4b	**C _ U from O to F**	Pat changed Sam from a prince to a frog.
I1	**U _**	Sam changed.
I2a	**U _ into F**	Sam changed into a frog.
I2b	**U _ to F**	Sam turned to stone.
I3a	**U _ from O into F**	Sam turned from a prince into a frog.
13b	**U _ from O to F**	Sam turned from a prince to a frog.
TR3	**C _ U F.result**	Pat turned Sam blue.
IR2	**U _ F.result**	Sam turned blue.

Table 5.23: Constructional range of the English Change valency frame

A total of 13 VCs comprise the constructional range of the English Change valency frame.[268] As mentioned at the beginning of 5.2.3, these VCs can be organized into various classes, depending on the number and types of arguments that they include. Such classes are useful in neatly summarizing the exact behavior of individual verbs, as demonstrated in the formulation of FBVEs in the following sub-section. These categories are summarized in Table 5.24 below, which is adapted from Table 5.14 in Section 5.3. Recall that valency features are properties that define (classes of) VCs, such as transitive vs. intransitive.

Valency Feature	Category	Valency Constructions
Transitivity	Transitive/Causative	T2, T3(a-c), T4(a-b), TR3
	Intransitive/Inchoative	I1, I2(a-b), I3(a-b), IR2
State realization	No states	T2, I1
	Only F	T3(a-c), I2(a-b), TR3, IR2
	both O and F	T4(a-b), I3(a-b)
F realization	intoPP	T3a, T4a, I2a, I3a
	toPP	T3b, T4b, I2b, I3b
	to/so (that) CP	T3c
	Resultative	TR3, IR2

Table 5.24: Categories of VCs according to valency features

[268] A more comprehensive corpus analysis would likely reveal a wider set of VCs. However, as such VCs did not occur in 549 corpus attestations, they are likely to be relatively infrequent. See also the following sub-section, where new VCs identified in the COCA data for *metamorphose* that can potentially be added to this preliminary formulation of the constructional range.

The first major distinction is that between transitive VCs and intransitive VCs. The second distinction separates VCs with no state arguments, VCs with only the F argument, and VCs with both O and F arguments. The final parameter distinguishes VCs based on the actual realization of the F argument, including classes for *into* prepositional F, *to* prepositional F, purposive clause F, and resultative F.

The identification of VC features and corresponding VC classes suggests that VCs used with Change verbs are not haphazardly chosen from the full set of VCs available to (English) verbs, but rather that they can be more systematically organized. For instance, all the transitive VCs are related and all the intransitive VCs are related. At the same time, VCs realizing a Final_state in a *to* PP are related, irrespective of their transitivity, and thereby differ from other VCs with the same transitivity type but without the same F realization type. The discussion of Construction Grammar in Section 3.2 showed how linguistic structures and knowledge can be viewed in terms of structured networks, and such networks appear capable of capturing the relations between English Change VCs. The proposed network structure relating the English Change VCs is shown in Figure 5.4.[269]

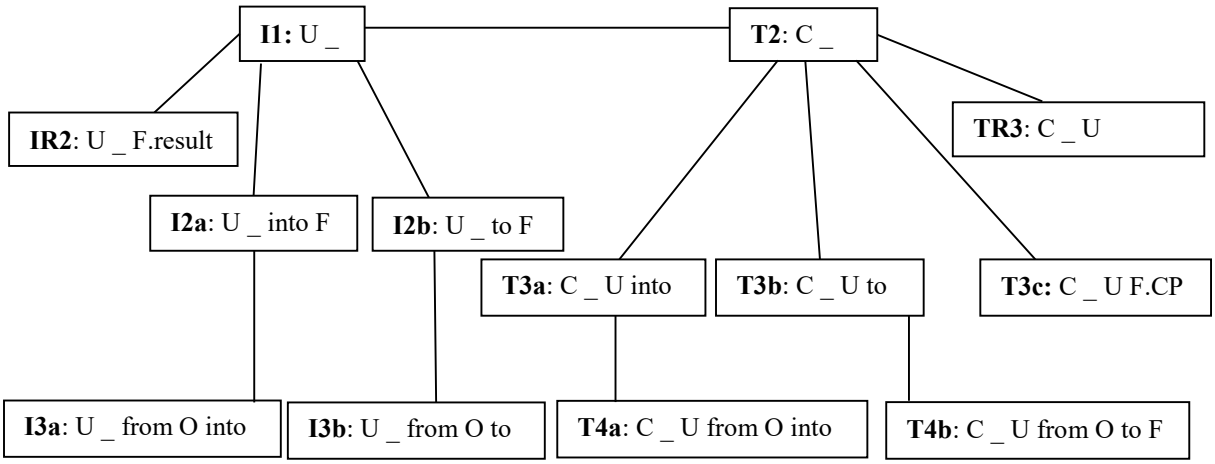

Figure 5.4: Network of Valency Constructions for English Change verbs

[269] To my knowledge, there have been no proposals for organizing "valency constructions" (i.e. the full range of constructions available to a set of semantically similar verbs) into networks in the manner proposed here. Future work must further investigate how these networks relate to those already proposed in Construction Grammar. At present, it appears that both the vertical relations (e.g. relating "I1: [U _]" to "I2b: [U _ to F]") and the horizontal relation relating intransitive and transitive VCs (e.g. "I1: [U _]" to "T2: [C _ U]") represent the sub-part link described by Goldberg (1995: 78-79).

The top level of this network includes the simple transitive and intransitive VCs without any state arguments. As described in Section 5.3, they are the most basic VCs and have the least specific semantic information (i.e. they do not specify precisely what kind of change is undergone, the final or original state).[270] The next level includes various constructions that inherit from the simple (in)transitive ones at the top. They describe the change in more detail by specifying the final state that the U argument is in after the change. There are seven VCs at this level. Six of these involve both intransitive and transitive variants: prepositional F with *into*, prepositional F with *to*, and resultative F. The seventh VC at this level expresses the F in a purposive clause (headed by *so (that)* or *to*) and occurs only with transitive uses. Finally, the four VCs at the bottom further specify the change by mentioning the original state (O) of the U before the change. The formal realization of this argument is a *from* PP. These constructions inherit from the transitive and intransitive VCs with *into* and *to* PPs, resulting in four distinct VCs.

While the above organization is the most explicit way to present the VCs available to Change verbs, there is a fair amount of redundancy. For instance, the VCs with prepositional F arguments must be listed twice, once each for transitive and intransitive patterns. Similarly, the VCs with *from* O must be listed four times, once for intransitive with *into* F, once for intransitive with *to* F, etc., but they are all very similar as they only further specify the higher-level constructions by adding a single *from* PP. It is possible to reduce the above figure to avoid redundancy by capturing the commonalities between the individual VCs, as in Figure 5.5:

[270] Given the tradition in usage-based approaches to syntax, such as CxG (Goldberg 2006), I do not posit that one of the constructions is more basic than the other and thus graphically represent them at the same level of the constructional hierarchy. Depending on which criteria are used, it is possible to claim that each construction is more basic than the other. A strictly formal argument suggests that the intransitive construction is more basic, since it involves fewer elements (subject and verb), both of which occur in the "more complex" transitive construction. However, a usage-based argument suggests that the transitive pattern is more basic, because the simple transitive VC is significantly more frequent than the simple intransitive VC across English Change verbs (with only *turn* appearing more frequently in intransitive patterns). Furthermore, the semantic difference between the two VCs (i.e. which role is instantiated as subject) suggests that the VCs are of different semantic types, as I will demonstrate in Chapter 7 by comparing the intransitive VCs of Change verbs against Theft verbs. I therefore eschew positing a more basic construction and treat them as equally basic constructions.

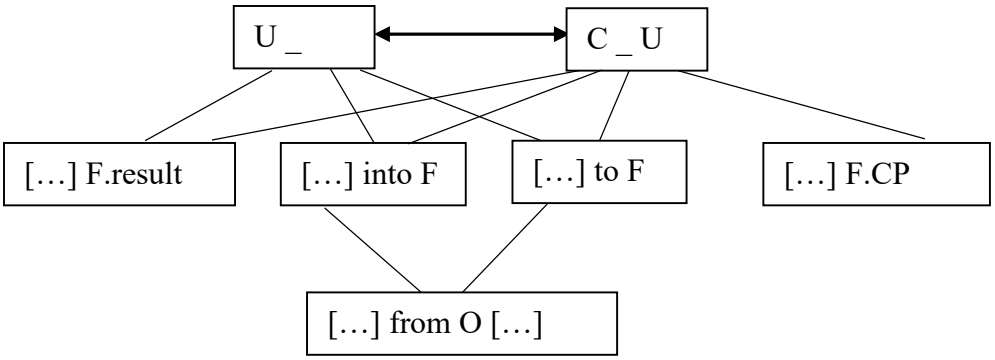

Figure 5.5: Simplified network of valency constructions for English Change verbs without redundancy

At the top level, again, are the simple transitive [C _ U] and simple intransitive [U _] patterns. These are linked by a causative-inchoative inheritance link,[271] represented by the bold arrow. The VC types at the second level all inherit information from the simple VCs at the top level, as represented by the lines connecting the individual boxes. The inherited information (i.e., inherited portions of the lower-level VCs) are represented with […]. The first three of the second-level VC types appear in both transitive and intransitive variants. This relation is represented by the lines going up from these VCs to the top-level arrow connecting the simple transitive and simple intransitive VCs. Thus, there are two specific VCs which express the F in an *into* PP, one of which is transitive and the other intransitive. The [C _ U] and [U _] from the top level is inherited by these specific VCs, respectively, and fills in the unspecified […] shown in the nodes of the second-level VCs. Note that the VC expressing F in a purposive clause is set off to the right and only connected to the top-level simple transitive VC, but not the intransitive one. This is because purposive clause F realizations only occur with transitive uses and thus do not also inherit the simple intransitive VC. At this level, the representation is much simpler than that in Figure 5.4 above, as only four VC types (nodes in Figure 5.5) capture the similarity between seven specific VCs in the more explicit representation in Figure 5.4. Finally, the lowest-level of the non-redundant VC network in Figure 5.5 requires only a single node, which inherits from the (transitive and intransitive) VC types realizing the F in *into* and *to* PPs, and adds to these an

[271] Inheritance links are discussed in detail in Section 3.2. Earlier in this section I justified why I place the simple transitive and simple intransitive VCs at the same level rather than having the transitive inherit from the intransitive.

additional O argument in a *from* PP. This single node represents four specific VCs: [C _ U from O into F], [C _ U from O to F], [U _ from O into F], and [U _ from O to F]. Because the *from* O argument appears after the simple (in)transitive VC and before the *(in)to* F PP, I include the […] representing inherited information to both the left and the right of the *from* O phrase (that further specifies the higher-level inherited features).

The non-redundant representation of the network of VCs for English Change verbs thus neatly captures the main parameters that distinguish and relate the individual VCs. At the top level is the transitive-intransitive distinction. At the second level are the various realizations of the F argument, with the two prepositional realizations (*into* PP, *to* PP) situated more closely to one another, and the purposive clause F realization set apart from the prepositional and resultative F realizations and only connected to the simple transitive VC at the top level, because it does not appear with intransitive uses. Finally, the lowest level captures the distinction between VCs with both the O and F arguments (always in prepositional phrases) and the higher-level ones with only the (prepositional) F argument.

As a side note, notice that the above constructions list only the Frame Elements, their relative ordering, and any relevant prepositions, but do not include specific phrase type specifications. As such, these are actually abstractions over sets of more specific constructions that differ only slightly, particularly with respect to the exact phrase types that instantiate the listed FEs. Thus, the simple transitive [C _ U] VC (T2) always realizes C as subject and U as direct object, but has different variants that involve subtly different phrase types. Tables 5.25 and 5.26 below show the various specific formal realizations of FEs (from the second row to the bottom row) that are sub-types of the more general, schematized VCs (in the top row of the tables; as used in the figures above). The general VCs typically have a default realization that appears in an overwhelming majority of instances, and this realization type is signified by double asterisks (**).

C _ U
**NP _ NP
NP _ RflxvNP
VPing _ NP
fortoCP _ NP
NP _ whCP

Table 5.25: Specific realizations of the T2 VC

C _ U from O to F
**NP _ NP from N to N
NP _ NP from Adj to Adj
NP _ NP from Adj to NP

Table 5.26: Specific realizations of the T4b VC

Table 5.25, for instance, shows that the simple transitive VC (#T2) has a default realization (marked by the double asterisks) in which both the subject C and object U are NPs. Other (non-default) realizations include U as a reflexive object, C as a gerundial VP, C as an infinitival clause of the type *for N to V*, and U as a *wh*-clause. Table 5.26 lists the various realizations of the [C _ U from O to F] VC (#T4b), showing that the elements within the PPs can be adjectives as well as nouns.[272]

The syntactic portion of the valency frame for English Change verbs, or its *constructional range*, which can be represented as a list of independent constructions or as a network of interrelated constructions, thus accounts for the full range of valency behavior of the five analyzed English Change verbs. That is, all examples of the verbs that were analyzed exhibit one of the 13 VCs in the constructional range. Subtle differences among exact realization types are accounted for with reference to constructions not directly related to valency, including the construal of entire phrases as NPs using *wh*-clauses, adjectival arguments of PPs, and reflexive objects.[273] This account shows that generalizations of the syntactic (valency) behavior of verb classes are extremely useful in predicting a verb's valency behavior based on its valency frame membership. As such, the valency frame aligns well with the findings of Levin (1993) and Fillmore (1968), who show that semantically related verbs exhibit uniform syntactic behavior, and it calls into question the view taken by Valency Grammar (Herbst et al. 2004, Faulhaber 2011) that valency behavior cannot be predicted by verb classes. These findings can also be integrated into FrameNet, which currently does not make any claims about the (potential) argument realization patterns for LUs of a given frame: specifically, each FrameNet frame could include a list such as that in Table 5.23 above that lists the VCs that are attested for any verb in

[272] For the various realizations of the other VCs, see Appendix D.

[273] Phrase-type changing VCs are discussed in the beginning of Section 5.3. For instance, I do not posit an additional VC for sentences such as *Learning German changed my life*, which are nearly identical to the simple transitive [C _ U] VC and differ only in that the subject is not a NP but a gerundial verb phrase (which can replace a NP in many but not all contexts).

the frame. This is currently done for individual LUs in FrameNet (albeit in a rather convoluted and inconsistent manner), but not for the entire range of (verbal) LUs for a given frame.

However, the corpus data also show that the individual verbs vary significantly with respect to the exact number and types of VCs in the constructional range they appear with, as well as to their frequency with each of these VCs. This idiosyncratic behavior is well documented in research on Construction Grammar (Boas 2003, 2008a) and to a greater extent in Valency Grammar (Herbst et al. 2004, Welke 2011), especially by Faulhaber (2011), as described in Section 3.3. The following sub-section thus accounts for the idiosyncrasies of individual verbs in terms of both their meanings and valency behavior through the formulation of FBVEs for each English Change verb under analysis.

5.4.3. Frame-based verb entries

While the valency frame described in the previous sub-section accounts for semantic and valency properties that are shared among verbs of a given class, this section introduces frame-based verb entries (FBVEs) that specify the exact meaning and valency distribution of individual verbs within the class. As noted above, individual Change verbs inherit the general semantics defined in the English Change valency frame (Figure 5.3) and the set of VCs defined in the constructional range (Table 5.19). However, each verb also exhibits additional meaning components that further specify the general semantics of the valency frame. Also, individual verbs (typically) do not appear in all VCs in the constructional range with equal frequency, but only in a sub-set of VCs with tendencies to appear more frequently in some VC(s) over others.

The first portion of the FBVE lists the verb's valency frame. In this case, each verb is associated with the Change valency frame, as defined above. The second portion of the FBVE states the (syntactic-semantic) sub-class of the verb, if applicable (this level is specified the following sub-section, see next paragraph). Finally, the portions "Additional Semantics", "Additional Syntax", and "Other" specify verb-specific information: "Additional Semantics" lists the additional meaning components identified for the verb in Section 5.2. "Additional Syntax" specifies the verb's tendencies for valency distribution based on the corpus analysis of Section 5.3, including a specification of its exact frequency in each of the general VCs defined above, as well as brief prose descriptions characterizing its valency distribution in more general terms. The

"Other" category[274] specifies other information necessary for proper use of the verb in question, such as pragmatics, collocations, and specific sub-senses of the verb, which are not treated in detail here.

Here, I first formulate FBVEs without including sub-class information because sub-classes are formulated on the basis of shared features in FBVEs for multiple individual verbs. If the original FBVEs for two or more verbs each include one (or more) shared meaning component(s) and similarities in their valency distributions, then I posit a sub-class accordingly. Once this sub-class information is included in the revised FBVE, the additional meaning component(s) and valency behavior need not be listed in the idiosyncratic "Additional Semantics" and "Additional Syntax" categories, but can be inherited from the sub-class.

The precise verb-specific information listed by the FBVE captures the results of item-specific analyses provided by Valency Grammar, as opposed to the broader generalizations sought by Levin (1993) and generative/decompositional work on the syntax-semantics interface (Pinker 1989, Jackendoff 1990, Rappaport Hovav and Levin 1998). FBVEs are also an attempt to state more systematically the information in the LU-specific lexical entries in FrameNet. Currently, FrameNet entries are associated with only an informal prose definition and a limited set of corpus sentences documenting valency behavior. As opposed to FrameNet lexical entries, the FBVE specifies any additional meaning components systematically with reference to the semantic frame and summarizes each verb's valency behavior with reference to its frequency in each type of VC. The combination of valency frames and FBVEs also roughly corresponds to Croft's (2003) distinction between verb-specific constructions, verb-class-specific constructions, and more general argument structure constructions.[275]

Alter

I now formulate FBVEs for each of the five verbs analyzed, beginning with *alter*. Its FBVE is presented in Table 5.27.

[274] Pragmatic and collocational properties could also be listed in the "Additional Meaning" category, but I prefer to reserve this category specifically for (additional) meaning components that further specify the base/core meaning of the valency frame, rather than more contextually-based semantic features.

[275] The current analysis, however, differs from Croft (2003), as his work primarily analyzed the ditransitive construction and its various interpretations across verbs of relatively distinct semantic frames. On the other hand, I analyze the full range of VCs that occur across a single, relatively semantically homogeneous class of verbs.

Verb	*Alter*
Frame:	CHANGE
Sub-class	see below[276]
Additional Semantics	--refers to changes that are subtle, minor, non-categorical
Additional Syntax	Appears in: T2 (90%), I1 (8%), and T3c (3%) → Strong preference for transitive VCs → Rarely (if at all) appears with prepositional state arguments
Other	a) Special senses include that of tailoring, or changing the size or fit of clothing articles, and, less frequently, that of changing one's gender.[277] b) *Alter* may appear with adverbs such as *drastically* or *dramatically*, in which case it is refers to changes that are more substantial than prototypical "subtle" changes.

Table 5.27: Frame-based verb entry for *alter*

As mentioned above, the frame level specifies that *alter* inherits information from the Change valency frame. That is, it has the general Change semantics and is associated with the Change roles (Figure 5.3), and, by default, it may appear with valency constructions listed in the Change valency frame's constructional range (Table 5.23). The sub-class category is left unspecified at present. (The following sub-section shows how the "Additional Semantics" and "Additional Syntax" categories can be left unspecified after formulating a "Minor Change" sub-class.) The "Additional Meaning" category identifies one additional meaning component for *alter*, namely that it refers to minor or non-categorical changes. The "Additional Syntax" category states that *alter* appears most frequently in VC #T2 and less frequently in I1 and T3c. It also summarizes this behavior by stating that it is much more frequent in transitive than intransitive VCs and that it does not occur (or rarely occurs) in VCs with prepositional state arguments. The "Other" category states that it is a slightly formal verb and that it exhibits a domain-specific senses referring to the alteration of garments.

[276] I introduce syntactic-semantic sub-classes in the following sub-section after the behavior of individual verbs is summarized in the FBVEs. A modified version of this table with sub-class specifications is provided in Table 5.37.

[277] It is possible that these specific uses of *alter* (and other Change verbs) can be viewed as a different sense of the verb from the highly general Change sense discussed here. In FrameNet terminology, *alter* can be seen as evoking different frames when it occurs in the general Change sense as opposed to the more specific "change garment size/fit" or "change gender" senses, among others.

To show how the valency behavior of individual verbs relates to the constructional range discussed above, Table 5.27 lists the frequency of *alter* with each of the VCs in the constructional range. It shows that 90% of the examples exhibit the T2 VC, 3% exhibit T3c, and 8% exhibit I1.

	Pattern	**Frequency with *alter***
T2	C _ U	90%
T3a	C _ U into F	0
T3b	C _ U to F	0
T3c	C _ U F.CP	3%
T4a	C _ U from O into F	0
T4b	C _ U from O to F	0
I1	U _	8%
I2a	U _ into F	0
I2b	U _ to F	0
I3a	U _ from O into F	0
13b	U _ from O to F	0
TR3	C _ U F.result	0
IR2	U _ F.result	0

Table 5.28: Distribution of *alter* in the constructional range of English Change: List view

This valency behavior can also be represented in terms of the constructional range network figures presented above, as in Figure 5.6:

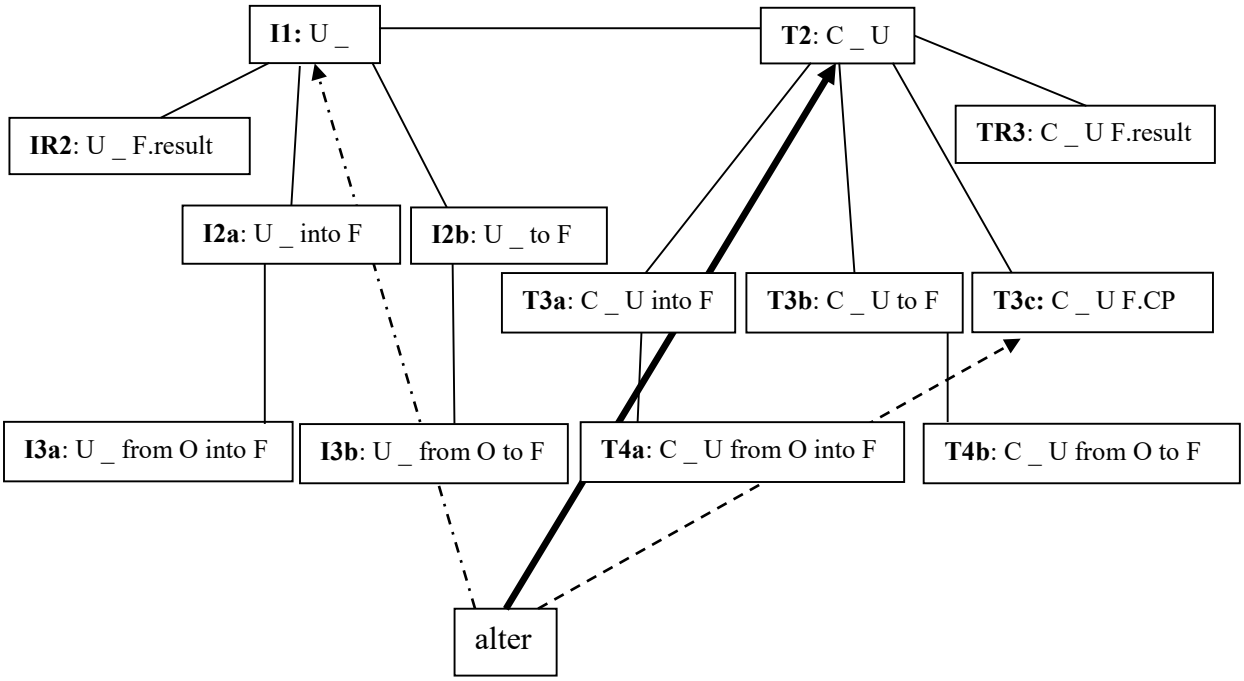

Figure 5.6: Distribution of *alter* in the constructional range of English Change: Network view

This figure includes the network of the constructional range of English Change at the top and a node signifying the verb *alter* at the bottom. The arrows going up from the *alter* node represent occurrences of the verb in individual VCs. The thick arrow represents a strong connection between the verb *alter* and the simple transitive (T2) VC, i.e. a high frequency of occurrence of the verb in that VC (over 60%). The dashed arrow represents a less strong connection between *alter* and the simple intransitive (I1) VC (between 5% and 20%). The dash-dotted arrow shows a very weak connection between *alter* and the transitive purposive clause-F (T3c) VC (less than 5%).[278] The figure thus shows that *alter* only occurs in three of the total 13 VC types. Of these three, it shows an extremely strong attraction to the simple transitive [C _ U] VC. The two other VC types, [C _ U F.CP] and [U _ V] are much less frequent with *alter* than the simple transitive VC.

Modify

Table 5.29 shows the FBVE for *modify*.

Verb	*Modify*
Frame	CHANGE
Sub-class	see below
Additional Meaning	--refers to changes that are subtle, minor, non-categorical --refers to changes undertaken in order to improve, make more acceptable, less extreme --refers to changes undertaken for a specific purpose
Additional Syntax	Appears in: T2 (82%), T3c (18%) → Only appears in transitive VCs → Infelicitous in VCs with prepositional F arguments → Frequent in VCs expressing Result of change (F) in a purposive clause headed by *so, so that,* or *to* (most frequent among all Change verbs in this VC)
Other	a) Special sense includes grammatical changes, as in adjectives modifying nouns.

Table 5.29: Frame-based verb entry for *modify*

[278] In the following presentations of verbal valency distributions in the constructional range networks, the types of lines signify the following:
Bold = over 60%
Solid = 20-60%
Dashed = 5-20%
Dot-dashed = less than 5%

As with *alter* and all other verbs discussed here, *modify* is a member of the Change valency frame and thus inherits the properties described in the preceding sub-section. The sub-class specification of *modify* is discussed in the following sub-section. The "Additional Meaning" category specifies that *modify* refers to minor, non-categorical changes, to changes intended to improve something or make it more acceptable, or more generally to changes with some specific purpose. The "Additional Syntax" category, in addition to listing the exact distribution across VCs, specifies that *modify* only occurs in transitive VCs, it does not occur in VCs with prepositional F arguments, and it is relatively frequent in VCs with dependent clauses headed by *so (that)* or *to* that express the result of the change. Finally, the "Other" category specifies that *modify* has a domain-specific sense in the field of linguistics in which it refers to grammatical modifications.

Again, the valency distribution of *modify* with respect to the constructional range of English Change verbs can be represented in prose format, as in Table 5.30.

	Pattern	**Frequency with *modify***
T2	C _ U	82%
T3a	C _ U into F	0
T3b	C _ U to F	0
T3c	C _ U F.CP	18%
T4a	C _ U from O into F	0
T4b	C _ U from O to F	0
I1	U _	0
I2a	U _ into F	0
I2b	U _ to F	0
I3a	U _ from O into F	0
13b	U _ from O to F	0
TR3	C _ U F.result	0
IR2	U _ F.result	0

Table 5.30: Distribution of *modify* in the constructional range of English Change: List view

The relation of *modify* to the constructional range can also be represented in the network format, as in Figure 5.7.

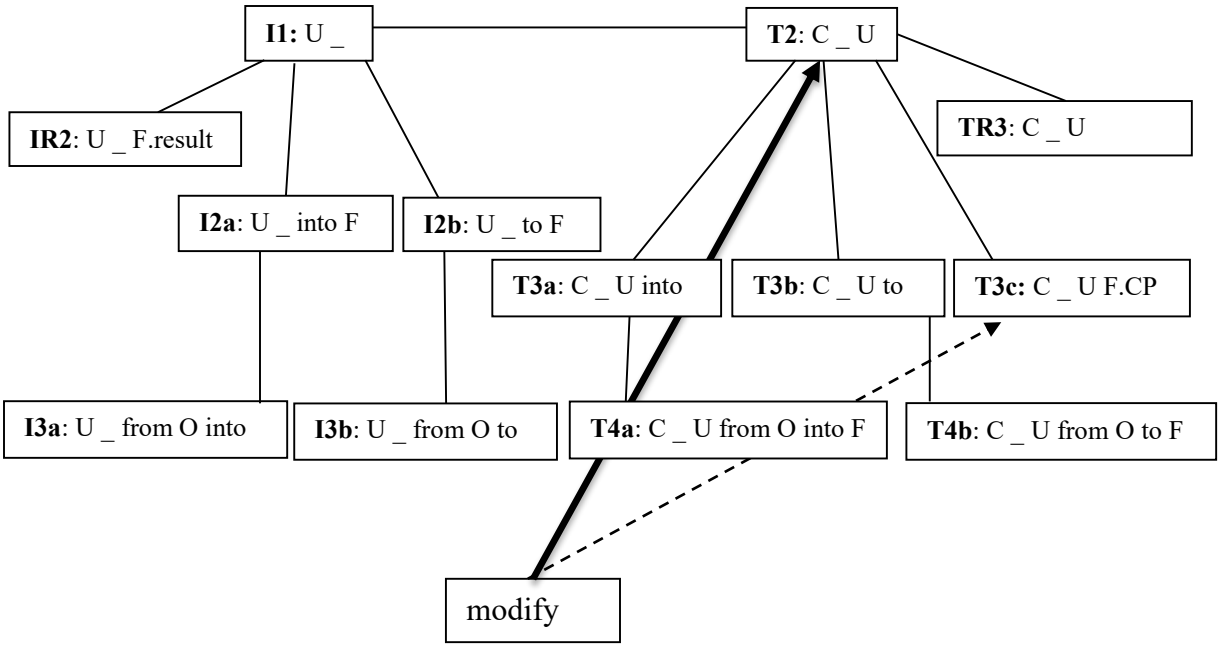

Figure 5.7: Distribution of *modify* in the constructional range of English Change: Network view

Here we see that the valency distribution of *modify* is even more restricted than that of *alter* above. *Modify* occurs only in two of the 13 total VC types, two of which were also found for *alter*, namely the simple transitive [C _ U] and transitive with clausal F [C _ U F.CP] VCs. The former are highly frequent with *modify*, whereas the clausal F realization only comprises 18% of *modify* examples, but the frequency of *modify* in this VC is much higher than that of any other verb analyzed here.

Transform

Table 5.31 below shows the FBVE for *transform*. Again, the "Valency Frame" category specifies general Change semantics and constructional range inherited by *transform*. I again leave "Sub-class" category unspecified here, but will discuss a potential sub-class of "Drastic/Major Change" verbs in the following sub-section. The "Additional Meaning" category specifies that *transform* refers to drastic and/or categorical changes as well as changes that are intended to improve the U argument. The "Additional Syntax" category states that *transform* shows a strong preference for transitive over intransitive VCs and that it occurs relatively frequently with reflexive objects and in VCs with both O and F arguments. Finally, the "Other" category mentions domain-specific senses of *transform* in the fields of electricity, mathematics, biology, and linguistics.

Verb	*Transform*
Frame	CHANGE
Sub-class	see below
Additional Meaning	--refers to drastic (categorical) changes --refers to "positive" changes
Additional Syntax	Appears in: T2 (48%), T3a (35%), T4a (6%), I2a (5%), I1 (3%), T4b (2%), T3c (1%), I3b (1%) → Strong preference for transitive VCs (91% transitive, 9% intransitive) → Most frequent among English Change verbs with reflexive object (10%) → Most frequent among English Change verbs in VCs "Both O and F" (10%)
Other	a) Special senses include changes in the fields of electricity, mathematics, linguistics, and biology.

Table 5.31: Frame-based verb entry for *transform*

The relation between *transform* and the constructional range of English Change verbs is again represented in prose format in Table 5.32 and in network format in Figure 5.8.

	Pattern	**Frequency with *transform***
T2	C _ U	48%
T3a	C _ U into F	35%
T3b	C _ U to F	0
T3c	C _ U F.CP	1%
T4a	C _ U from O into F	5%
T4b	C _ U from O to F	4%
I1	U _	3%
I2a	U _ into F	5%
I2b	U _ to F	0
I3a	U _ from O into F	0
13b	U _ from O to F	1%
TR3	C _ U F.result	0
IR2	U _ F.result	0

Table 5.32: Distribution of *transform* in the constructional range of English Change: List view

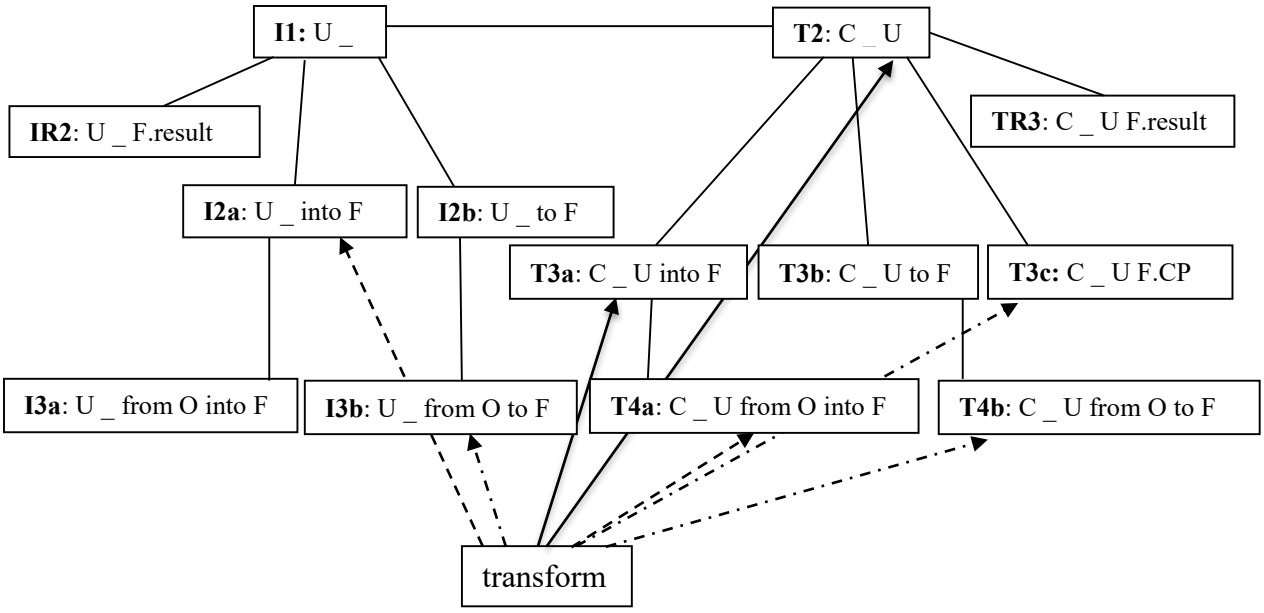

Figure 5.8: Distribution of *transform* in the constructional range of English Change: Network view

Transform occurs in a much wider range of VCs than *alter* or *modify*, with a total of eight VCs. Unlike those verbs, however, *transform* is not strongly associated with just one VC. Instead, two VCs are fairly equally frequent and comprise 83% of the analyzed examples. These are the simple transitive [C _ U] VC (48% of *transform* examples) and the transitive plus *into* F [C _ U into F] VC (35%). However, none of the remaining five VCs account for more than 5% of the corpus examples.

Change

The FBVE for *change* is given in Table 5.33 below. As with the other verbs, *change* inherits the general information defined for the Change valency frame. *Change* is not associated with any syntactic-semantic sub-classes, so the "Sub-Class" category simply states "none". *Change* also exhibits no additional meaning components that further specify the base/core meaning identified for the Change valency frame, defined in Figure 5.3 above, so the "Additional Meaning" category also states "none". The "Additional Syntax" category specifies the only noteworthy valency property noted for *change*, namely that it has a strong preference to occur in patterns that do not

include State arguments (including prepositional and clausal F types). Finally, the "Other" category lists several collocations and domain-specific senses of *change*.[279]

Verb	*Change*
Frame	CHANGE
Sub-class	none
Additional Meaning	none
Additional Syntax	Appears in: T2 (55%), I1 (42%), T4b (2%), T3b (1%), I2a (1%) → Strong preference (> 90%) for VCs without State arguments (T2, I1) → Equally frequent in transitive and intransitive VCs
Other	a) *Change* is associated with many collocations and scene-specific senses, e.g., leaves (color), moon (cycle), voice (tone, e.g. lowering), seasons, mind. b) *Change* also evokes several other semantic frames, particularly those of Exchanging and Replacing: *change clothes, bed, diapers, means of transportation, change sides, gears*, etc.

Table 5.33: Frame-based verb entry for *change*

The valency distribution of *change* is summarized in Table 5.34 and Figure 5.9.

	Pattern	**Frequency with *change***
T2	C _ U	55%
T3a	C _ U into F	0
T3b	C _ U to F	1%
T3c	C _ U F.CP	0
T4a	C _ U from O into F	0
T4b	C _ U from O to F	1%
I1	U _	42%
I2a	U _ into F	1%
I2b	U _ to F	0
I3a	U _ from O into F	0
13b	U _ from O to F	0
TR3	C _ U F.result	0
IR2	U _ F.result	0

Table 5.34: Distribution of *change* in the constructional range of English Change: List view

[279] Many of these collocations do not clearly exhibit Change semantics, but rather evoke frames of Replacing or Changing. For instance, when one changes their clothes, the original clothes do not undergo a change, but are replaced by a new set of clothes. Similarly, when one changes sides (of an argument, team, etc.), the sides do not change but one changes their membership from one side to the other. As such, it is unclear to what degree these collocations should be included in the entry for *change* in this specific frame, rather than listing them in other entries for *change* in frames such as Replacing or Exchanging. The same holds for *turn*.

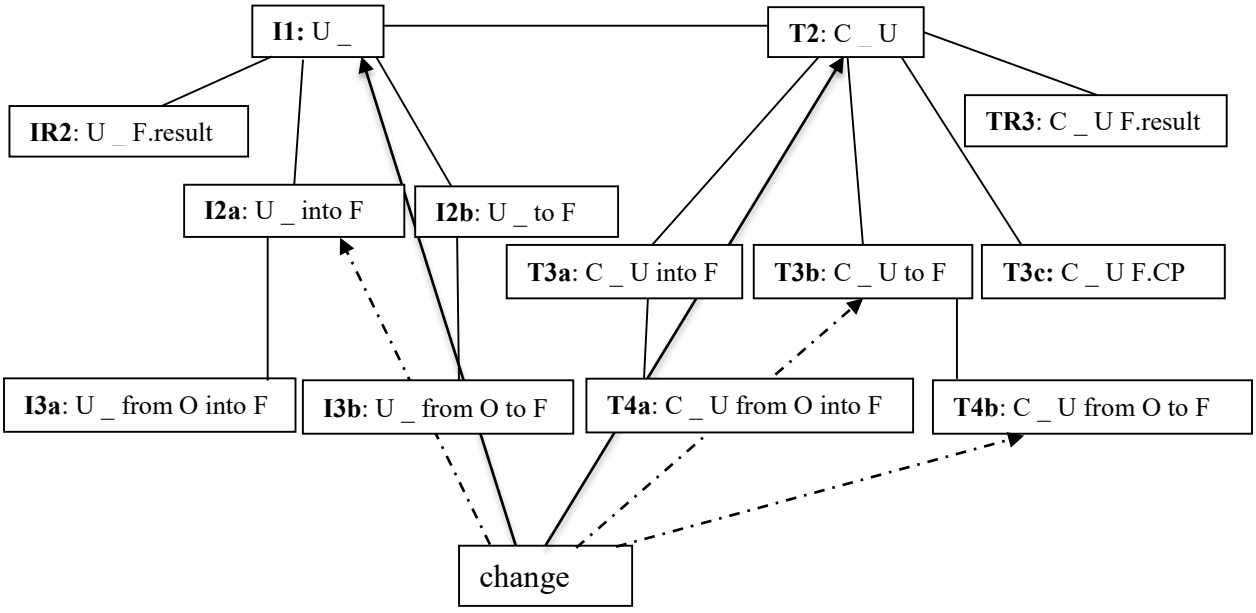

Figure 5.9: Distribution of *change* in the constructional range of English Change: Network view

While *change* appears in a total of five different VCs, two of these VCs comprise over 97% of its examples: the simple transitive VC (55%) and the simple intransitive VC (42%). The other three VCs, however, each occur only once in the 134 analyzed corpus examples. As such, the valency behavior of *change* in the analyzed corpus is much different than what would be intuitively expected. Specifically, *change* sounds acceptable to most speakers in all of the VCs except the resultative ones found only with *turn*. As such, one would expect that it occurs with similar frequency in each of the VCs. However, the data analysis revealed that *change* almost always appears in just the two VCs mentioned above, whereas the other ones are highly infrequent.

Turn

The FBVE for *turn* is shown in Table 5.35 below. As with *change*, the FBVE for *turn* specifies that it inherits properties from the Change valency frame, that it does not have a sub-class membership, and that it does not exhibit additional meaning components. The "Additional Syntax" category specifies that *turn* occurs exclusively in patterns which realize the F argument in either a PP or as a resultative phrase. Furthermore, it states that *turn* is the only English Change verb that appears in resultative VCs. Specifically, *turn* appears in the resultative constructions. Finally, the "Other" category notes that *turn* has several specific senses or collocations, listing

several of these. It also mentions that *turn* is highly polysemous, mentioning some of its most frequently occurring non-Change senses.

Verb	*Turn*
Frame	CHANGE
Sub-class	none
Additional Meaning	none
Additional Syntax	Appears in: T3a (38%), I2a (24%), IR2 (23%), I2b (5%), I3b (3%), TR3 (3%), T3b (2%), T4a (1%). → Exclusively in VCs with F realized in PP or Resultative phrase → Only English Change verb to appear in resultative VCs
Other	a) Many frequent collocations and scene-specific senses in Change sense, e.g., turn number (age), food spoiling (intransitive), leaf color (intransitive), face color, etc. b) Highly polysemous, with many non-Change senses, e.g., rotational motion, seek advice.

Table 5.35: Frame-based verb entry for *turn*

The valency distribution of *turn* is summarized in Table 5.36 and Figure 5.10.

	Pattern	Frequency with *turn*
T2	C _ U	0
T3a	C _ U into F	38%
T3b	C _ U to F	2%
T3c	C _ U F.CP	0
T4a	C _ U from O into F	1%
T4b	C _ U from O to F	0
I1	U _	0
I2a	U _ into F	23%
I2b	U _ to F	5%
I3a	U _ from O into F	0
13b	U _ from O to F	3%
TR3	C _ U F.result	3%
IR2	U _ F.result	23%

Table 5.36: Distribution of *turn* in the constructional range of English Change: List view

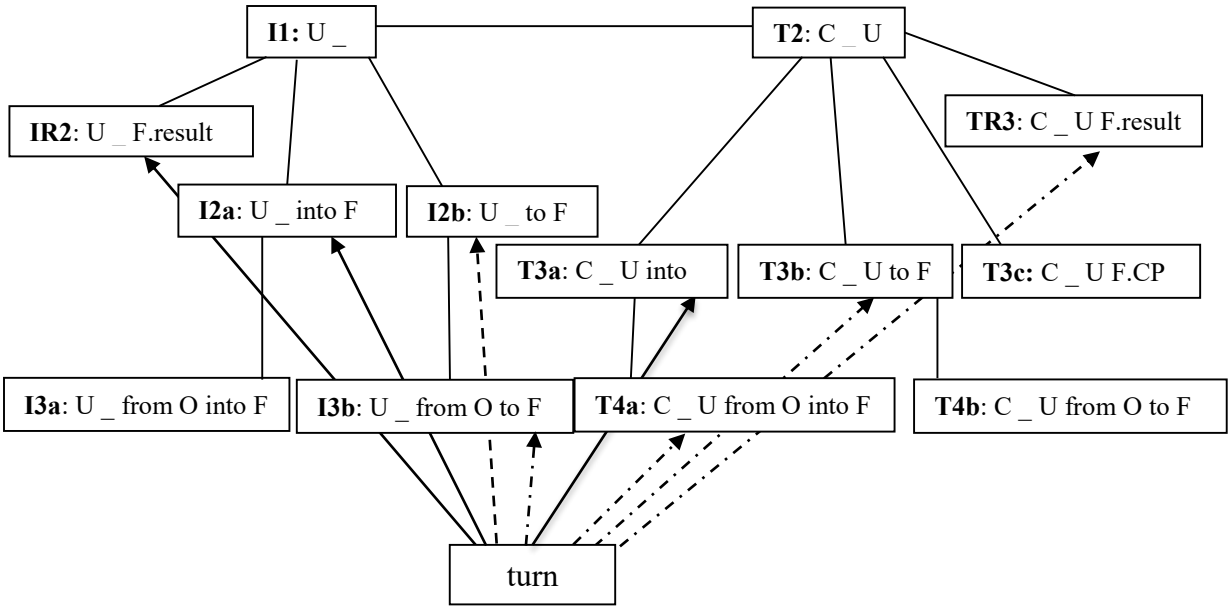

Figure 5.10: Distribution of *turn* in the constructional range of English Change: Network view

Like *transform*, *turn* also occurs in a wide range of VCs, eight in total. However, while *transform* most frequently occurred in just two VCs, *turn* has a much more even distribution across VCs. Specifically, three VCs each occur in over 23% of the examples, with the intransitive plus *into* F VC [U _ into F] and the intransitive resultative VC [U _ F.result] each comprising 23% of the data, and the transitive plus *into* VC [C _ U into F] comprising 38% of the data.[280]

5.4.4 Syntactic-semantic sub-classes and refining FBVEs

Having defined FBVEs for each of the verbs under analysis, I now identify (syntactic-semantic) sub-classes among sub-sets of the analyzed verbs, as well as grammatically relevant meaning components that influence valency behavior. As mentioned above, sub-classes are posited when groups of verbs in the same frame share some additional meaning component(s) and exhibit significant similarities in their valency behavior.

5.4.4.1. Minor Change sub-class

I posit a sub-class of Minor Change verbs based on the meaning components identified in dictionaries and the range of valency patterns identified in the syntactic corpus analysis for the

[280] In fact, given that *turn* is required to appear in VCs prepositional or resultative F arguments (i.e. it may not appear in the simple transitive and intransitive VCs, transitive with clausal F VC), *turn* has a very wide distribution, as it occurs in eight of the 10 other VCs that are not restricted.

verbs *alter* and *modify*. The dictionary definitions for both of these verbs cite aspects of meaning which restrict the type of Change event to minor, non-categorical changes. For *alter*, the definitions modify the base/core Change meaning (i.e. [cause to] become different) with phrases such as "in some respect" (CT) and "without changing into something else" (MW). For *modify*, these specifications include phrases such as "minor changes" or "change some parts but not others" and adverbs such as "slightly" or "partially."

While these shared meaning components alone do not justify the formulation of a sub-class, correspondences in valency behavior suggest that these two verbs form a coherent sub-class of English Change verbs. Specifically, both verbs appear almost exclusively in transitive VCs. Of the 79 active examples of *alter*, 73 are transitive (> 92%), while all 95 of the analyzed examples of *modify* are transitive. Furthermore, both verbs seem to be infelicitous in VCs with prepositional state arguments: none of the analyzed examples of either verb appear with such arguments. These correspondences thus allow us to posit a sub-class of Minor Change verbs, as defined in Table 5.37.

Sub-class	Minor Change
Verbs	*alter, modify*
Semantics	Refer to subtle and non-categorical changes
Syntax	Most frequent in: T2 May also appear in: T3c Not felicitous in patterns with prepositional or resultative state arguments Strong preference for transitive VCs

Table 5.37: Minor Change verb sub-class

The "Syntax" portion of the Minor Change sub-class entry can also be represented in terms of the VC network introduced above, as shown in Figure 5.11. The most frequent VC with Minor Change verbs is T2, which is set off in bold and underlined. The next most frequent VC, T3c, is marked only in bold but not underlined. The I1 VC, which is not incompatible but also not frequent with Minor Change verbs, is in normal font. The remaining VCs are incompatible with Minor Change verbs, as they involve prepositional or resultative realizations of state arguments; these are de-highlighted with a grey font to show they do not appear with Minor Change verbs.

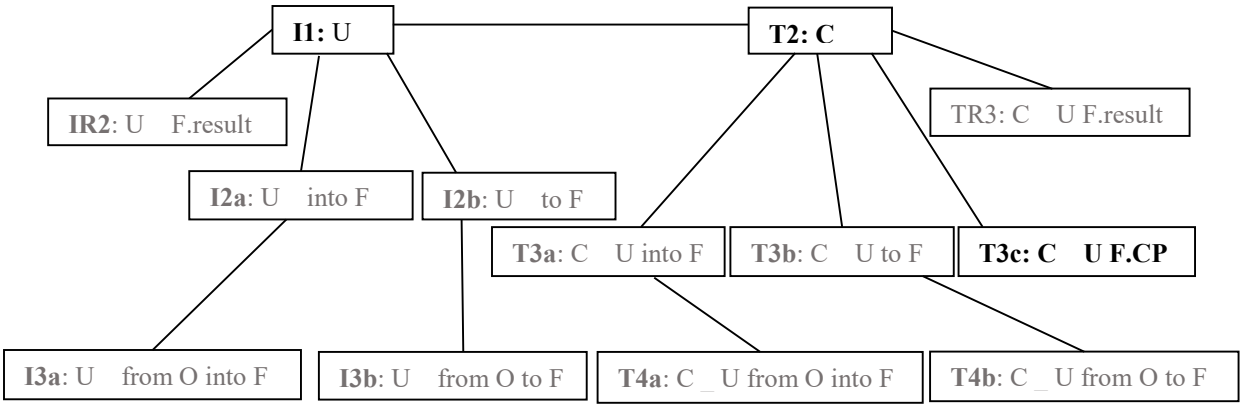

Figure 5.11: Valency behavior of Minor Change sub-class: Network view

By including the sub-class specification with its semantic and valency properties in the FBVEs for these verbs, it is no longer necessary to list these properties separately in the verb-specific categories of "Additional Meaning" and "Additional Syntax". Tables 5.38 and 5.39 show the new FBVEs for *alter* and *modify*, respectively, which now include the sub-class specification rather than listing these properties at the verb-specific level. Note how the revised FBVE for *alter* now requires no verb-specific properties to be specified in the "Additional Meaning" and "Additional Syntax", as all of this information is captured by the general valency frame and the sub-class.

Verb	*Alter*
Frame:	CHANGE
Sub-class	Minor Change
Additional Meaning	none
Additional Syntax	May appear in: I1 (with low frequency)
Other	a) Special senses include that of tailoring, or changing the size or fit of clothing articles, and, less frequently, that of changing one's gender. b) *Alter* may appear with adverbs such as *drastically* or *dramatically*, in which case it is refers to changes that are more substantial than prototypical "subtle" changes. However, it still very seldom refers to categorical changes, in which the changed entity becomes something else.

Table 5.38: Revised frame-based verb entry for *alter* with sub-class specification

Verb	*Modify*
Frame	CHANGE
Sub-class	Minor Change
Additional Meaning	--change in order to improve, make more acceptable, less extreme --change for a specific purpose
Additional Syntax	--Relatively frequent in: T3c
Other	-Special sense includes grammatical changes, as in adjectives modifying nouns.

Table 5.39: Revised frame-based verb entry for *modify* with sub-class specification

However, while the Minor Change sub-class captures most aspects of the behavior of *alter* and *modify*, there are still some differences that set these verbs apart from one another. Specifically, *alter* also appears (with relatively low frequency) in the simple intransitive I1 VC, which is not attested for *modify*. *Modify* differs from *alter* in that it is associated with changes that serve specific purposes, especially the purpose of making something more acceptable or less extreme. Syntactically, *modify* also appears relatively frequently with purposive clauses headed by *so (that)* or *to*, expressing the purpose or result of the change. Such minor differences among verbs of the same (sub-)class are expected. They are captured in the "Additional Semantics" and "Additional Syntax" portions of the verbs' lexical entries, and they further support the notion that every verb can be seen as forming its own "verb class."

While actual "explanations" of correspondences between verb meaning and argument structure are not always feasible or necessary, it is worth noting the logic behind the correlation of the "subtle change" meaning component and the lack of prepositional state arguments. Specifically, if something undergoes a subtle change, it usually does not become something different. As such, it would be unusual to say that something changed "into something else," when only a single part, characteristic, or attribute of that thing has changed. The correlation between the subtle change meaning component and the aversion to intransitive patterns, on the other hand, lacks such a clear "explanation" (i.e. one can imagine something undergoing subtle changes of its own accord, without a causing agent, so it seems plausible that agent-less utterances would be just as frequent as those without C).

5.4.4.2. (Potential) Drastic Change sub-class

Given the existence of a Minor Change sub-class, it is worth considering whether a corresponding "Drastic Change" sub-class also exists. While *transform* is the only verb analyzed thus far with a meaning component specifying that it refers to drastic (categorical) changes, as described in 5.2.2, the verb *metamorphose* is also a potential candidate for membership in this sub-class.[281] Various dictionary entries state that *metamorphose* refers to complete or radical changes and compare it to the verb *transform*.[282] In the following section, I present a corpus analysis of *metamorphose* in order to determine whether its valency behavior is similar enough to that of *transform*, in which case there is evidence for a sub-class of "Drastic Change" verbs.

For the present, I present a proposal for the "Drastic Change" sub-class whose syntactic side reflects the valency behavior documented in the corpus analysis of *transform*. Three such properties reveal themselves: first, *transform* is much more frequent with transitive patterns than with intransitive patterns (100 of the 109 instances are transitive). Second, the use of reflexive object pronouns identifying the U argument with the C argument are relatively more frequent with *transform* than with the other verbs. Third, *transform* is relatively frequent with VCs including both O and F arguments. Table 5.40 defines the characteristics of the potential Drastic Change sub-class, which will be refined as needed, or entirely rejected, based on the analysis of *metamorphose* undertaken below.

Sub-class	Drastic Change
Verbs	*transform*, (*metamorphose*?)
Semantics	Refer to drastic, complete changes
Syntax	--Strong preference for transitive VCs --Relatively high frequency with reflexive objects --Relatively high frequency in VCs with both O and F arguments

Table 5.40: (Potential) Drastic Change verb sub-class

[281] Levin (1993) lists *metamorphose* as a member of the *Turn* class. FrameNet does not include this verb in any frame, but if so, it would fall into the Cause_change and/or Undergo_change frames, which correspond to the Change verb class discussed here.

[282]For instance, the AH dictionary (see Section 5.2) includes the following as one definition of *metamorphose*: "*To change into a wholly different form or appearance; transform*". Other entries can be found at the following website: http://www.thefreedictionary.com/metamorphose (cited 10 August 2015).

5.4.4.3. No other sub-classes

With respect to the other analyzed verbs, *change* and *turn*, it is tempting to posit a sub-class which includes these two verbs on the basis of their shared meaning: both are not restricted to drastic or minor changes and both can refer to virtually any type of change. However, I prefer not to posit a "General Change" class for these verbs due to dramatic differences in their syntactic behavior. For one, *change* rarely appeared in VCs with F arguments, while every *turn* instance expressed this argument. Furthermore, *turn* is quite frequent in resultative VCs, while no such VCs were attested for *change*. These verbs' entries are thus not associated with any sub-class. To capture the fact that both verbs are general, I simply list "n/a" in the "Additional Semantics" section, thus stating that the verbs exhibit no noticeable semantic restrictions. The "Additional Syntax" entry portions for both verbs, of course, required more specifications than those for the verbs included in sub-classes.

5.5. THE PREDICTIVE POWER OF VALENCY FRAMES AND SUB-CLASSES: THE CASE OF *METAMORPHOSE*

The discussion up to this point has demonstrated the unique relationship between verb classes and valency behavior, which involves both generalizations that capture shared properties of one verb class in comparison with other classes, as well as idiosyncrasies in the finer-grained semantic and valency properties of individual verbs within the class. In the preceding sub-section, I defined the English Change valency frame to account for shared properties of the five English Change verbs under analysis, frame-based verb entries to account accurately for idiosyncratic behavior of individual verbs, and (syntactic-semantic) sub-classes which capture low-level generalizations among sub-sets of verbs in the class. The discussion implied that the notions of valency frame, FBVE, and sub-classes, have some predictive power in determining the valency behavior of a verb based on its meaning, or vice versa. That is, once it is known that a novel verb evokes a certain semantic frame, then one the valency frame (formulated by analyzing other verbs evoking that frame) can be used to predict the range of valency patterns the verb should appear in. At a finer-grained level, if this verb also includes an additional meaning component identified to be grammatically relevant for other verbs in the class, then even more aspects of its valency behavior may be predicted. At the same time, the FBVEs described above show that it is rarely

possible (if at all) to predict the full range of valency behavior on the basis of (easily defined)[283] meaning components alone, emphasizing the view taken in Valency Grammar (esp. Faulhaber 2011) that valency is a purely item-specific phenomenon.

This section concludes the chapter by testing the degree to which valency behavior is predictable based on established valency frames and (syntactic-semantic) sub-classes. As a test case, I use the verb *metamorphose*, which is included in Levin's (1993) *Turn* class but not yet documented (as a LU of any semantic frame) in FrameNet. After informally analyzing its semantics based on internet-accessible dictionary resources, I present the results of a corpus analysis of 206 examples from COCA, in order to determine the extent to which the valency behavior of this 'novel verb' corresponds to the behavior of the previously analyzed near-synonyms.

After establishing that the valency behavior of *metamorphose* is neatly accounted for by the valency frame, I then proceed to determine whether *metamorphose* can be included in any sub-classes. The dictionary analysis shows that it shares the 'drastic change' meaning component with *transform*, so I will compare the valency behavior of the two verbs. If they share some aspect(s) of valency behavior in addition to the shared 'drastic change' meaning component, then this is evidence for the "Drastic Change" syntactic-semantic subclass of Change verbs proposed in Table 5.40, which includes *metamorphose* and *transform*.

To begin, I present the dictionary definitions of *metamorphose* in Table 5.41 below. The full definitions are in the second row, and the relevant additional meaning components extracted from the full definitions are in the bottom row. *Metamorphose* is thus a change verb, as each of the definitions use the more general verb *change* (which in 5.2.2 I claimed represents the base/core meaning of the Change frame) and further specifies it with additional phrases. Specifically, each of the definitions show that *metamorphose* has a meaning component specifying that it refers to changes which are drastic or major. Specifically, this drastic nature of the change is expressed as "into a wholly different form" (AH), "into something completely different" (CT), and "change strikingly" (MW), among others.

[283] Levin (1993: 12f.) stresses that the precise formulation of grammatically relevant meaning components (GRMCs) is at times very difficult and that some aspects of syntactic behavior which have previously not been put in correspondence with meaning components may in fact reveal GRMCs once they are more properly defined.

AH	CT	MW
v.tr. 1. To change into a wholly diff erent form or appearance; tran sform [...] *v.intr.* 1. To be changed or transform ed: […]	To metamorphose or be metamorphosed means to develop and change into something completely different	transitive verb 1 a : to change into a different physical form especially by supernatural means b : to change strikingly the appearance or character of : transform […] intransitive verb […] 2 : to become transformed
-into a wholly different form	-to develop -into something completely different	-into a different physical form -esp. by supernatural means -strikingly

Table 5.41: Meaning components for *metamorphose*[284]

Furthermore, both AH and MW relate *metamorphose* to another Change verb, *transform*, which also exhibits the 'drastic change' meaning component. Apart from this meaning component, CT mentions that the changing entity "develop[s]" before or while undergoing the change, and MW mentions an optional meaning component (marked with the phrase "especially") that the change is caused "by supernatural means."[285] Table 5.42 summarizes the valency behavior of *metamorphose* on the basis of 206 examples from COCA.

[284] The versions of the American Heritage (AH) and Merriam-Webster (MW) dictionaries supplying the definitions here are the same as those presented and cited at the beginning of 5.2. As the online-accessible version of the Collins dictionary (CT) only include the technical sense of *metamorphose* ('undergo metamorphosis'), I extracted the definition here from the online version of the Collins Cobuild English Learner's Dictionary (http://www.collinsdictionary.com/dictionary/english-cobuild-learners; accessed 11 August 2015). The dictionaries also mention a specific sense of *metamorphose*, namely "to undergo metamorphosis" in the technical sense used in biology, geography, and other hard sciences. I have omitted these senses from the definition presentation.

[285] I do not discuss these two potential meaning components any further, as the present focus is on testing how well the Change valency frame predicts the valency behavior of *metamorphose* and whether there is evidence for a 'Drastic Change' sub-class of English Change verbs.

VC	Frq.	%	VC	Example
T2	2	1%	C V U	(5.92) No wonder the vampires refuse to metamorphose those with children.
T3a	3	1%	C V U into F	(5.93) One kit, for example, metamorphoses a Datsun 240 into a Ferrari 250 GTO Le Mans race car.
I1	28	14%	U V	(5.94) But nearly all of our emotional landscapes had dramatically metamorphosed.
I2a	145	70%	U V into F	(5.95) Mary now metamorphoses into Rose […]
I2b	8	4%	U V to F[286]	(5.96) […] how he metamorphosed from a high-school dropout to a multimillion-dollar music mogul […]
I3a	6	3%	U V from O into F	(5.97) Laura Nyro was a recluse who had metamorphosed from a sultry teen-ager into a plump earth mother […]
I3b	10	5%	U V from O to F[287]	(5.98) Deadwood had metamorphosed from a gold rush camp to a mining city.
??	1	1%	U V as F	(5.99) Betty B's Bomber Bar bombed, the building metamorphosed as the Tupimamba Tropical […].
??	1	1%	U V through F	(5.100) […] like dolphins and wheels that metamorphosed through fifteen patterns.
??	1	1%	U V from O toF.CP	(5.101) It could just metamorphose from bankruptcy and potential civil war to surpass elder sister Russia in reform and perhaps even consensus.
??	1	1%	U V toF.CP	(5.102) Each larva attaches and metamorphoses to form a polyp […]

Table 5.42: Valency distribution of *metamorphose*

The data show several interesting trends for the valency behavior of *metamorphose*. With respect to transitivity, *metamorphose* shows an extremely strong tendency to appear in intransitive VCs rather than transitive VCs, as nearly 98% of the analyzed examples exhibit intransitive VCs. It is also much more frequent in VCs with state arguments than most English Change verbs, specifically with prepositional state arguments: 85% of the analyzed examples include states (176 of 206), and all but two of these realize the F argument in a PP (rather than as a purposive clause). In these respects, *metamorphose* behaves most similar to *turn* among the five verbs analyzed. In Section 5.2.3, I noted that *turn* is the only verb that appears more frequently in intransitive VCs (56%) than transitive VCs (44%), and it is the only verb that appears more frequently with state arguments (100%) than without (0%). *Metamorphose*, while similar,

[286] One of the 8 instances of the I2b VC includes an adjective within the *to* PP, rather than the default noun: *Ypsithra were born male, then metamorphosed to female later*.

[287] Two of the 10 instances of the I3b VC include adjectives within both the *from* and *to* PPs, rather than the default nouns, as in: *[…] he metamorphoses stolidly from detestable to sympathetic.*

displays a much higher frequency of intransitive VCs, but a slightly lower frequency of (prepositional) state FEs than *turn*.

Turning now to the question of how well the constructional range of the valency frame accounts for the valency behavior of *metamorphose*, the data show that 202 of the 206 examples for *metamorphose* were already included in the constructional range defined in Table 5.23 above. These patterns include the first seven VCs listed in the table above. While four examples were not defined as part of the constructional range, one novel VC identified in the analysis of *metamorphose* is easily integrated into the constructional range defined on the basis of the original five verbs. This is the intransitive VC with the purposive clausal F introduced by *to* [U V toF.CP] (5.102). A similar VC (T3c) was well documented in the main corpus analysis, which only differs from this in that it is transitive [C V U toF.CP]. When these two VCs are added to the constructional range of the English Change valency frame, then only three of the 206 examples of *metamorphose* need to be labeled as verb-limited VCs that occur only with this verb but are not shared by other verbs of the frame. In this case, over 98% of the analyzed *metamorphose* examples are predictable by the valency frame, showing the strong predictive power of verb classes, formulated in terms of valency frames, for the valency behavior of novel verbs.

I now briefly discuss the three examples that are not predictable from the English Change valency frame. The first, found in (5.99) in table 5.41 above, is an intransitive VC in which an *as* PP introduces the Final_state argument. The use of this preposition to introduce the F argument seems rather peculiar and is only attested once in over 200 examples of *metamorphose*. This example may be an instance of creative language use employing a novel argument structure pattern, it may be a performance error by the speaker/writer of the corpus example, or it may involve a participant type that differs in some way from the prototypical F participant. The next example introduces a unique type of F argument (*fifteen patterns*) in a PP headed by *through* (5.100). While this PP type is unique in the data set, its use is understandable as the argument actually refers to multiple final states, in which case *through* is an appropriate preposition, particularly if the various F states are arranged in an ordered sequence. The final example which diverges significantly from the common VCs identified for English Change verbs involves an intransitive pattern in which the Original_state is expressed in a *from* PP and the Final_state is described in a purposive clause headed by *to* (5.101). While both of these argument realization types (*from* O; *to* F.CP) are amply attested as individual arguments in the corpus the combination

of only these two arguments is rather unexpected. I noted in Section 2.3 (Case Roles) that the O argument may only be expressed when the F argument is also expressed. I had also expected that in such cases, the F argument should be introduced as a PP headed by *to* or *into*, in order to conform to the prepositional realization of O. Indeed, every instance of O in the main corpus was accompanied by a prepositional F. This example is thus unique, as O is realized as a noun phrase within a PP, whereas F is in a purposive clause. It may be the case that this configuration is licensed because the purposive F clause begins with the preposition *to*, which also introduces normal prepositional F arguments.

From this analysis, we may conclude that the inclusion of valency frame information in lexical entries is a powerful strategy for predicting the range of valency constructions a verb may appear in. Specifically, over 98% of the examples for *metamorphose* were predictable from the valency behavior of semantically related verbs. The three examples with unexpected or divergent valency constructions, indeed a very small percentage, are likely a reflection of the creativity of language use, especially as it is seen in large corpora. As a larger number of examples are analyzed, the analyses will inevitably reveal new valency constructions that may or may not correspond to those constructions that are well attested for a given semantic frame, depending on the level of creativity of the language user.

However, despite the valency frame's ability to predict the general types of valency constructions a novel verb will appear in, the data for *metamorphose* demonstrate that the exact distribution of a novel verb across VCs is highly unpredictable. Specifically, *metamorphose* exhibits several valency features, such as its high frequency in intransitive VCs and in VCs with prepositional State arguments, that are not clearly predictable from its meaning. These findings underscore the importance of not only capturing generalities among verb classes by means of the valency frame, but also accounting for verb-specific information by means of frame-based verb entries that accurately capture idiosyncratic and unpredictable information.

Comparing* metamorphose *with* transform: *a 'Drastic Change' sub-class?

I now turn to the comparison of *metamorphose* with *transform* in order to determine whether a potential 'Drastic Change' sub-class could be included in the verbs' FBVEs in order to predict some aspects of their valency behavior on the basis of the 'drastic change' meaning component. In Table 5.39 in the preceding sub-section, I noted that *transform* exhibited three valency properties distinguishing it from other Change verbs, which may be related to its 'drastic change'

meaning component. These are (a) a strong preference for transitive VCs, (b) relatively high frequency (~10%) with reflexive objects, and (c) relatively high frequency (~9%) with VCs including both O and F arguments. If any of these valency properties are also exhibited by *metamorphose*, which also has the 'drastic change' meaning component, then these properties are likely related to the meaning component and can be included in the entry for the 'Drastic Change' sub-class and thus increase the amount of generalized information in the individual verbs' FBVEs.

With respect to the first property of transitivity, *metamorphose* differs significantly from *transform*. Specifically, over 97% of the corpus examples for *metamorphose* involved intransitive VCs, whereas only 8% of the *transform* examples were intransitive. Therefore, it can be concluded that the 'drastic change' meaning component does not influence whether a Change verb appears more frequently in transitive or intransitive VCs. With respect to the second possible valency property, relatively high frequency with reflexive objects, only one example of *metamorphose* includes a reflexive object, comprising less than 0.5% of all analyzed examples. Here again, the data for *metamorphose* shows that this valency property is also not predictable from the 'drastic change' meaning component.[288] A third valency property identified for *transform* that may be influenced by the 'drastic change' meaning component (and could thus be included as a valency feature of the 'Drastic Change' sub-class) is a relatively high frequency of VCs that include O arguments (in addition to F arguments). A total of 17 of the 206 examples of *metamorphose*, or 8%, included O arguments. This figure is close to that for *transform* with 9% of its VCs including O arguments. In comparison with other Change verbs, the verb with the next most frequent occurrence of such VCs is *turn*, with 4 such VCs occurring in 132 examples, or just over 3%. It is thus likely that the 'drastic change' meaning component influences a verb's valency behavior by increasing its frequency in VCs which include O arguments. The Drastic Change sub-class from Table 5.29 above must therefore be reformulated by listing only one (not three) valency features in the Syntax category, as shown in Table 5.43.

[288] The frequency of reflexive objects with *transform* may thus be associated with another one of its additional meaning components, namely that it refers to changes that are improvements or otherwise deemed positive.

Sub-class	Drastic Change
Verbs	*transform, metamorphose*
Semantics	Refer to drastic, complete changes
Syntax	Relatively high frequency (~10%) in VCs with both O and F: (T4a-b, I3a-b)

Table 5.43: Revised Drastic Change verb sub-class

The FBVEs for *metamorphose* and *transform* can then be revised by including the Drastic Change sub-class specification in the Sub-class category and omit specifying the features in Table 5.32 in the verb-specific Semantics and Syntax categories. I forego this reformulation here, but refer the reader to compare Tables 5.27 and 5.29 with Tables 5.38 and 5.39, respectively, to see how applying the Minor Change sub-class label simplifies the FBVE for the verbs *alter* and *metamorphose*.

In sum, the test case of *metamorphose* suggests that the valency frame can predict a large portion of the valency behavior of novel verbs at a general level. Specifically, almost all (98%) of the examples of *metamorphose* exhibited VCs that were already observed for other verbs in the Change frame. Most of the examples that had not been attested exhibited novel constellations of arguments that could be generated on the basis of the previously attested VCs. Very few (only three of 206 examples for *metamorphose*) VCs were completely unexpected based on data from existing (already analyzed) Change verbs. At the same time, however, the exact distribution of novel verbs across VCs cannot be readily predicted on the basis of valency frames or sub-classes. The data for *metamorphose* showed that it was unlike other Change verbs in exhibiting an overwhelming preference for intransitive over transitive VCs and a strong preference for VCs including State arguments, and none of these features could be predicted on the basis of verbal semantics alone. In fact, the sub-class formulated on the basis of the 'drastic change' meaning component shared by *transform* and *metamorphose* could only account for one aspect of the verbs' valency behavior (i.e. a relatively high frequency of O arguments) which nonetheless only accounts for about 10% of the analyzed examples for either verb. Thus, while the valency frame helps to delimit the set of potential VCs a novel verb may occur in, only a small portion of the exact valency distribution of individual verbs within a valency frame can be predicted from verbal semantics.

5.6. CONCLUSION

To conclude this chapter, I return to the research question presented in the introduction.

> **Research Question 2:** To what degree are verbs within a given class similar or different with respect to their meaning and argument realization, and how can we account for regularities and variation within verb classes?

With respect to the first portion of this question, the semantic analysis in Section 5.2 revealed that the meanings of *change* verbs are largely uniform but some verbs differ with respect to the types of changes they may describe. Particularly, three sub-types of English Change verb meanings were identified: the subtle change verbs *alter* and *modify*, the general change verbs *change* and *turn*, and the drastic change verbs *metamorphose* and *transform*. Within these three classes, no meaning components were found which differentiate *turn* and *change,* and only very nuanced meaning components separate the verbs of the other two groups: *transform* differs from *metamorphose* in that it is optionally associated with changes that are viewed as positive, and *modify* differs from *alter* in that it refers to purpose-oriented changes, especially changes to make something more acceptable or less extreme.

In contrast, with respect to valency behavior, English Change verbs differ quite drastically. Table 5.20 at the end of Section 5.3 demonstrate the drastic variation of English Change verb valency. While *alter* and *modify* exhibit fairly uniform valency behavior, each of the other verbs differed significantly in their valency distribution. Furthermore, none of the 13 total VC types identified occur with all five analyzed verbs. These data thus corroborate the findings of Faulhaber (2011), who showed that a large portion of verb valency behavior is not predictable from verb meaning, as discussed in Section 3.3

I addressed the second portion of the research question in Sections 5.4 and 5.5. Specifically, I developed lexical entries that capture verb meaning and valency behavior at various levels of granularity. At the highest level is the valency frame, which captures the shared meaning of all verbs in a class and the full range of VCs identified for any verb in the class. To capture verb-specific information, I proposed frame-based verb entries that show how individual verbs differ from one another by further specifying aspects of the general meaning and constructional range given by the valency frame specification. At an intermediate level of analysis, I proposed sub-classes, such as the "subtle change" sub-class containing *alter* and

modify, which capture low-level generalizations among sub-sets of verbs in a class and can thus be seen as finer-grained verb classes than those posited by Levin (1993) or FrameNet.

In the following chapter, I determine whether German Change verbs also exhibit the features identified for English Change verbs, with a specific focus on the meaning components, valency constructions, and (potential) grammatically relevant meaning components discussed in this chapter. In Chapter 7, I then compare the language-specific and cross-linguistic findings for Change verbs with Theft verbs, which represent a significantly different semantic domain than Change verbs.

Chapter 6: Comparing German and English Change verbs

6.1. CONTRASTIVE AND GERMAN-SPECIFIC VERB CLASS RESEARCH

In this chapter, I determine the extent to which the characterization of English Change verbs and valency constructions proposed in the previous chapter can be carried over to German, in order to test the cross-linguistic similarity of verb classes and valency frames. The German analysis not only provides further evidence for the language-specific research questions on the structure and uniformity of verb classes, but it also allows me to answer the next major research question of the dissertation, surrounding the cross-linguistic applicability of verb classes. Here, I first review the existing research investigating verb classes and argument realization from a contrastive and/or German-specific perspective in order to contextualize my analysis.

In Chapters 2 and 3, I introduced approaches to the syntax-semantics interface which are generally applicable to all languages or developed specifically to account for English data. In order to situate the cross-linguistic analyses in this chapter and Chapter 7 in the literature, here I discuss research focusing on contrastive analyses of verb meanings, verb classes, and grammatical constructions in different languages, particularly German and English. I begin by introducing approaches to the contrastive/comparative analysis of grammatical constructions in Section 6.1.1. Here, I first contrast two approaches from the field of Construction Grammar, namely Croft's (2001) Radical Construction Grammar and Boas's (2010a, 2010b) Contrastive Construction Grammar. I then discuss analyses of specific constructions in German or from contrastive perspectives, before finally mentioning some works applying the alternations and verb classes of Levin (1993) to German. In Section 6.1.2, I present contrastive and non-English research on verb meanings, first introducing Ballmer and Brennenstuhl's (1986) classification of German verbs and Snell-Hornby's (1983) comparative investigation of verb descriptivity in German and English, and then focusing on projects and studies that employ concepts from Frame Semantics in contrastive analyses. In Section 6.1.3, I introduce relevant research in the field of Valency Grammar, first describing the VALBU, a valency dictionary of German, and then discussing specific contrastive studies on verb classes and valency behavior, particularly those in a recent volume published at the Institute for German Language (Engelberg et al. 2015).

6.1.1. Contrastive comparisons of grammatical constructions

6.1.1.1. General approaches: Radical Construction Grammar (Croft 2001) and Contrastive Construction Grammar (Boas 2010a)

The comprehensive, cognitivist philosophy behind Construction Grammar has led scholars to rethink the status of language universals and how they are to be identified through contrastive analyses. The brief presentation in Section 3.2 of Boas's (2010b) suggestions for a Contrastive CxG showed how a frame-semantic analysis of verbs and constructions is language-independent and can thus be applied to different languages. It was also argued that such analyses are useful in that they make clear both similarities and differences in the syntactic expression of frames across languages.

Croft's (2001; also 2009, 2013) Radical Construction Grammar, on the other hand, takes a more cautious view of the possibility of comparing constructions across languages. Croft argues that atomic syntactic primitives (e.g. the grammatical functions subject and object) often believed to be universal are in fact not clearly the same across languages. Even within a given language such as English, well-established categories such as Subject and Direct Object do not behave regularly across grammatical constructions. Croft (2013: 213-215) demonstrates this on the basis of data such as that in (6.1)-(6.4) below. Specifically, (6.1)-(6.2) demonstrate a well-known "fact" about English, namely that the direct object of active sentences (6.1) appear as the subject of corresponding passive sentences.

(6.1) a. The wind knocked the potted plants over.
b. The police tapped my phone. (Croft 2013: 213)

(6.2) a. The potted plants were knocked over by the wind.
b. My phone was tapped by the police. (Croft 2013: 215)

However, a closer analysis of a wider range of data reveals differences in the distribution of categories such as "Active Direct Object." Specifically, (6.3)-(6.4) show that not all direct objects can appear as subjects of related passive sentences.

(6.3) a. The road extends ten miles into the mountains.
b. 2010 saw the first hung parliament in Britain for over thirty years. (Croft 2013: 215)

(6.4) a. * Ten miles is extended by the road into the mountains.
b. * The first hung parliament in Britain for over thirty years was seen by 2010. (Croft 2013: 215)

Croft claims that many previous (typological) theories of language suffer from methodological opportunism, in that they establish a given construction as criterial for a syntactic category (e.g. Passive subjecthood as a criteria for the Active Direct Object category) and that they posit different categories when linguistic forms vary in their distribution in these constructions (e.g. *ten miles* is not an Active Direct Object because it cannot be a Passive Subject). This is particularly problematic for cross-linguistic comparisons, in which traditional theories take a given construction of different languages to establish the same category across languages. However, constructions of different languages are often sensitive to different types of categories, as noted for instance by Dryer (1997) for differences in Subject-Object vs. Absolutive-Ergative or differences in the "Verb" category across languages (e.g. some languages treat as verbs what in English are adjectives). These findings lead Croft to claim that language-specific syntactic categories are defined only with respect to the range of constructions they appear in. In this view then, constructions, and not atomic syntactic primitives, are the basic unit of syntactic representation. Therefore Croft concludes that, because syntactic categories are language-specific and constructions are characterized by these categories, then constructions themselves are language-specific and cannot be compared across languages.

However, Croft does not abandon the idea of language universals altogether, but observes that they must be sought somewhere other than in atomic syntactic primitives. In particular, he argues that universals arise from similarities in how the same linguistic function is expressed in different languages:

> "These are systematic patterns of variation, such as prototypes and implicational hierarchies that characterize cross-constructional and cross-linguistic diversity and constrain the distribution and even the form of constructions used for particular functions. (...) That is, valid cross-linguistic generalizations are generalizations about how function is encoded in linguistic form. Moreover, the variation within and across languages is governed by the same generalization" (Croft 2001: 363).

Based on this observation, Croft develops the notion of a *conceptual space*, which is a universal/language-independent representation of functions language serves,[289] in order to capture (supposed) universals in how these functions are mapped to grammatical constructions. To demonstrate, Figure 6.1 shows the range of functions of indefinite pronouns and how these functions are related to each other. This figure represents the universal, language-independent conceptual space which is divided differently in different languages.

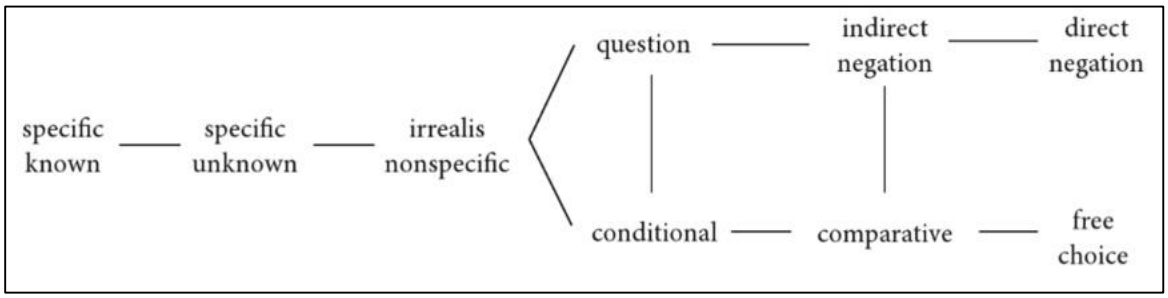

Figure 6.1: Conceptual space for indefinite pronoun functions (Croft 2012: 130)

The *semantic map* in Figure 6.2 shows how specific languages express the various functions (or areas of conceptual space) linguistically. The dotted lines represent the semantic space denoted by Romanian indefinite pronouns, and the broken lines represent Kazakh indefinite pronouns. The top right of the figure shows us, for instance, that Kazakh *eŝ* is used only for direct negation, whereas Romanian *ni-* expresses both direct and indirect negation.

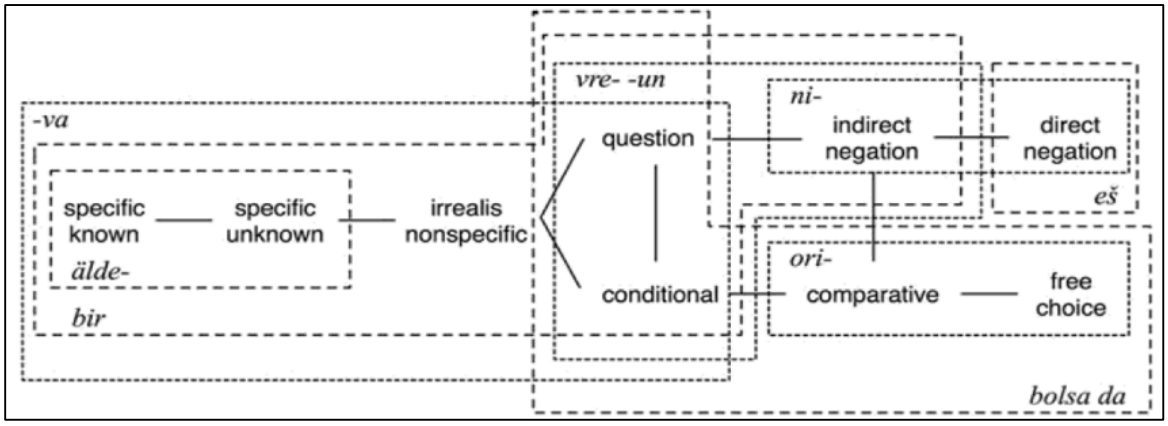

Figure 6.2: Semantic maps of Romanian and Kazakh indefinite pronouns (Croft 2012: 131)

[289] Croft (2012: 399) defines conceptual space as "a representation of conceptual similarity relations among situation types , either as a graph structure or a Euclidean geometric space. […] It is constructed by a typological analysis of the functions performed by specific linguistic forms across languages."

These concepts are useful in separating universal conceptual space from language-specific semantic maps. An important assumption in this methodology is that when the same linguistic form expresses different, but related functions, then these functions are closer together in the conceptual space. This assumption has led to the Semantic Map Connectivity Hypothesis (Croft 2001: 96), which states that language-specific forms are mapped onto connected subparts of language-independent conceptual spaces. Conversely, the hypothesis disallows a single linguistic form from expressing functions which are not connected in the conceptual space.[290]

Boas (2010b) also generally agrees with Croft's non-reductionist formulation of putative universals and his implementation of semantic maps. However, he is more optimistic about the ability to compare constructions across languages. Boas points out that Croft's skepticism results from the coarse-grained nature of his analysis. Although Croft relies on data from a vast number of languages, he uses only sparse data for many languages, and thereby misses important similarities between languages.

In particular, Boas shows how Frame Semantics provides a useful semantic interface for comparing constructions across languages.[291] Frames and FEs are not language-dependent, but rather characterizations of real-world situations which can be objectively compared without reference to linguistic structures. As such, "it is in principle possible to map the same frame-semantic meaning to different forms across languages" (Boas 2010b: 11). Contrastive frame-semantic analyses can determine the extent to which languages are similar in the syntactic expression and semantic interpretation of frames, FEs, and FE configurations. For instance, a brief comparison of the expression of the FEC [Donor, Theme, Recipient] of the Giving frame reveals interesting differences.

(6.5) a. He gave her a book.
b. He gave a book to her.

(6.6) a. Er gab ihr ein Buch.
b. ??Er gab ein Buch zu ihr.

[290] While I do not address them directly in the dissertation, the notions of conceptual space and semantic maps may prove especially useful for the present comparison of the range of verb meanings in German and English. Ideally, one could propose that verbs of the same semantic class (e.g. Change verbs) express the same general conceptual space (e.g. Change events), but differ in exactly which portions of this conceptual space they express (e.g. Causative vs. Inchoative Change).

[291] Some portions of this review are repeated from Section 3.2, where Boas's (2010b) approach was cursorily presented in the discussion of Construction Grammar.

While English allows the Recipient to be realized as either a first object in a double object construction or as a *to* PP, German only allows the double (dative) object construction. Furthermore, the Recipient is realized as a dative NP in German, whereas in English there is no clear difference between dative and accusative marking. By analyzing sentences in this way, it is possible to determine the range of syntactic frames (i.e. constructions) associated with individual LUs and with semantic frames in general. This method for mapping semantics, in the form of frames and FEs, and syntax, in the form of phrase types and grammatical functions, allows one to identify similar classes of verbs in different languages and determine the range of syntactic patterns they may appear in. These classes then serve as a basis for comparison and facilitate the identification of cross-linguistic variability in the syntactic expression of a given function (or semantic domain).

As such, Boas's Contrastive CxG differs from Croft's Radical CxG in various ways. Most importantly, it emphasizes the importance of fine-grained, bottom-up analyses which begin with a close analysis of comparable constructions in small sets of closely-related languages. As a result, Contrastive CxG puts off the search for language universals, because such phenomena can only be proved "universal" once all languages of the world are studied in their entirety. Instead, this approach emphasizes the identification of low-level commonalities in how linguistic functions are grammatically expressed in different languages. These functions are not described using conceptual space maps, as with Croft (2001), but with reference to concrete semantic frames as documented in FrameNet. In the following section, I discuss how I apply Boas's (2010b) method in the present analysis.

6.1.1.2. Cross-linguistic studies of specific grammatical constructions

I now discuss studies which investigate specific grammatical constructions in other languages or from a contrastive perspective, focusing on Michaelis and Ruppenhofer's (2001) study of the applicative construction in German, Iwata's (2008) comparison of the locative alternation across English and Japanese, and DeClerck et al.'s (2012) corpus study of secundative transfer constructions in Dutch, English, and French.

Michaelis and Ruppenhofer (2001) discuss how the German applicative (*be-* prefix) construction is not accounted for by traditional approaches employing lexical rules (Pinker 1989, Brinkmann 1997) and argue for the advantages of a Construction Grammar account of the construction. While their analysis is primarily language-specific, Michaelis and Ruppenhofer

(2001: 2) note the similarity between the German applicative and the English locative construction (e.g. *she smeared the canvas with paint*), in that the Theme argument 'typically' appearing as a direct object is realized as an oblique.[292] However, they also observe two striking differences between the German and English constructions. First, the constructions are formally different in that German verbs in the applicative are marked with a morpheme *be-* that distinguishes the verb from its basic (non-applicative) form, as in (6.7).[293]

(6.7) a. *Sie schmiert Farbe an die Leinwand*. ('She smears paint on the canvas.')
b. *Sie **be**schmiert die Leinwand mit Farbe.* ('She smears the canvas with paint.')
(Michaelis and Ruppenhofer 2001: 2)

More significantly, Michaelis and Ruppenhofer (2001: 2) identify differences in the distribution of the constructions across verbs, specifically that German has a wider distribution in that it occurs with (certain) intransitive verbs and not just transitive verbs like English.

(6.8) a. *Sie wanderte durch den Schwarzwald*. ('She wandered through the Black Forest.)
b. *Sie bewanderte den Schawarzwald*. ('She wandered the Black Forest.)
(Michaelis and Ruppenhofer 2001: 2)

Throughout their German-specific analysis, it becomes more apparent that the German applicative construction is much more productive than the English locative construction, as it occurs with a high number of verbs from different semantic domains as well as with nouns, adjectives, and even nonce words. This comparison suggests that constructions which are formally related across languages may differ significantly in their distribution.[294]

Iwata (2008) analyzes the locative alternation from a lexico-constructional perspective. While he primarily focuses on the English alternation, emphasizing the importance of concrete verb-specific analyses of the construction(s) rather than viewing them as abstract, verb-independent linguistic entities, Iwata also contrasts the English locative alternation with similar German and Japanese constructions. In the Japanese-English comparison, Iwata observes that the

[292] For comparisons of the German applicative construction and English locative alternation, see Brinkmann (1997), Dewell (2004), and Iwata (2008: 149–156).
[293] This morphological marking of the applicative is also found in similar constructions in Bantu languages (Alsina and Mchombo 1990, Wunderlich 1991).
[294] Dux (fc.) discusses how the ability of Theft verbs to appear in the applicative construction with a *be-* prefixes has implications for verb classification and translation.

"the locative alternation in Japanese is fundamentally the same as that in English" and that "the remaining differences between the two languages should boil down to the lexical encoding of each verb" (195).

DeClerck et al. (2012) obtain similar findings in their corpus-based investigation of secundative transfer constructions in English, French, and Dutch.[295] Specifically, they find that while all three languages have the construction, its distribution across verbs differs across the languages. Citing data from Levin's (1993) alternation-based classes, they demonstrate that English secundative alignment occurs with a wide range of verbs from various domains, and that these verbs are often flexible in that they can also occur with other alignment types (i.e. constructions). For instance, while *provide* is most frequent in the secundative alignment (*provide him with money*), it also occurs with indirective alignment (*provide money to him*) or neutral alignment (*provide him money*; i.e. double-object construction). They go on to show that French also has a relatively high number of verbs occurring in the secundative construction, citing Willem's (1981: 122-124) list of over 170 French verbs. However, unlike English, French verbs that occur in the secundative construction do not also occur in other transfer "alignments": of the verbs identified by Willem, only nine also occur with indirective alignment (Willem 1981: 120). The construction is even more restricted in Dutch. Specifically, a fairly comprehensive list from Delorge and DeClerck (2007) identifies only 44 verbs that occur in the secundative construction, most of which are highly infrequent (31 of the 44 occur less than 10 times per million words in the Eindhoven corpus of written Dutch). Furthermore, "the majority of" (DeClerck et al. 2012: 17) those verbs occurring in the secundative are ungrammatical in the other construction types. These findings suggest that, even though a semantically and syntactically related construction may exist in different languages, the distribution of verbs (or verb classes) and constructions may differ greatly across the languages.

In summary, these investigations show that, while constructions (at various levels of abstraction) with similar forms and meanings can be identified across languages, close analyses of their distribution across verbs (and verb classes) reveal interesting cross-linguistic differences. In the contrastive section of this study, I draw on these studies by investigating the similarities

[295] DeClerck et al. (2012) actually refer to secundative alignment than to a secundative construction, as they oppose it to other syntactic alignments of Donor, Recipient, and Theme to express possessional transfer. With secundative alignment, the Recipient is realized as direct object and the transferred Theme is expressed in a prepositional phrase, as in English *She endowed/provided him with money*.

and differences in valency constructions in which Change verbs appear across German and English. At the same time, I compare the constructions from a rather different perspective than the aforementioned studies which focus on very general constructions and investigate their distribution across verbs of a wide variety of semantic classes. In contrast, the present analysis focuses on the full range of valency constructions occurring with a specific, semantically defined set of verbs. As such, this type of analysis enables me to investigate whether and how the two languages differ in the inventory of constructions they offer their speakers to express a given situation.

6.1.1.3. Frense and Bennett's (1996) application of Levin (1993) to German verbs

Another relevant branch of cross-linguistic verb class research includes work applying Levin's (1993) alternation-based verb classification method to German, specifically Frense and Bennett (1996). Frense and Bennett (1996) determine the extent to which alternations and the corresponding alternation-based classes identified by Levin (1993) for English can be applied to the German verbal lexicon. Their analysis of the English conative, middle, and locative alternations and their occurrence with German verbs shows that alternating behavior can be used to formulate coherent semantic classes of German verbs, as Levin showed for English. However, they also identify significant cross-linguistic variation in both the alternations themselves and the classes undergoing them. For one, Frense and Bennett (1996) show that some English alternations do not exist in German (such as the *swarm* variant of the locative alternation). Also, some English alternations have multiple German translations. For instance, the German middle alternation may involve a simple verb (6.9) or the modal verb *lassen* (6.10).

(6.9) Dieses Buch liest sich leicht
this book reads itself easily
'This book reads easily' (Frense & Bennett 1996: 311)

(6.10) Dieses Buch lässt sich gut lesen
this book lets itself well read
'This book reads well' (Frense & Bennett 1996: 311)

Frense and Bennett also show that classes of German verbs do not have the same alternating behavior as their English counterparts. As an example, while English verbs of creation do not undergo the conative alternation, their German counterparts do (6.11).

(6.11) a. Arno baute das Haus
b. Arno baute am Haus
c. 'Arno built the house'
d. *Arno built at the house' (cf. Frense & Bennett 1996: 310)

Frense and Bennett's findings demonstrate the importance of recognizing subtle differences in related constructions of different languages and the difficulty of applying English-based categories to other languages. These factors are more easily accounted for in a constructional approach like Boas (2010b), which uses extra-linguistic concepts (i.e. semantic frames) as a point of comparison between languages, than in an approach developed based solely on English data like Levin (1993).[296]

6.1.2. Cross-linguistic comparisons of verb meanings and semantic frames

I now introduce German-based and contrastive research on verb meanings and frame-semantic verb classes. I begin by presenting Snell-Hornby's (1983) comparison of verb descriptivity in German and English. I then describe applications of Frame Semantics both in the development of FrameNets for other languages and in specific studies of semantic frames and individual verb meanings across languages. Finally, I briefly discuss Ballmer and Brennenstuhl's (1986) semantic classification of German verbs, which shows promise for comparing the verb inventories of the German and English lexicons but is not employed in the present work.

6.1.2.1. Snell-Hornby's (1983) comparison of verb descriptivity in German and English

Another important work is Snell-Hornby's (1983) detailed comparison of English and German verbs with respect to their level of descriptivity, focusing primarily on the domains of human behavior (e.g., activity, emotions, behavior), movement and position, and sounds (e.g. speaking, nature sounds).[297] Her project was motivated by frequent problems encountered in

[296] The work of Schulte im Walde (2000, 2003, 2006) should also be mentioned here. Schulte im Walde applies alternation-based classification to German verbs. In particular, she determines whether verb classes can be automatically induced for computational applications based on alternating behavior, prepositional information, and selectional restrictions. To fulfill this goal, she carries out a statistical analysis of these features in German verbs and compares the results with manually-annotated gold-standard data. While Schulte im Walde's approach successfully generates classes based on coarse-grained properties, it cannot capture subtler properties of verbal behavior. She concludes that a fully comprehensive and accurate classification can only be done with a significant amount of manual annotation.

[297] The notion of verb-descriptivity is also briefly introduced in Chapters 3 and employed in the English Change analysis of Chapter 5. It will also come into play in Chapter 7, where I argue that Change and Theft

translations between the two languages. In particular, translators are challenged by verbal 'translation equivalent' pairs in which both members describe the same general scenario, but differ in specific aspects of the general scenario, such as the means or manner with which the scenario takes place.

To account for these problematic verbs, Snell-Hornby (1983) shows that a verb's meaning consists of two parts. One part, the *act nucleus* (ANu) is the general underlying semantics of a verb, and the other, the *modificant* (Mod), gives extra meaning components to the act nucleus, which are otherwise encoded using adjectives or adverbial phrases.[298] Snell-Hornby (1983: 25-26) provides the formula in (6.12) to describe the relationship of Mod and ANu (where *x* is "an optional element without evaluative properties and not expressible in terms of adjectives or manner adverbs").

(6.12) DV = ANu + Mod (+ x)

The formula shows that the ANu and the Mod combine to make a descriptive verb. Verbs vary in how "heavy" the modificant is in relation to the act nucleus – their verb-descriptivity. A verb is said to have a high degree of descriptivity when its Mod takes up more weight than the ANu. For example, the verb *bustle* has many modificants (noisily, quickly, under stress), but the specific activity it describes is rather vague (*behave, move about*), thus qualifying *bustle* as a high-descriptivity verb. Snell-Hornby also claims that a high level of verb-descriptivity correlates with a lower "range of application," stating that a "verb with a broad range of application leaves participants and circumstances open and can be used in varying situations" (1983: 34).

6.1.2.2. Cross-linguistic applications of Frame Semantics

Another branch of research applies principles of Frame Semantics to other languages. The success of the Berkeley FrameNet has led to the development of similar resources for other

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verbs differ with respect to meaning components and valency behavior due to their varying levels of descriptivity.

[298] In frame-semantic terms, the meaning of the ANu includes those meaning components that are shared among all members of a frame and "is typically associated with the most prototypical verb of that frame" (Boas 2008a: 30). The distinction of ANu and Mod, however, differs from the division of verb meaning into an event structure and a root in event-structural approaches (see Section 2.4), as the ANu is not viewed in terms of primitive, grammatically relevant event structures and the Mod is not claimed to be irrelevant for grammatical behavior.

languages, including French, Hebrew, Japanese, and Spanish (summarized in Boas 2009b, 2010b). Of particular interest is the SALSA project (Burchardt et al. 2006, 2009), which has annotated numerous German sentences from the TIGER corpus using frame-semantic principles. A major goal of the project is to test whether the FrameNet frame definitions developed from English data can be directly applied to German data. The project found that the majority of the German data can be described using FrameNet frames, but that some problems arise due to general structural differences between the languages (e.g. dative case in German) and differences in lexicalization patterns. For instance, one of the few differences in frames across the two languages involves the German verb *fahren*, which can be used both in the sense of 'drive a car' and 'ride a car'. As English does not have any verbs that are ambiguous between these senses (unless the proper context coerces such readings), a description of the German lexicon would require a more general `Travel_by_vehicle` frame that overarches the `Drive_vehicle` and `Ride_in_vehicle` frames required by English.

Along similar lines, the Kicktionary project (Schmidt 2008, 2009)[299] provides an online-accessible FrameNet of soccer terminology in English, German, and French. This project compares individual lexical items of different languages in a very specific and rigidly defined semantic domain and relies on news reports and sport announcer transcripts that are clearly parallel, as they describe the same game being played. While Schmidt shows that Frame Semantics is extremely useful in describing this domain and identifying translation problems in how individual languages describe the game of soccer, he also points out that an adequate characterization of soccer language cannot rely on Frame Semantics alone (at least as formulated in FrameNet) but must draw on other methods for describing meaning. Two constructs in particular are relevant here. For one, Schmidt (2009: 128) argues that defining meanings in terms of lexical relations such as synonymy or meronymy is helpful for more "static" concepts that do not lend themselves well to FrameNet's approach where semantic roles play a crucial part, such as the various parts of the playing field. A more significant alteration of FrameNet is Schmidt's (2009: 102f.) distinction between (conceptual) scenes and (linguistic) frames, whereby "a *frame* is a structural entity used to group linguistic expressions which share a common *perspective* on a given conceptual *scene*" (102; emphasis in original). To demonstrate, one scene in the domain of

[299] www.kicktionary.de

soccer is a one-on-one situation in which a defender challenges an offensive player somewhere on the field. However, this scene is perspectivized in different ways by different lexical units which, are organized into frames according to how they perspectivize the one-on-one situation scene. For instance, the verbs *beat* or *sidestep* are part of the "Beat" frame as they describe how the offender gets past the defender, while *tackle* and *challenge* describe the defender's activity and thus fall into the "Challenge" frame. These findings show that certain domains may require different methodological tools for an accurate (cross-linguistic) semantic description.

In addition to these frame-semantic lexical resources, a variety of studies apply frame-semantic principles to compare specific groups of English verbs (or lexical items in general) to those in other languages, such as Boas (2001) for Motion verbs in English and German, Boas (2002) for Communication verbs in German and English, Ohara (2009) for the concept of 'risk' in English and Japanese, and Bertoldi et al. (2010) for verbs of judgment and assessing in English and Portuguese. These studies apply close analyses of verbal semantics and valency behavior to investigate polysemy and translation equivalency. These studies underscore the important role of the grammatical context in determining what frame a polysemous verb evokes, concluding that verbs cannot be translated as independent entities, but only within the context of their valency construction. Another finding shared by these studies is that verbs of a given FrameNet frame frequently differ in their detailed semantic properties and constructional distribution, so cross-linguistic comparisons require more verb-specific details than those offered by FrameNet.

A related branch of research has applied Frame Semantics to German vocabulary learning by English speakers. Atzler (2011) discusses how German-English "translation equivalents" evoking the semantically rich `Personal Relationship` frame exhibit cultural and pragmatic differences that lead to problems in cross-cultural interactions but are rarely discussed in pedagogical materials. In reaction to Atzler's (2011) study, researchers developed the German Frame-based Online Lexicon (G-FOL; http://coerll.utexas.edu/frames/home; Boas and Dux 2012; Boas, Dux, and Ziem in press). The G-FOL employs principles from Frame Semantics and FrameNet to provide rich vocabulary instruction integrating semantic/pragmatic and syntactic information for lexical items and to point out problematic areas in translation. In particular, the project emphasizes that learners can benefit from a frame-semantic organization of vocabulary items, in which groups of words are associated with the same set of semantic roles and similar grammatical features (and differences across languages) and clearly exemplified through

annotated examples based on natural language data. For example, the G-FOL includes a `Grooming` frame including German verbs equivalent to English *wash (hair), brush (teeth), shower,* and *shave*. One benefit of the G-FOL is that it points out subtle differences in the meanings, collocations, or usage patterns of individual lexical items that are not always clearly explicated in traditional bilingual resources. For example, while English uses the verb *brush* with both *hair* and *teeth*, whereas German uses different verbs in each context (*putzen* 'wash/scrub' for hair, *bürsten* 'brush' for teeth). The G-FOL's frame-semantic organization also enables it to capture more systematic differences across entire word classes. The German verbs differ systematically from their English counterparts, for instance, in that the German verbs are used reflexively (e.g. *Er duscht sich* 'he showers himself') while English expressions require a support verb construction (*He takes a shower*). While the current implementation of the G-FOL addresses grammatical constructions only as they pertain to semantic frames, Boas et al. (fc.) describe how the resource can be enhanced to include entries for specific constructions.

A major finding shared by all of these works is that similar lexical items in different languages may display significant semantic and syntactic differences. These often subtle differences are not captured in most approaches, be they theoretical, pedagogical, or lexicographic, but Frame Semantics proves to be useful for modeling this behavior because of its emphasis on word meaning and its empirical methodology for describing syntactic behavior.

6.1.2.3. Ballmer and Brennenstuhl's (1986) semantic classification of German verbs

To conclude this sub-section, I briefly discuss a classification of German verbs that has not figured prominently in the (American) research paradigm of verb classification, but offers an interesting approach that may be integrated with many of the techniques employed here. Ballmer and Brennenstuhl (1986, henceforth B&B) provide a comprehensive semantic classification of German verbs, motivated by their belief that existing lexical resources (dictionaries, thesauruses) are inadequate because they do not provide ample information and categorize verbs using a priori, non-linguistic criteria. Furthermore, they claim that these problems arise from the scope of most lexical works, which focus either on small sets of highly related verbs or on the entire lexicon of a language. Their goal is thus a semantically accurate and empirically-driven classification of a large portion of the German vocabulary, namely verbs.

In B&B's methodology, verbs are grouped together based on "shared meaning," which is determined primarily via paraphrase (can the verbs be paraphrased using the same words from)

and implications (do the verbs imply the same scenes, phases, participants, etc.). B&B's classification exhibits an interesting hierarchical structure: the 8,000 verbs categorized fall into about 700 categories, which group verbs with similar paraphrases. These categories are subsumed under about 40 models, which represent specific scenarios or aspectual phases of these scenarios. In turn, the specific models fall into 11 model groups, which correspond to general semantic domains, such as the *Fortbewegungsmodell* ('motion model') or the *Lebensmodell* ('life model'). This hierarchical structure helps support B&B's goal of not only classifying verbs semantically, but also clarifying how different verbs are related to each other.

It is unfortunate that B&B's classification and corresponding methodology have received little attention, especially in the Anglo-American research community, due primarily to the preliminary nature of this study and the subsequent death of one of the authors. Although some aspects of the approach are questionable, such as the exact use of periphrasis and the lacking review other work to situate their approach among others, B&B's work may still be relevant today. First, their classification should be compared with other verb classifications, such as FrameNet and Levin (1993). Second, the hierarchical structure of their classification facilitates the formulation of classes with varying granularity levels, which brings out both similarities and differences between partially related verbs. Also, their classification appears to be quite sensitive to grammatically relevant differences, such as aspect. Furthermore, a motivation for B&B's work is the development of the then-young notion of frames for linguistic purposes, and a number of parallels exist between B&B and FrameNet. While B&B's approach cannot be integrated into the present study, future work should reexamine the applicability of their methodology and compare their classification with existing approaches.

6.1.3. Contrastive and German-based applications of Valency Grammar

I now turn to cross-linguistic and German-based applications of Valency Grammar, first introducing the VALBU and then discussing several recent studies investigating the valency behavior of related verbs and verb classes across languages.

6.1.3.1. VALBU

The VALBU, a valency dictionary of German verbs (Schumacher et al. 2004), is highly similar to the Valency Dictionary of English (VDE, Herbst et al. 2004) discussed in Section 3.3.2. The VALBU contains entries for 638 German verbs with detailed information on their meanings and valency properties as well as notes on their morphology, phraseology, pragmatics and other

properties. The layout and purpose of the VALBU is highly similar to that of the VDE, so I refer the reader to Section 3.3.2 for details on how Valency Grammar is applied to lexicography. A digital version of the VALBU is also available online (E-VALBU; http://hypermedia.ids-mannheim.de/evalbu/index.html) and contains updated and additional entries compared to the print version.

While a detailed comparison of the VALBU data with the types of English data provided by the VDE may lead to fruitful comparisons of valency properties of related verbs across German and English, I forego such a comparison. One reason for this is that the VALBU is associated with many of the same issues as noted for the VDE in Section 3.3.2. It does not address similarities among related verbs (i.e. verb classes), its coverage is limited (only two of the five German verbs that I analyze in Chapter 6 are included), and it does not address the role of frequency in verb-construction combinations. A further problem with the VALBU that complicates its application to this study is that some verbs are associated with several different senses, but the distinctions/boundaries between these senses are not made clear. Observe, for instance, the five senses identified for German *ändern* ('change/alter') in the VALBU given in Table 6.1.

1 ändern	bewirken, dass etwas anders wird ('to cause something to become different')
2 ändern	etwas umarbeiten ('to adapt/edit something')
3 ändern	anders werden ('to become different')
4 ändern an	etwas an etwas verändern ('to change something about something')
5 ändern	veranlassen, dass etwas um irgendwieviel anders wird ('to cause something to become different to a certain degree')

Table 6.1: Senses for German *ändern* ('change/alter') in VALBU

While Sense 3 ('become different') and Sense 4 ('to change something about something') may deviate from the standard transitive Change semantics (i.e. 'cause to become different'), the distinctions between Sense 1 ('to cause something to become different'), Sense 2 ('to adapt/edit something'), and Sense 5 ('to cause something to become different to a certain degree') are not intuitive. For these reasons, I rely solely on the dictionary and corpus analyses for describing the syntax and semantics of German verbs and comparing them with English.

6.1.3.2. Contrastive studies on verb (class) valency

In recent years, proponents of Valency Grammar have become increasingly interested in finding relations with Construction Grammar (see Section 3.3.3; Herbst et al. 2014) and applying

these to contrastive analyses of verbal valency. A recent publication by the Institute for German Language (Engelberg et al. 2015) on the relation between lexical-item-specific valency and more general abstract argument structure constructions includes several studies comparing the valency behavior of related verbs and verb classes across languages. Meliss (2015) investigates the valency behavior of verbs of smelling (such as those related to English *smell*, *stink*, and *sniff*) across German and Spanish, particularly with the goal of highlighting problems foreign language learners may encounter when using these verbs. Drawing on data from the German DeReKo Reference Corpus and the Spanish CREA corpus, Meliss investigates the types of valency constructions occurring with verbs of both languages. She observes that specific valency constructions give rise to different senses of the verbs, such as scent emission (e.g. *it stinks*), scent perception (e.g. *he smells it*), or even various "searching" senses (e.g. *sniff around for something* 'look for something'). Meliss concludes that, while bilingual resources often capture general properties of frequently occurring verb-construction combinations (e.g. scent emission, scent perception), cross-linguistic differences in less frequent constructions or with "non-projected arguments" (see Welke 2015) that are not typically viewed as essential arguments of a verb (such as the location argument of the "searching" sense).

Winkler (2015) analyzes the product/material alternation (Levin 1993: 55f.; *make X out of Y* vs. *make Y into X*) in German from a Valency Grammar perspective. Her study is primarily language-specific, focusing on the distribution the two variants across German verbs such as *machen* ('make'), *bauen* ('build'), *formen* ('form'), and *herstellen* ('produce'). However, in the brief sections contrasting the German data with English, Winkler observes that the German construction(s) may express the material in either a *von* ('from'), *aus* ('out of'), or *mit* ('with') PP, whereas English only allows *out of* or, less frequently, *from*. Winkler observes very few syntactic differences across the languages, the primary one being that German may express the material in either a *von* ('from'), *aus* ('out of'), or *mit* ('with') PP, whereas English only allows *out of* or, less frequently, *from*. Another cross-linguistic difference noted by Winkler is that very few German verbs occur in both alternation variants, whereas a larger set of English verbs appear in both variants.[300]

[300] In a similar study, Fernández Méndez (2015) compares various expressions for the concept of 'kidnap/abduct' in German and Spanish, showing that while the two languages have verbs to express this concept, they differ in the types of arguments and valency constructions they appear with. For instance, the

6.1.4. Summary

In this section, I discussed both German-specific and contrastive research on the relation between verb meaning and syntax. I began by describing both general approaches to comparing grammatical constructions cross-linguistically and specific applications of such approaches. I then discussed research focusing on verb meanings, particularly those employing semantic frames as a tertium comparationis for comparing verb meanings. Next, I described various studies from the field of Valency Grammar that emphasize the subtleties of verb-construction interaction in comparative analyses. In addition to specific cross-linguistic analyses, I also discussed some resources and approaches that I do not integrate into the present analysis but are nonetheless promising for future contrastive research.

Although the studies are situated in different theoretical frameworks, there are several converging results from all studies that motivate the methodology of the contrastive analysis, discussed in the following sub-section. For one, cross-linguistic comparisons of verbs and/or constructions cannot be done directly (e.g. comparing a German verb with an English verb) given the unique syntactic repertoire of each language, but must be mediated through language-independent formulations of meaning, such as semantic frames. Studies following such a methodology have repeatedly found that, while language pairs often verbs and constructions that appear similar on the surface, detailed corpus-based analyses often reveal important differences in the distribution of verbs across constructions, and vice versa. In the following section, I describe in detail how my contrastive analysis of Change verbs and constructions draws and builds on the research presented here.

6.2. RESEARCH QUESTIONS, METHODOLOGY, AND OUTLINE

6.2.1. Research Questions

The next major question of my dissertation surrounds the cross-linguistic comparability of verb classes.

> **Research Question 3:** Are verb classes specific to individual languages or can they be applied to multiple languages? Are the meanings and constructions associated with an English verb class comparable to translation equivalents in another language?

German verbs frequently express spatial information such as the original or final location of the abducted entity, the Spanish verbs realize such participants much less frequently.

I address this question by comparing three of the last chapter's major findings for English Change verbs with German Change verbs.

- Do German Change verbs have the same general meanings and additional meaning components as those found for English Change verbs?

- To what extent are VCs of German and English Changer verbs comparable, with respect to both their semantic and formally properties?

- Are the grammatically relevant meaning components identified for English Change verbs also grammatically relevant for German Change verbs? If so, do they influence the valency behavior of German verbs bearing them in the same way as with English Change verbs?

To answer these questions, I investigate the semantics and valency behavior of five German Change verbs: *abändern* ('change/alter/modify'),[301] *ändern* ('change/alter/modify'), *verändern* ('change/alter/ modify'), *verwandeln* ('change/transform'), and *wandeln* ('change/transform'). These verbs are close translation equivalents to the English Change verbs discussed in Chapter 5[302] Before conducting the German Change analysis and comparison, I first contextualize my analysis.

6.2.2. Comparing meaning components

Snell-Hornby (1983) investigates differences between German and English verb meanings in detail. As discussed in the previous section, she appeals to the notion of verb descriptivity to demonstrate that "translation equivalents" often share the same Act Nucleus (i.e. general meaning) but differ with respect to their Modificants that further specify the Act Nucleus (i.e. additional meaning components). We may rephrase Snell-Hornby's account in frame-semantic terms by saying that verbs of a given class/frame in two languages will share the same general frame semantics, but the individual LUs will differ in how they construe or profile certain more detailed aspects of the semantic frame. In other words, semantic frames may serve as a tertium comparationis, as they are language-independent and potentially universal (provided that

[301] The English glosses provided here and throughout the chapter are provided for clarity and are not necessarily direct translation equivalents.

[302] These verbs are listed as translation equivalents in resources such as bilingual dictionaries, including dict.cc, LEO online dictionary (dict.leo.org), and *Langenscheidts Grosswörterbuch Deutsch-Englisch* (1st Edition). A bilingual dictionary was included in the analysis as it may help identify meaning components of German verbs by associating them with English verbs.

a language's culture has the concept corresponding to the given frame) and we may thus compare individual LUs in different languages against the backdrop of a single semantic frame (see the contributions in Boas 2010a, especially Boas 2010b). Several studies have supported this approach in comparing verb (classes) across languages, including Boas (2001) for motion verbs in German and English, Schmidt (2009) for soccer terminology in German, English, and French, Ohara (2009) for the concept of risk in English and Japanese, and Fernández Méndez (2015) for the concept of kidnapping/abduction (*entführen*) in German and Spanish. Each of these studies suggest that FrameNet frames are appropriate for structuring verb meanings at a medium-grained level, but more verb-specific information is required to account for subtle differences in individual verbs evoking the same frame across languages. While these studies investigate the meanings of verbs with relatively rich semantic content, the current analysis of Change verbs investigates translation equivalency in a verb class with much less detailed semantic content (see Sections 5.4 and 7.1.2 on the generality of Change verbs in comparison with more detailed change-of-state verbs).

In Section 6.3, I analyze the meanings of the five German Change verbs listed above, through dictionary definitions and (to a lesser extent) corpus data, in order to determine the degree of cross-linguistic similarity of (a) the general frame semantics shared by all Change verbs, (b) the additional meaning components that further specify the general frame semantics, and (c) the combinations of additional meaning components for individual verbs. The previous chapter showed that English Change verbs share the same general frame semantics and corresponding FEs (i.e. an entity undergoes a change from an original state to a final state; see Section 5.4.2). In addition to the general meaning shared by all verbs in the class, individual verbs exhibited additional meaning components, the most prominent of which was the component(s) restricting verbs to either subtle (*alter, modify*) or drastic (*transform, metamorphose*) changes. Other additional components are verb-specific, referring to purpose-specific changes (*modify*), changes to make things more acceptable/less extreme (*modify*), and changes that are deemed positive (*transform*). According to the research cited above, we may expect that German Change verbs will also exhibit similar general frame semantics as English, but they will differ with respect to the types and combinations of additional meaning components.

6.2.3. Comparing valency constructions

The second step in the contrastive analysis is the comparison of constructions across German and English. In the previous section, I contrasted two views of constructional comparison to determine the most appropriate way to compare valency constructions across languages. On the one hand, Radical Construction Grammar (Croft 2001) assumes that grammatical constructions are not directly comparable across languages due to striking cross-linguistic differences in the grammatical categories provided by individual language's structures, and that comparisons must rely on more abstract notions of conceptual space, as formalized in terms of semantic maps. On the other hand, Contrastive Construction Grammar (Boas 2010a) is less pessimistic about the contrastive comparison of constructions. Here again, the role of Frame Semantics as a tertium comparationis is important. Specifically, Boas (2010b) argues that constructions may be deemed similar across languages if they are used to evoke the same semantic frame and they involve the same number and types of Frame Elements in comparable formal realizations. This method has often been applied to cross-linguistic comparisons of the abstract argument structure constructions identified by Goldberg (1995, 2006), such as the applicative in German and English (Michaelis and Ruppenhofer 2001), the resultative in English and German (Boas 2003; Ch. 8), or the locative alternation in English and Japanese (Iwata 2008), in order to show both idiosyncratic and systematic differences and similarities across languages. However, there exist few studies comparing the full range of valency constructions for a given semantic class across languages (an exception being Meliss (2015)). Another strand of contrastive studies investigates how argument structure alternations, such as those described in Levin (1993), play out in other languages. Frense and Bennett (1996), who show that only some, but not all, of the alternations and alternation-based classes that Levin (1993) identifies for English have correspondences in German. More recent studies (Proost 2015, Winkler 2015) have also compared alternation pairs either contrastively or language-specifically for non-English languages. However, some of these studies take the English-based alternations as given in other languages and do not critically compare the formal and distributional qualities of the alternations. To overcome the aforementioned problems by proposing constructional translational equivalents at the verb-class-specific level (rather than abstract ASCs) when valency constructions exhibit the same number and type of FEs in similar formal realizations.

In Section 6.4.1, I compare the valency constructions identified for German and English Change verbs in order to determine whether German Change verbs have similar valency constructions as English. The English analysis in the previous chapter showed that English Change valency constructions include (a) transitive and intransitive VCs, (b) VCs with no State arguments, with only the Final_state FE, or with both the Original_state and Final_state FEs, and (c) VCs with various realizations of the F argument (*into* PP, *to* PP, or subordinate clause). The question thus arises whether German Change verbs occur in VCs with similar features and in similar categories. After establishing the constructional range of the German Change valency frame in 6.4, I then establish constructional equivalents where possible, following Boas's (2010b) suggestions for frame-based comparisons outlined above. This analysis allows me to determine whether one language has a broader range of valency constructions than the other (or, conversely, whether one language exhibits 'constructional gaps'), and if so, whether these differences should be traced to more general grammatical characteristics of the language (e.g. case marking in German) or to differences in the construal and conceptualization of similar events cross-linguistically.

6.2.4. Comparing grammatically relevant meaning components

Finally, in Section 6.4.2, I tie together the preceding questions to determine whether the grammatically relevant meaning components and corresponding syntactic-semantic sub-classes identified for English Change verbs are also relevant for German, and if so, whether these meaning components have the same syntactic repercussions for verbs that contain these components. Scholars have tested whether coarse-grained meaning components identified as being grammatically relevant in English, such as aspectual classes (Croft 2012) or manner vs. result verbs (Levin fc.), influence verbs in similar ways cross-linguistically, in order to establish their status as universals. Levin (fc.), for instance, shows that the manner/result distinction cross-cuts the lexicon of various languages and has similar repercussions across languages (e.g. manner verbs are more flexible with respect to how they realize the affected theme). In contrast to these highly general meaning components, other research has investigated the contribution of rich fine-grained meaning components in small sets of verbs across languages, showing that not only highly abstract notions of verb meaning, but also very detailed aspects of verb meaning, influence grammatical behavior cross-linguistically, thus explaining some grammatical differences in (not so) closely related translation equivalents (see Ohara 2010, Fernández Méndez 2015).

In the previous chapter, I identified a handful of meaning components that could be traced to valency behavior. The most notable of these is the "subtle change" meaning component, as the data showed that verbs exhibiting this component (*alter, modify*) are highly frequent in simple transitive VCs and highly infrequent in VCs with prepositional Final_state arguments. I demonstrated that verbs with the "drastic change" meaning component (*transform, metamorphose*) are relatively frequent (compared with other English Change verbs) in VCs that include the Original_state (as well as the Final_state) argument. Based on these correspondences between meaning and valency behavior, I proposed sub-classes of 'minor change' and "drastic change" verbs for the English data. I also identified other potentially grammatically relevant meaning components that apply only to individual verbs, such as the 'positive change' component for *transform* that may correspond to a relatively high frequency of reflexive objects, and the 'purposive change' component for *modify* that may correspond to a relatively high frequency of VCs expressing the Final_state in a subordinate clause. After determining the detailed meanings and valency distributions of the German Change, I investigate for German verbs with similar additional components to English also have comparable valency behavior (e.g. whether German Change verbs with the "subtle change" meaning component also prefer transitive VCs without prepositional F arguments). Such findings would suggest that fine-grained, frame-specific meaning components may account for more nuanced similarities and differences in valency behavior among near-synonyms cross-linguistically than the highly abstract semantic features such as manner/result or verbal aspect.

6.3. COMPARING THE MEANINGS OF GERMAN AND ENGLISH CHANGE VERBS

6.3.1. Meanings of German Change verbs

I begin by investigating the meanings of German Change verbs in order to address the first contrastive research question, namely whether the same general meanings and additional meaning components identified for English Change verbs also apply to German Change verbs. To assess the verb meanings, I analyze definitions of the verbs in four dictionaries: *Duden Deutsches Universalwörterbuch* (7th edition), *Wahrig Deutsches Wörterbuch*, the on-line version of the *Digitales Wörterbuch der Deutschen Sprache* (DWDS; www.dwds.de), and the bilingual German-English *Langenscheidts Grosswörterbuch Deutsch-Englisch* (1st Edition). All five of the verbs under analysis exhibit the basic Change semantics discussed in Section 5.1, as they are

listed as translation equivalents of English Change verbs in numerous bilingual resources. In the following, I discuss the definitions for each individual verb and highlight any meaning components mentioned in the dictionaries which expand on the basic Change semantics. The full definitions for each verb are found in Appendix A2 and this section only includes the relevant (i.e. Change sense) portions of the definitions. At the end of this sub-section, I summarize the meanings of the set of verbs and then compare them to the findings for the English Change verbs, in order to answer the research question stated above.

Abändern ('change/alter/modify')

The first verb under discussion is *abändern*, whose dictionary definitions are provided in Table 6.2. The second row provides the full definitions of the verb's Change sense, and the bottom row includes only those phrases which further specify the basic Change semantics.

DUDEN	WAHRIG	DWDS	LANGENSCHEIDT
1. *ein wenig, in Teilen ändern* 2. (Biol.) *(durch Mutation od. Umwelt) in den Artmerkmalen variieren, sich wandeln*	<V.t.; hat> *anders machen, umändern, umbilden; verbessern*	1 etw. teilweise verändern, ein wenig umgestalten 2 etw. durch Änderung beseitigen	1. alter, change *s.th.* (partially), modify, (*berichtigen*) rectify, correct, amend. 3. *parl.* (*Gesetzesentwurf, Verfassung*) amend, (*Gesetz*) revise
-ein wenig -in Teilen	-verbessern	-teilweise -ein wenig - durch Änderung beseitigen	-partially -rectify

Table 6.2: Relevant definitions for *abändern*

The dictionary definitions show that *abändern* is a Change verb based on both the translation equivalents listed in Langenscheidt, namely *alter*, *change*, and *modify*, as well as the German definitions, which include other Change verbs such as *ändern* (Duden), *verändern* (DWDS), and the phrase *anders machen* ('make different'; Wahrig).

However, *abändern* is not a general Change verb, as the definitions contain various phrases that characterize it as a "Minor Change verb" similar to English *modify* or *alter*. In particular, Duden, Wahrig, and DWDS each further specify the general Change meaning with meaning components such as *ein wenig* ('a little bit'), *teilweise* ('partially'), or *in Teilen* ('in parts'). The equivalents in Langenscheidt include the phrase *change (partially)* and lists the English verbs *alter* and *modify*. Furthermore, none of the definitions mention that the changed entity changes 'into something else,' as is noted in definitions for some of the other verbs discussed below. In

the previous chapter, I showed that *alter* and *modify* exhibit this "subtle change" meaning component, and that this component is grammatically relevant, as these verbs show a strong preference for transitive VCs and VCs without prepositional Final_state arguments. If the grammatical relevance of this meaning component is cross-linguistically applicable, we may expect *abändern* to exhibit behavior that is different from general Change verbs or verbs restricted to drastic changes. I return to this question after conducting the valency analysis in the next section.

In addition to the 'partial/minor' component, *abändern* is also listed with meaning components referring to improvements of some sort. Langenscheidt lists English verbs such as *rectify, correct,* and *amend* as translation equivalents, as well as the German verb *berichtigen* ('amend'). Wahrig provides the verb *verbessern* ('improve') as one synonym of *abändern*, and DWDS defines an additional sense of the verb as *etw. durch Anderung beseitigen* ('to eradicate/resolve sth. by changing'). Recall that a similar meaning component was identified for the English Change verb *modify*, and that this component is potentially tied to a relatively high frequency of Final_state arguments being realized in purposive subordinate clauses. After conducting the valency analysis, I discuss whether the meaning component has similar syntactic effects on German *abändern*.

Another meaning component that is not clearly mentioned in any of the dictionaries, but seems pertinent to the meaning of *abändern* based on native speaker consultations, is that the verb primarily refers to changes in texts, guidelines, or laws. This aspect of meaning is partially captured in Definition 3 of Langenscheidt which refers to the amendment of laws. It is also seen in the range of Undergo_change entities identified in the corpus examples, all of which pertain to some type of text or rule. In fact, 12 of the 22 corpus examples from DWDS included some type of text or law as the Undergo_change participant (e.g. *Gesetz* 'law', *Verordnungen* 'regulation', *Dokumente* 'documents', *Formulierungen* 'phrasing/formulation'). Other U arguments are also abstract 'text-like' entities, such as policies, methods, or approaches to problems. This aspect of meaning demonstrates a difference between *abändern* and the English "subtle change" verbs *alter* and *modify*, as the English verbs can appear with a much wider range of U arguments (including concrete objects that are not texts) than *abändern*.

Abändern is also used in biology to describe changes resulting from evolution or mutation, as indicated in Definition 2 of Duden. No such uses, however, were found in the DWDS corpus examples, so this specific sense of *abändern* is likely less frequent than its normal 'change' sense.

With respect to grammatical behavior, the dictionaries characterize *abändern* as a transitive/causative verb, as no dictionaries mention inchoative (i.e. reflexive) uses of the verb. Furthermore, Wahrig includes *anders machen* ('make different') as a definition, but not *anders werden* ('become different'). While this is a proper characterization of most uses of *abändern*, it is not completely accurate, as a few instances of *abändern* exhibit inchoative, reflexive uses, as I demonstrate in Section 6.3.

In summary, *abändern* is a Change verb with the meaning component specifying that it refers to subtle/minor changes. It also has a FE-related adverbial meaning component (not clearly identified in the dictionaries) specifying that it refers to changes in texts, particularly laws or policies, and it has a (infrequent) domain-specific sense referring to biological changes through mutation or evolution.

With respect to the research questions comparing meaning components of German and English Change verbs, we see that the components identified for *abändern* are quite similar to those for English *alter* and *modify*. Specifically, all these verbs are restricted to subtle changes. One subtle difference is that *abändern* shows a much narrower range of U types, specifically text-like entities such as laws, guidelines, or policies, whereas the English verbs are more flexible in that they appear with a much wider range of U types. This "subtle change" meaning component influenced the behavior of the English verbs (i.e. strong preference for transitive VCs without prepositional F arguments), and we must therefore determine whether it has similar effects on German *abändern*. Also, *modify* and *abändern* share the component that they refer to changes for a specific purpose, particularly for making things more acceptable. I suggested that this meaning component may lead to the relatively high frequency of *modify* in VCs expressing the purpose of the change in a subordinate clause, and we may find support for this hypothesis if *abändern* is shown to exhibit similar behavior. Having established the semantics of *abändern*, I now discuss the meaning of *ändern*.

Ändern ('change/alter/modify')

The definitions for *ändern* are provided in Table 6.3 below. The definitions show that *ändern* is a change verb in that each of them reference another Change verb in German, such as *abändern*

(Duden), *wandeln* (Duden, DWDS), or *verändern* (Duden, DWDS), or English, such as *change, alter, modify* (Langenscheidt).

DUDEN	WAHRIG	DWDS	LANGENSCHEIDT
1a) [*durch Hinzufügen oder Streichen, durch Veränderung von Details] abändern, modifizieren* […] b) *[…] umformen, wandeln:* 2) (ä + sich) *anders werden, sich verändern* […]	<V.t.; hat> 1. *anders machen, eine andere Form, ein anderes Aussehen geben;* […] 2 <V. refl.> sich ~ *anders werden*; […]	**etw., jmdn. verändern, umgestalten** *sich ändern* anders werden, sich wandeln	**I** v/t <h> 1. change, alter, vary, *teilweise*: modify, *bes. jur. pol.* amend**;** […] 2. (*Kleider etc.*) alter; **et. ~ an** (*dat*) make alterations to. **II** v/reflex **sich ~** 3. change, alter; […] 4. *Wetter*: change, break, *Wind*: change, shift; […] 5. *econ. Preise etc.*: vary, fluctuate.
-von Details	-Form / Aussehen		-teilweise

Table 6.3: Relevant definitions for *ändern*

The *Duden* and *Wahrig* definitions, however, list components which suggest that *ändern* is not typically used for dramatic/major changes: *Duden* mentions that the verb involves the *Hinzufügen, Streichen, Veränderung von Details* ('addition, removal, or changing of details'), while *Wahrig* defines it as giving the changed entity a different form (*Form*) or look (*Aussehen*). As with *abändern*, no entries state that the changed entity is changed 'into something else.' Furthermore, the synonyms (*abändern, modifizieren*) and translation equivalents (*alter, modify, amend*) further suggest that *ändern* is a minor change verb. As with *abändern, ändern* can thus also be compared with English *alter* and *modify* to determine whether the "subtle change" meaning component has similar effects on valency behavior across languages. This comparison is tested after the valency analysis in Section 6.3. Langenscheidt also mentions various domain-specific senses of *ändern*, such as the alteration of clothing or variations in prices and weather. These senses are included in the corpus analysis, as they directly relate to the general Change semantics. However, the corpus data show that *ändern* may appear with a much wider range of U argument types than just clothing, prices, or weather.

With respect to its syntax, *ändern* is characterized as having both a transitive use (*anders machen* in Wahrig, *etwas verändern* in DWDS) and a reflexive use (*anders werden* in Duden,

Wahrig, and DWDS). In the valency analysis, both of these uses were attested for *ändern* with relatively equal frequency, thus supporting the dictionary's syntactic characterization of *ändern*.

In sum, the definitions show that *ändern* is a Change verb with the meaning component restricting it to subtle/minor changes. It is also likely to refer to changes in clothing, prices, and weather, but is not restricted to these U types, and it can be used both transitively and reflexively. Given the "subtle change" meaning component, I determine the cross-linguistic grammatical relevance of the meaning component following the valency analysis by testing whether *abändern* behaves similarly to English *alter* and *modify* and German *abändern*, each of which is also associated with the "subtle change" component. I now turn to the next German Change verb, *verändern*.

Verändern ('change/alter/modify')

The definitions for *verändern* are provided in Table 6.4.

DUDEN	WAHRIG	DWDS	LANGENSCHEIDT
1.) (*in Wesen od. in der Erscheinung) anders machen, ändern* (1a), *umgestalten*: […] 2.) <v. + sich> *(im Wesen od. in der Ersscheinung) anders werden, sich ändern*: […] […]	1 <V.t.> *anders machen, umgestalten, verwandeln, umarbeiten;* […] 2 <V. refl.> sich ~ *anders werden;* <umg.> *Stellung, Beruf od. Wohnung wechseln* […]	**etw. in eine andere, von der bisherigen verschiedene Form, Beschaffenheit, Zusammensetzung, Ordnung bringen, etw. umgestalten, umwandeln** *sich verändern* anders werden, sich umwandeln **2** umgangssprachlich *sich verändern* eine andere Arbeitsanstellung annehmen *sie sagte, sie wolle sich verändern*	**I** v/t <*no* **ge-, h**> **1.** *allg*. change. *bes. in Einzelheiten, in Größe, Aussehen etc*: alter. *leicht*: modify. *weitS.* (*umformen*) transform: […] **II** v/reflex **sich ~** **2.** change, alter; […] […]
-in Wesen od. in der Erscheinung	-Beruf/Wohnung wechseln	-eine andere Arbeitsanstellung annehmen	- *bes. in Einzeiheiten, in Größe, Aussehen etc*

Table 6.4: Relevant definitions for *verändern*

As with the previously discussed verbs, *verändern* is defined using other Change verbs or phrases in German such as *anders machen* (Duden, Wahrig), *anders werden* (Duden, Wahrig, DWDS) or with reference to English Change verbs, such as *change* and *alter* (Langenscheidt), thus showing that *verändern* is a Change verb.

Verändern also appears to be restricted to minor changes, rather than dramatic change types in which the changed entity becomes something else. Most definitions state that *verändern*

refers to changes in specific properties of an entity, including its nature/character (*Wesen;* Duden), its appearance/form (*Aussehen/Erscheinung/Form*; Duden, Langenscheidt, DWDS), or other properties. Langenscheidt definition also mentions that it refers to changes 'in details' (*in Einzelheiten*) and relates it to the English Minor Change verbs *alter* and *modify*. Again, no dictionaries mention that the entity changes "into something else," suggesting that it is not used to describe drastic, categorical changes.

DWDS and *Wahrig* each also list a special sense of the verb when used reflexively, namely that the subject changes either their profession or their place of residence. These senses are not included in the analysis, as they are highly idiomatic and do not exhibit the Change frame semantics, but rather that of Exchanging or Replacing. With respect to transitivity, the definitions cite both transitive and reflexive uses, as seen in the difference between Definition 1 and Definition 2 of both Duden and Wahrig. This characterization is also appropriate, as the corpus data for *verändern* included nearly equal frequencies of transitive and reflexive valency constructions.

In sum, the definitions show that *verändern*, similar to *abändern* and *ändern*, refers to minor, non-categorical changes in some property of the changed entity. Again, because these three verbs exhibit the "subtle change" meaning component identified as grammatically relevant for the English Change verbs, we may expect them to exhibit valency behavior that is similar to one another and different from verbs without this meaning component, as discussed in Section 6.3.

Verwandeln ('change/transform')

The definitions for *verwandeln* are provided in Table 6.5 below.

DUDEN	WAHRIG	DWDS	LANGENSCHEIDT
1.a) (*in Wesen od. in der Erscheinung) sehr stark, völlig verändern, anders werden lassen* […] b) *zu jmd., etw. anderem werden lassen* […] c) <v. + sich> *zu jmd., etw. anderem werden*: […] 2. *umwandeln* (a); *umgestalten*: […] 3. (Ballspiele) […]	<V.t.; hat> *ändern, umgestalten, umformen*; […] sich in etwas ~ *die Gestalt von etwas annehmen* […]	*etw., jmdn. verwandeln* einer Sache, jmdm. eine andere Gestalt, ein anderes Aussehen geben, etw., jmdn. (völlig) ändern *etw., jmdn. in etw., jmdn. verwandeln*	**I** *v/t* <*no* **ge-, h**> **1.** (*verändern*) change, transform, alter, metamorphose […] **2.** (*umwandeln*) (**in** *acc* into) change, turn, convert, transform, transmute […] **3.** *Fußball* […] **II** *v/reflex* **sich ~ 4.** change, alter. **5. sich ~ in** (*acc*) change (*od.* turn) into, be converted (*od*. transformed) into, turn (*od*. metamorphose) (o.s.) into
-völlig, sehr stark -zu jmd./etw. anders	-die Gestalt von etw. annhemen	-völlig -andere Gestalt geben	-'turn into' *-transform, transmute*

Table 6.5: Relevant definitions for *verwandeln*

Again, the definitions show that *verwandeln* is a Change verb by referencing other German Change verbs such as *verändern* (Duden, Langenscheidt) or *ändern* (Wahrig, DWDS), as well as English equivalents such as *change*, *transform,* and *metamorphose* (Langenscheidt).

Verwandeln differs from the verbs discussed so far in that it refers to more dramatic categorical changes, and not simply changes in attributes or specific properties. First, the definitions include adverbs such as *sehr stark* ('very strongly'; Duden) or *völlig* ('completely'; Duden, DWDS). They also mention that the entity changes "into something else" (Duden) or "takes the shape/form of something else" (Wahrig, DWDS). Similarly, the English translation equivalents provided in *Langenscheidt* include drastic Change verbs such as *transform, transmute,* and *metamorphose*.[303] Thus, unlike the previously discussed verbs, *verwandeln* refers to drastic, categorical changes.

In the previous chapter, I showed that this meaning component, which applies to English *transform* and *metamorphose,* is likely linked to the relatively high frequency of these verbs in valency constructions which include the Original_state in addition to the Final_state arguments. If the grammatical relevance of this component applies cross-linguistically, *verwandeln* would be expected to exhibit equivalent behavior with respect to the German valency constructions.[304] The definitions also specify both transitive uses of the verb, as in Definitions 1a and 1b of Duden, and reflexive uses, as seen in Definition 1c of Duden and the use of *sich* in Duden, Langenscheidt, and Wahrig. Again, this characterization is accurate, as transitive and reflexive valency constructions were attested with nearly equal frequency in the corpus data for *verwandeln*.

The definitions thus show that *verwandeln* differs from the previously discussed verbs, in that it has a meaning component specifying that it refers to drastic, categorical changes. It can be used both transitively and reflexively, and it does not have any relevant domain-specific Change senses or restrictions on types of changed entities. The "drastic change" was also identified for English Change verbs and is associated with the grammatical property of a (relatively) high frequency in VCs with Original_state arguments. After conducting the valency analysis, I determine whether

[303] It is unclear why Langenscheidt also lists *alter* as an equivalent of German *verwandeln,* as *verwandeln* is associated with drastic changes whereas English *alter* is associated with subtle changes.
[304] One domain-specific sense includes the successful conversion, e.g. of a free kick or free shot, in sports. This sense is excluded from the corpus analysis, as it does not refer to situations where an entity undergoes a change.

this meaning component is also grammatically relevant among German Change verbs, such as *verwandeln*.

Wandeln ('change/transform')

The definitions for *verwandeln* are provided in Table 6.6.

DUDEN	LANGENSCHEIDT	WAHRIG	DWDS
1. <w. + sich; hat> a) *sich [grundlegend] verändern; eine andere Form, Gestalt o.Ä. bekommen; in seinem Wesen, Verhalten, o.Ä. anders werden* […] b) *zu etw. anderem werden; sich verwandeln* […] 2. <hat> a) *anders werden lassen, verändern* […] b) *zu etw. anderem werden lassen, verwandeln* […]	*v/t u.* **sich ~** *v/reflex* <*h*> change.	1 <V.t.; hat> = *verwandeln, verändern* […] […] (GEHEN)	*sich wandeln* sich im Wesen ändern, verändern, wesentlich anders werden, in einen neuen, anderen Zustand übergehen *jmdn., etw. wandeln* jmdn., etw. im Wesen ändern, verändern, bewirken, dass jmd., etw. anders wird
-grundlegend -zu etw. anderem			- im Wesen -wesentlich anders werden -in neuen Zustand übergehen

Table 6.6: Relevant definitions for *wandeln*

Again, the definitions show that *wandeln* is a Change verb through reference to other German and English Change verbs, such as *verwandeln* (Duden, Wahrig, DWDS) or *verändern* (Duden, Wahrig, DWDS).

Similar to *verwandeln*, the dictionary definitions suggest that *wandeln* refers to drastic, categorical changes. Multiple entries elaborate on the basic Change sense of the verb using adverbs such as *wesentlich* ('noticeably'; Duden, DWDS) or *grundlegend* ('fundamentally'; *Duden*). The dictionaries also mention phrases expressing categorical change, where something turns "into something else" (Duden, DWDS). As noted above for *verwandeln*, we may expect that *wandeln* also exhibits unique valency behavior (i.e. relatively high frequency in VCs with Original_state arguments), because similar behavior was noted for the English Change verbs with the "drastic change" meaning component. *Wandeln* also has two non-Change senses, one referring to 'wandering' or walking without a specific goal, and the other referring to the annulation of a contract in legal terminology. Neither of these senses are relevant for the analysis of the Change frame, so I exclude both senses from the corpus analysis.

Both transitive and reflexive uses for *wandeln* are seen in the dictionary definitions. For instance, both Langenscheidt and Wahrig include the abbreviation *t.* (transitive) and Duden,

Langenscheidt, and DWDS each include the reflexive pronoun *sich*. While this characterization is accurate in that the corpus data included both valency construction types with *wandeln*, the data are strongly skewed towards reflexive constructions, and transitive constructions comprise less than 10% of the analyzed examples of *wandeln*. These definitions could thus be improved by stating that transitive uses are much less frequent with *wandeln* than reflexive uses.

In sum, the dictionaries show that *wandeln* is similar to *verwandeln* in that it exhibits the meaning component restricting it to drastic, categorical changes. It can be used both transitively and reflexively, and it does not have any domain-specific Change senses or restrictions on changed entity types. Given the semantic similarity of these verbs to the English verbs *metamorphose* and *transform*, after the valency analysis in Section 6.3, I test whether theverbs behave similar to their English equivalents with the "drastic change" meaning component.

6.3.2. Summary of meaning components of German Change verbs

Having discussed in detail the dictionary definitions of the German Change verbs, the verbs can now be compared against each other in order to arrive at semantic sub-classes, which will aid in the identification of grammatically relevant meaning components and the potential formulation of sub-classes after conducting the syntactic/valency analysis. This also allows me to compare the (combination of) meaning components of German Change verbs with those identified for English Change verbs, in order to answer the first contrastive research question regarding the similarity of verb meanings in a given semantic frame across languages. Table 6.7 summarizes the meanings of these five German Change verbs, listing whether they are restricted to subtle or drastic changes, any other meaning components, domain-specific senses or special U argument types, as well as any non-change senses of the lexemes.

Verb	Minor/Drastic	Other components	Domain-specific	Non-Change senses
abändern	Minor	-improve/amend	-texts -policies/laws	
ändern	Minor		-clothes	
verändern	Minor			-switch residence/job
verwandeln	Drastic			-convert goal
wandeln	Drastic			-motion/wander

Table 6.7: Meaning components, domain-specific uses, and other senses of German Change verbs

To summarize the analysis of dictionary definitions for German Change verbs, we can conclude that *abändern, ändern*, and *verändern* are Minor Change verbs. For *ändern*, the *Duden* entry mentions changes 'in details' and no entries include phrases that imply drastic changes, such as 'significantly' or 'into something else.' A similar case holds for *verändern*. Definitions for *abändern* include phrases such as *teilweise* ('partially') or *ein wenig* ('a little bit'). *Abändern* is also associated with changes whose purpose is to improve or amend something.

Wandeln and *verwandeln*, on the other hand, are drastic change verbs, according to their dictionary definitions. Entries for *verwandeln* include phrases such as *sehr stark* ('very strongly'; Duden) or *völlig* ('completely'; Duden, DWDS), while *wandeln* is associated with adverbials such as *wesentlich* ('noticeably'; Duden, DWDS) or *grundlegend* ('substantially'; Duden). The only additional component identified for these verbs applies to *verwandeln*, which is used to refer to converting a goal in the domain of sports. This, however, is not a relevant Change sense of *verwandeln*.

With respect to semantic classes, the clearest possible sub-categorization would separate the drastic change verbs *verwandeln* and *wandeln* from the minor change verbs *ändern, abändern*, and *veräandern*. It is also possible to distinguish between the minor verbs with no additional components (*ändern* and *verändern*) from *abändern*, which is also associated with improvements or amendments and with changes to texts or policies/laws.

6.3.3. Comparing the meanings of German and English Change verbs

Having identified these meaning components, we may now return to the first aspect of the contrastive research questions regarding the similarity of both the general frame semantics and additional meaning components across German and English Change verbs. The general meaning shared by all the verbs is the same across both languages. Specifically, most of the German definitions include phrases such as *anders werden* for reflexive uses or *anders machen* for transitive uses, which correspond to similar phrases for English definitions, 'become different' and 'make different,' respectively. The general nature of this Change meaning, relative to more specific 'change-of-state' verbs, is seen in the listing of several attributes (e.g. *Form* 'form', *Aussehen* 'appearance', *Wesen* 'nature', *Verhalten* 'behavior') found in many of the definitions. That the general frame semantics is virtually identical across languages supports previous

research that emphasizes the importance of semantic frames for comparing verb meanings (and syntax) across languages (Boas 2002, 2010b, Burchardt et al. 2006/2009, Schmidt 2009).

With respect to the additional meaning components that further specify the base/core Change semantics, there is also a great deal of overlap across the two languages. As with the English Change verbs, the primary meaning component(s) distinguishing individual verbs are those of "subtle change" and "drastic change". Specifically, some verbs evoking the Change frame are restricted to minor, non-categorical changes, e.g. in appearance, function, or form (*alter, modify, abändern ändern, verändern*), while others refer to more significant changes in which the Undergo_change argument becomes an entity of an entirely different category, e.g. from a human to a frog (*transform, metamorphose, verwandeln, wandeln*). Another relevant additional meaning component identified in both languages specifies that change is undertaken/undergone for a specific purpose, especially for making something more acceptable or less extreme. This component was identified for *modify* in English and for *abändern* in German.

I also identified for the German Change verbs two 'domain-specific' senses that specify tendencies or restrictions on the types of entities that can fill an argument role, both of which were also found for English Change verbs. German *abändern* shows a strong preference to refer to changes in texts or other abstract text-like entities (e.g. policies, guidelines, methods). The English verbs *alter* and *modify* also seem more likely than other Change verbs to describe changes to these types of entities. However, they are not as restricted to these types of U arguments as German *abändern*, which was found to seldom describe changes to other types of entities.[305] The second domain-specific sense referring to scenes in which clothing articles are changed to fit better applies to English *alter* and German *ändern*, both of which can be used for a much wider variety of U argument types than just clothing.

Only one meaning component identified for English Change verbs did not appear in any of the definitions of German Change verbs. This is the "positive change" meaning of *transform*, which refers to changes that are deemed positive in some respect (e.g. becoming a better person).

[305] Furthermore, it seems that one or the other of *alter* and *modify* may be preferred with different 'sub-types' of the abstract U arguments found with *abändern*. Specifically, *alter* appears to be more appropriate for texts and documents per se (*We altered/?modified the text*.), whereas *modify* appears to be more appropriate for more abstract policies and methods (*We modified/??altered our approach*). Of course, these are intuitive judgments only and must be confirmed through a corpus analysis.

While no German verbs were explicitly associated with this meaning component, native speaker consultations suggest that *verwandeln* is the most appropriate verb for describing such situations.

The contrastive research question relating to how specific additional meaning components apply to the verbs helps us to determine the degree of semantic equivalence between individual verbs of different languages. One notable difference is that the English lexicon includes semantically general *turn* and *change*, which are not associated with any additional meaning components, including the subtle/drastic distinction, whereas all of the German verbs can be categorized as either drastic or minor change verbs.[306] As such, one must take into account the specific change scenario in order to determine the proper translation equivalents for the English General Change verbs. For instance, changes to entities such as laws or policies are typically expressed by *abändern* in German and by either *alter* or *modify* in English, whereas changes to a person's name tend to be expressed by *ändern* in German and by *change* in English. Another difference is the aforementioned meaning component restricting *abändern* to changes in abstract text entities, which may be expressed by either *modify* or *alter* in English, depending on the specific type of entity that is changed. Otherwise, the 'purposive change'/'improve' meaning component is shared by English *modify* and German *abändern*, and the domain-specific 'change clothes to fit better' meaning component is shared by English *alter* and German *ändern*.

To summarize the comparison of the meanings of German and English Change verbs, we see that both the base/core frame semantics and nearly all of the additional meaning components are highly similar across the two languages. There is some minor variability in the precise distribution of additional meaning components of the individual LUs across the languages, but none of the verbs appear to be untranslatable, assuming that sufficient contextual knowledge is given. These findings differ from previous studies (Snell-Hornby 1983, Boas 2001, 2002, Ohara 2010, Bertoldi et al. 2010), which emphasize the differences between word meanings across

[306] The German verbs cannot easily be subdivided according to their level of descriptivity, as was possible for the English data. Specifically, each verb is associated with the minor/drastic distinction, as well as some combination of other components, domain-specific senses, or non-Change senses. As such, it appears that each verb analyzed is medium-descriptivity. It is possible that *abändern* has a slightly higher descriptivity level than the other verbs, because it is the only verb with an additional meaning component (i.e., improve/amend) modifying the basic Change sense. Also, *verwandeln* and *wandeln* appear to be lower-descriptivity, as they show no modifications of their Change semantics (apart from being limited to drastic changes), but only additional non-Change senses, whereas *ändern* and *verändern* each exhibit scene-specific Change senses and/or non-Change senses.

languages in specific semantic domains (e.g. communication, motion, risk), as the cross-linguistic differences in the meanings of Change verbs are fairly insignificant.[307] This cross-linguistic semantic similarity may be due to the highly general nature of the Change frame, as the verbs do not include much semantic content regarding the specific type of change, as with other 'change-of-state' verbs. In Chapter 7, I test this hypothesis by conducting a similar comparison for Theft verbs in English and German, which are semantically much richer than Change verbs. Having established the German Change verb meanings and compared them with the English data, I now discuss the valency analysis of German Change verbs.

6.4. COMPARING THE SYNTAX OF GERMAN AND ENGLISH CHANGE VERBS: VALENCY CONSTRUCTIONS AND GRAMMATICALLY RELEVANT MEANING COMPONENTS

I now turn to the next research questions, namely the comparison of specific VCs and the comparison of grammatically relevant meaning components across German and English Change verbs. I follow the research methodology of Contrastive Construction Grammar as introduced by Boas (2010b), who argues that semantic frames and frame elements provide the most appropriate basis for cross-linguistic comparisons of valency constructions, rather than coarse-grained features such as verbal aspect or abstract notions of cognitive space. By comparing the full range of valency constructions available to Change verbs in both languages, I expand on studies that apply Levin's (1993) notion of argument structure alternations to other languages (Frense and Bennett 1996, Winkler 2014), which often only investigate a limited range of two to three related constructions. Furthermore, I employ the bottom-up methodology endorsed by recent work on Construction Grammar (Croft 2003, Boas 2011b, Stefanowitsch 2011) and Valency Grammar (Faulhaber 2012, Herbst 2014) by defining valency constructions at the level of verb classes and individual verbs rather than as abstract argument structure constructions that are defined independently from the verb (classes) they occur in (à la Goldberg 1995, 2006).

After establishing and comparing the valency constructions, I then determine the valency distributions of the German Change verbs in order to determine whether the grammatically relevant meaning components identified for English also apply to German Change verbs. In this

[307] While analyzing a broader range of Change verbs or conducting deeper semantic analyses of these verbs may reveal more semantic differences than those identified in the present analysis, the dictionary definitions, shallow semantic corpus analysis, and consultations with native speakers did not reveal any significant differences beyond those listed here.

process, my approach differs from comparative studies that relate highly abstract meaning components (e.g. aspect, manner/result) to cross-linguistically recurring patterns in coarse-grained argument realization features (Croft 2012, Levin 2013), recent research (particularly the contributions in Boas 2010 and Engelberg et al. 2015) has suggested that subtler frame-specific and verb-specific meaning components are grammatically relevant across languages. I test this claim by determining whether the grammatically relevant meaning components identified for the English Change valency frame have similar effects on German Change verbs exhibiting these components.

To answer these contrastive research questions, a corpus analysis was conducted to determine the valency distribution of each German Change verb. I then establish the full range of valency constructions and classes thereof, and identify any correspondences between valency distribution and (additional) meaning components. Here, I draw on the *Kernkorpus 20* ('main corpus – 20th century') from the *Digitales Wörterbuch der deutschen Sprache* (DWDS; http://www.dwds.de; 'Digital Dictionary of the German Language'), searching the corpus for all forms of the five verbs under analysis.[308] Following the methodology employed in the previous chapter, for each corpus example I document the valency construction by identifying the phrase type and grammatical function for all of the expressed core FEs (C, U, O, F). I then summarize the verb's valency distribution by stating how frequently it appears in each valency construction. Table 6.8 shows the total number of hits for each verb, as well as the number of examples that were used in the analysis.[309]

[308] Because the corpus contains data from throughout the 20th century, I filtered the data to only include examples from 1970-2000 for a better synchronic fit with the English COCA corpus, which ranges from 1990-2011. Because the DWDS corpus is much smaller than COCA, I did not randomly select 500 instances per verb, but extracted every example for analysis.

[309] As with the English corpus analysis, a larger amount of data is necessary to establish the precise valency distribution of each verb. The number of examples employed here, however, appears to provide a good general picture of the full range of VCs available to German Change verbs, as well as of the relative frequency of each verb in each VC.

Verb	Total extracted	Total analyzed
abändern[310]	95	22
ändern	150	95
verändern	150	77
verwandeln	166	114
wandeln	150	87
Total	711	395

Table 6.8: Number of examples extracted and analyzed

Similar to the procedure for the English corpus analysis, examples were excluded from analysis if they exhibited a non-Change sense of a verb (e.g. 'move' for *wandeln*), if they were non-verbal uses of the lemma (e.g. adjectives), or if they appeared in complex syntactic constructions which influence argument realization, such as infinitival clauses or passives.

6.4.1. Comparing the valency constructions

6.4.1.1. Introducing the German valency constructions

Before describing the results of the valency distribution analysis for German Change verbs, I introduce the valency constructions attested in the corpus and their corresponding labels, in order to more clearly present each verb's valency behavior below. While the English Change VCs' labels require only three distinctions and corresponding label digits (one for transitivity, one for number of core FEs, and one for the formal realization of F), the labels for German Change VCs require a fourth digit to account for two possible realizations of the O argument (as a *von* PP or an *aus* PP).

Simple transitivity VCs

As with the English Change VCs, the first digit indicates the transitivity type of the VC. The German data revealed three transitivity types: the two most frequent types are transitive (T; with a fully specified object U argument) and reflexive (R; with a reflexive pronoun as object U), while the intransitive type (I; with no object) was only attested twice in the corpus, both with the verb *verwandeln*. (6.13)-(6.15) exemplify these patterns, providing the VC label and description, a simple, invented example (unless otherwise noted), and the mapping of FE, grammatical function, and (default) phrase type realization. Again, the second digit of the VC label specifies the number

[310] Due to the low number of valid examples for *abändern* in DWDS, I also consulted the COSMAS-II DeReKo corpus to support the findings based on the DWDS data.

of arguments realized (I count the reflexive pronoun as an argument). For example, the label T2 in (6.13) signifies "transitive with two arguments" (here, *die Hexe* and *den Mann*; additional digits are added to the labels for VCs with F and O arguments, as specified below).

(6.13) **T2: Simple Transitive**
[C.NP.Nom + verb + U.NP.Acc]
Die Hexe verwandelt den Mann.
'The witch changes the man.'

(6.14) **R2: Simple Reflexive**
[U.NP.Nom + verb + U.Refl.Acc]
Der Mann verwandelt sich.
'The man changes.'

(6.15) **I1: Simple Intransitive**
[C.NP.Nom + verb]
Liebe verwandelt […] (DWDS)
'Love transforms.'

To briefly compare these VC types with the English data,[311] the transitive VCs align well across the two languages, as they each realize the C argument as (nominative) subject and the U argument as (accusative) object. However, the German reflexive VCs systematically differ from English intransitive VCs. These VC types are semantically related, as they describe inchoative change scenarios without (directly) expressing the cause of the change (assuming there is one). However, they differ formally, as the English intransitive VCs have no (direct) object, while the German reflexive VCs include a reflexive accusative object pronoun that identifies the object with the fully spelled out subject. The highly infrequent German intransitive VC does not have a clear equivalent in English, as the German variant realizes the C argument as (nominative) subject and does not express the U argument, and is associated with a habitual reading. In English, the interpretation of intransitive uses as habitual agentive actions (i.e. *He changes*, where *he* is interpreted as habitually causing changes in other entities) appears to be blocked, because

[311] The two English transitivity VC types are transitive "T2" [C.NP.Sbj + verb + U.NP.Obj] and intransitive "I1" [U.NP.Sbj + verb].

the inchoative reading is associated with Change verbs in the English intransitive construction in the vast majority of such combinations.[312]

VCs with F realization

German VCs which realize an additional F argument, in addition to the simple VCs described above, require an additional digit specifying how F is formally realized. Most frequent are prepositional realizations of F in either an *in* PP (as in (6.16) and (6.19); labeled "a") or a *zu* PP (as in (6.17) and (6.20); labeled "b"). The F may also expressed as the purpose or result of the change, rather than a simple state or category, in which it is introduced in a subordinate *dass* clause that is marked with the word *so* ('so'/'such that') or *dahingehend* ('to the effect that') in the main clause (as in (6.18) and (6.21); labeled "c"). These VCs occur in both transitive and reflexive variants and are presented in (6.16)-(6.21).

(6.16) **T3a: Transitive with *in* F**
[C.NP.Nom + verb + U.NP.Acc + F.inPP.Obl]
Die Hexe verwandelt den Mann in einen Frosch.
'The witch changes the man into a frog.'

(6.17) **T3b: Transitive with *zu* F**
[C.NP.Nom + verb + U.NP.Acc + F.zuPP.Obl]
Die Hexe verwandelt den Mann zu einem Frosch.
'The witch changes the man into a frog.'

(6.18) **T3c: Transitive with clausal F**
[C.NP.Nom + verb + U.NP.Acc + F.dassCP.Obl]
Die Hexe verwandelt den Mann so/dahingehend, dass er zum Frosch wird.
'The witch changes the man so that he becomes a frog.'

(6.19) **R3a: Reflexive with *in* F**
[U.NP.Nom + verb + U.Refl.Acc + F.inPP.Obl]
Der Mann verwandelt sich in einen Frosch.
'The man changes (himself) into a frog.'

[312] Of course, the habitual agentive reading of English intransitive constructions with Change verbs may be coerced given the proper context (see Boas 2011c on coercion). Specifically, a Google search for "that transforms." returns two intransitive uses, both in heading titles for websites: "A Love that Transforms" and "Teaching transforms" (conducted 11 January 2016). Native speaker intuition suggests interpretation may only be possible for *transform*, but not other English Change verbs, but a corpus analysis remains to be done.

(6.20) **R3b: Reflexive with *zu* F**
[U.NP.Nom + verb + U.Refl.Acc + F.zuPP.Obl]
Der Mann verwandelt sich zu einem Frosch.
'The man changes (himself) into a frog.'

(6.21) **R3c: Reflexive with clausal F**
[U.NP.Nom + verb + U.Refl.Acc + F.dassCP.Obl]
Der Mann verwandelt sich so/dahingehend, dass er zum Frosch wird.
'The man changes (himself) so that he becomes a frog.'

These VC types correspond more clearly to the English VCs than those discussed above. Specifically, English VCs may employ one of two prepositions to introduce F, namely *in* and *into*, which is also the case with German *in* and *zu*.[313] A more complete semantic analysis of the corpus data would allow us to determine whether these prepositions correspond to a certain range of F argument types, and if so, whether the same range of argument types occurs with one or the other preposition across the two languages.[314]

The German clausal F VCs exemplified in (6.18) and (6.21) are semantically related to the English purposive F clause VCs (e.g. *He changed it to do something/so that it would do something*.), as they each express the Final_state of the change in a clause describing in detail the new properties in the changed U argument. However, the formal expression of the purposive clause differs across the languages, as the German VCs require a "placeholder" particle (*so* or *dahingehend*) in the main clause and consistently express the purposive F in a finite subordinate clause with *dass*, whereas the English VCs do not have such placeholders and the purposive clause may be either infinitival (introduced by *to*) or finite (introduced by *so* or *so that*). The

[313] Winkler (2015), in her analysis of material/product alternations in German, which involves constructions similar to those found with Change verbs, notes that *zu* is the only preposition used to introduce the product. It is unclear whether Winkler simply overlooked the *in* variant or whether she treats the constructions associated with Levin's (1993: 55-58) 'transformation' alternation (*She turned him into a frog*. - *She turned him from a prince into a frog*) as distinct from those in the 'material/product' alternations (*She made the statue out of clay*. – *She made the clay into a statue*).

[314] In the English discussion, I noted the possibility that *to* was more likely to refer to specific materials or qualities (e.g. *turn to stone, to powder, to rust*), whereas full category nouns are more likely to be introduced with *into* (e.g. *She turned him into/*to a frog*.). A more detailed and comprehensive analysis is required to support this hypothesis. However, by determining what semantic/ontological types of F arguments may occur with each of these prepositions, and then comparing them with the types occurring with the two German prepositions, one may determine the extent to which the various prepositions match up semantically across the two languages.

purposive clause VCs also differ cross-linguistically with respect to their distribution, in that the German purposive clause VCs appear in both reflexive and transitive variants, whereas the English purposive VCs were almost exclusively found in transitive rather than intransitive ones.[315]

The "NEG an U" VC with ändern

One interesting VC type, with both transitive and reflexive variants, occurs only with the verb *ändern*. This VC includes a negative element (e.g. *nichts, kein Wort*) as either subject (in intransitive VCs) or object (in transitive VCs) as well as an *an* PP spelling out in more detail the U argument about which "nothing" has changed. These examples have "d" as the third digit of their label and are presented in (6.22)-(6.23).[316]

(6.22) **T3d: Transitive with NEG *an* U**
[C.NP.Nom + verb + NEG + U.anPP.Obl]
Und auch ein fetter Hintern und ein gelber Stock änderten nichts an dieser Tatsache.
'And even a fat behind and a yellow stick changed nothing about this fact.' (DWDS)

(6.23) **R3d: Reflexive with NEG *an* U**
[NEG + verb + U.Refl.Acc + U.anPP.Obl]
An dieser Logik hat sich seit Piet Retiefs Zeiten nichts geändert. (DWDS)
'Nothing has changed (itself) about this logic since the times of Piet Retief.'

Although it did not occur in the main corpus data for the English Change verbs, there is an English VC closely related to the German "NEG an U" construction, as in *She didn't change anything about it*.[317] The transitive variant of the English construction is formally quite similar to the German, as it includes a negative polarity item as the direct object and realizes the U in a prepositional phrase, differing only in that the English preposition is *about*. Also, this VC also

[315] In the English analysis, no intransitive VCs with purposive clause F arguments were found in the primary, core data of the five verbs under analysis. Only one intransitive VC with a purposive clause was found in the 206 examples analyzed in the test case of *metamorphose*, showing that such combinations (intransitive + purposive F) are indeed possible in English, but they are highly infrequent.

[316] This VC type may not relate directly to verbal valency but instead arises from more quantification processes, as the phrase *nichts an der Tatsache* ('nothing about the fact') can be viewed as a single, complex NP built op from constructions for noun formation. However, if such phrases (or VCs) were independent of verb valency, one would expect that these constructions would occur with relatively similar frequencies for all German Change verbs, which will be shown in the following section not to be the case.

[317] This VC type would ideally be included in the constructional range of the English Change valency frame defined in Section 5.4.

appears to be restricted to a single verb, *change*, in English as well (**She altered/modified/transformed/turned nothing about it*.). However, there is more significant cross-linguistic difference in the frequency and distribution of this VC type, as the English version appears to be much less frequent than the German version and occurs almost exclusively in transitive rather than intransitive variants, whereas the German VC appears in both transitive and reflexive variants.

VCs with both O and F arguments

I now turn to VCs that realize both a F and an O argument. These are labeled with the number 4 as the second digit, as they involve four arguments (including the reflexive object of reflexive VCs). While in English, the O argument is consistently realized in a *from* PP, in German the O argument can appear in either an *aus* PP or a *von* PP. As these PPs can occur in combination with both *in* PP and *zu* PP F arguments, a fourth digit is required to differentiate the various combinations. VCs realizing O in an *aus* PP include "a" as the fourth digit (as in 6.24, 6.26, 6.28, and 6.30), while VCs realizing O in a *von* PP include "a" as the fourth digit (as in 6.25, 6.27, 6.29, and 6.31). Thus, a transitive VC realizing F in an *in* PP and O in an *aus* PP is labeled T4aa. A total of eight VCs are thus possible (two each for transitive and reflexive, *in* vs. *zu* F, and *aus* vs. *von* O), as presented in (6.24)-(6.31).

(6.24) **T4aa: Transitive with *aus* O and *in* F**
[C.NP.Nom + verb + U.NP.Acc + O.ausPP.Obl + F.inPP.Obl]
Die Hexe verwandelt den Mann aus einem Prinzen in einen Frosch.
'The witch changed the man from a prince into a frog.'

(6.25) **T4ab: Transitive with *von* O and *in* F**
[C.NP.Nom + verb + U.NP.Acc + O.vonPP.Obl + F.inPP.Obl]
Die Hexe verwandelt den Mann von einem Prinzen in einen Frosch.[318]
'The witch changed the man from a prince into a frog.'

(6.26) **T4ba: Transitive with *aus* O and *zu* F**
[C.NP.Nom + verb + U.NP.Acc + O.ausPP.Obl + F.zuPP.Obl]
Die Hexe verwandelt den Mann aus einem Prinzen zu einem Frosch.
'The witch changed the man from a prince into a frog.'

[318] The reader may notice that this (and likely several other) invented example(s) in the presentation of valency constructions sound somewhat unnatural. Note that these examples are only intended to show the valency constructions (focusing only on the phrase type, role, grammatical function of arguments), and the actual lexical items can be replaced with more appropriate words.

(6.27) **T4bb: Transitive with *von* O and *zu* F**
[C.NP.Nom + verb + U.NP.Acc + O.vonPP.Obl + F.zuPP.Obl]
Die Hexe verwandelt den Mann von einem Prinzen zu einem Frosch.
'The witch changed the man from a prince into a frog.'

(6.28) **R4aa: Reflexive with *aus* O and *in* F**
[U.NP.Nom + verb + U.Refl.Acc + O.ausPP.Obl + F.inPP.Obl]
Der Mann verwandelt sich aus einem Prinzen in einen Frosch.
'The man changed from a prince into a frog.'

(6.29) **R4ab: Reflexive with *von* O and *in* F**
[U.NP.Nom + verb + U.Refl.Acc + O.vonPP.Obl + F.inPP.Obl]
Der Mann verwandelt sich von einem Prinzen in einen Frosch.
'The man changed from a prince into a frog.'

(6.30) **R4ba: Reflexive with *aus* O and *zu* F**
[U.NP.Nom + verb + U.Refl.Acc + O.ausPP.Obl + F.zuPP.Obl]
Der Mann verwandelt sich aus einem Prinzen zu einem Frosch.
'The man changed from a prince into a frog.'

(6.31) **R4bb: Reflexive with *von* O and *zu* F**
[U.NP.Nom + verb + U.Refl.Acc + O.vonPP.Obl + F.zuPP.Obl]
Der Mann verwandelt sich von einem Prinzen zu einem Frosch.
'The man changed from a prince into a frog.'

This large array of four-argument VC types represents a more significant cross-linguistic difference from English than the VC types discussed above. Namely, in English the O argument is consistently realized in PPs headed by *from* and no other realization of O was attested in the corpus analysis. In German, however, the O argument may appear in a PP headed by either *aus* or *von*. As noted above for the various prepositional realizations of F (*in* PP vs. *zu* PP), the existence of two O realization types raises the obvious question of whether the German prepositions exhibit systematic semantic differences, with each preposition being associated with different types of Original_state entity types.[319] If this is found to be the case, then this would suggest that a semantic distinction exists in German that is not made apparent in the English grammar.

[319] Winkler (2015) discusses the prepositions used in German equivalents of the material/product alternation constructions in German (*make X out of Y; make Y into X*), which are related to the Total Transformation alternation constructions discussed here (see Levin 1993: 55-58). She notes that the

6.4.1.2. Summary of German Change VCs

In summary, the present analysis identified 19 VCs that occur with the five German Change verbs under analysis, which are shown in Table 6.9. The table lists the transitive VCs in the left column and the reflexive VCs with equivalent oblique argument types (F, O, and the "NEG an U" construction) in the corresponding right column. The infrequent intransitive VC is also included in the left column among the transitive VCs, with no corresponding reflexive VC, only for clarity of presentation (instead of having an additional intransitive column with only one VC). The VCs labels are also included in the table and are to be interpreted as follows. The first digit refers to the transitivity of the VC, with "I" mapping to the intransitive VC, "T" mapping to the transitive VCs, and "R" mapping to reflexive VCs. The second digit refers to the number of arguments in the VC, ranging from only one argument in the intransitive VC ("I1") up to four arguments in VCs expressing both the F and the O arguments. (Recall that I count the reflexive object of the reflexive VCs as an argument in order to make the transitive and reflexive VC labels match up.) The third digit of the labels applies to VCs that include additional oblique arguments in addition to the basic transitivity VC. These mainly refer to the realization of the F argument, with "a" mapping to *in* PP realizations, "b" mapping to *to* PP realizations, and "c" mapping to clausal realizations of F. The "d" label in the third digit refers not to the F realization, but to the *an* PP realization of the U argument in the special "NEG an U" construction. Finally, the fourth digit only appears among VCs with both the O and the F arguments and serves to distinguish the two possible realizations of O, with "a" referring to *aus* PP realizations and "b" referring to *von* PP realizations. For example, the "T4ab" label corresponds to a transitive ("T") VC with four arguments ("4") in which the F argument is realized in a *in* PP (third digit "a") and the O argument is realized in a *von* PP (fourth digit "b"). The mapping between the labels is also summarized in Footnote 319.

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material roles, relatable to the Undergo_change role discussed here, can be expressed with *aus, von,* or *mit* PPs, with *aus* being most frequent as it is more prototypically associated with materials than the others. For the product role, related to the Final_state argument of Change verbs, she notes that it only occurs in *in* PPs, but does not mention *zu* PPs. Future work must investigate the relation between these alternations/construction types, as well as how they may differ with respect to the prepositions they employ.

Transitive	Reflexive
I1: C V	
T2: C V U	**R2**: U V sich
T3a: C V U in F	**R3a**: U V sich in F
T3b: C V U zu F	**R3b**: U V sich zu F
T3c: C V U dahing/so…	**R3c**: U V sich dahing/so,...
T3d: C V Uneg an U	**R3d**: Uneg V sich an U
T4aa: C V U aus O in F	**R4aa**: U V sich aus O in F
T4ab: C V U von O in F	**R4ab**: U V sich von O in F
T4ba: C V U aus O zu F	**R4ba**: U V sich aus O zu F
T4bb: C V U von O zu F	**R4bb**: U V sich von O zu F

Table 6.9: Valency constructions of German Change verbs[320]

The individual German VCs discussed above can be organized into various classes according to (a) transitivity, (b) number of state arguments realized, (c) specific realization of the F argument, and (d) specific realization of the O argument, along with an additional class for the "NEG an U" VC occurring only with *ändern*, which includes a negative polarity item and specifies the U in an *an* PP. The advantage of organizing VCs into such classes is that it is much easier to succinctly describe the specific valency distribution of individual verbs. For example, rather than saying a verb consistently appears in T2, T3a, T3b, etc., rather than R2, R3a, etc., we may simply state that the verb appears in transitive VC types rather than reflexive VC types. This classification is presented in Table 6.10 and discussed in more detail in the following section.

[320] The VCs are labeled as follows, along with informal English translations where relevant.
First digit: I/T/R = Intransitive/Transitive/Reflexive
Second digit: 1-4 = # of arguments (including reflexive object)
Third (to fourth) digit:
- a = in F (*in/to* F)
- b = zu F (*in/to* F)
- aa = aus O in F (*from* O *in/to* F)
- ab = von O in F (*from* O *in/to* F)
- ba = aus O zu F (*from* O *in/to* F)
- bb = von O zu F (*from* O *in/to* F)
- c = so/dahingehend, dass… (clausal F: *change it such that it…*)
- d = nichts ändern an U (*change nothing about*)

Valency Feature	Options	VCs
Transitive/Reflexive	Transitive	T2, T3a-d, T4aa-bb
	Reflexive	R2, R3a-d, R4aa-bb
State realization	No states	I1, T2, R2
	Only F	T3a-d, R3a-d
	Both O and F	T4aa-bb, R4aa-bb
F realization	*in* PP	T3a, T4aa, T4ab, R3a, R4aa, R4ab
	zu PP	T3b, T4ba, T4bb, R3b, R4ba, R4bb
	so/dahingehend, dass	T3c, R3c
O realization	*aus* PP	T4aa, T4ba, R4aa, R4ba
	von PP	T4ab, T4bb, R4ab, R4bb
Special	*NEG an U*	T3d, R3d

Table 6.10: Classes of German Change valency constructions

6.4.1.3. Comparing German and English Change VCs

Having established the range of VCs for German Change verbs and the classes thereof, we are now in a position to compare systematically the German VCs with those identified for the English data in Section 5.3. This allows me to establish which VC pairs/groups are equivalent across the languages, which is necessary to investigate the cross-linguistic equivalency of individual verbs and grammatically relevant meaning components. Specifically, I determine whether VCs or sets thereof are semantically and/or formally equivalent across languages. *Formal equivalence* holds between two (or more) VCs across languages when they involve the same number of syntactic arguments in the same phrase types and grammatical functions.[321] *Semantic equivalence* refers to when VCs in two languages include the same set of FEs and perspectivize them in the same way.[322] Semantic equivalence between VCs may be tested by determining whether the same (Change) situation can be expressed by both (or all) equivalent

[321] In this comparison, I assume that German nominative arguments correspond to English subjects, and German accusative arguments correspond to English direct objects. While these categories are not entirely equivalent across the two languages in all contexts, the assumption seems unproblematic for the data discussed here.

[322] In this German-English comparison, VCs perspectivize FEs differently by assigning them different grammatical functions (through word order in English and case assignment in German) or instantiating them with different phrase types (as with the clausal F arguments, which perspectivize the Final_state as a type of activity that the U role may do after the change, and thus differ from prepositional F argument which state more directly the new category or value of the U role).

VCs in the two languages. Rather than directly comparing the VCs themselves, I first compare specific features that characterize the VCs and establish which features are equivalent, then draw on this VC feature comparison to determine the equivalency of specific VCs. To ensure clarity in the comparison, I present the list of English Change VCs and their classification in Tables 6.11 and 6.12, respectively, repeated from the previous chapter.

	Pattern	Example
T2	**C _ U**	Pat changed Sam.
T3a	**C _ U into F**	Pat changed Sam into a frog.
T3b	**C _ U to F**	Pat turned Sam to stone.
T3c	**C _ U F.CP**	Pat changed it to do something different.
T4a	**C _ U from O into F**	Pat changed Sam from a person into a frog.
T4b	**C _ U from O to F**	Pat changed Sam from a prince to a frog.
I1	**U _**	Sam changed.
I2a	**U _ into F**	Sam changed into a frog.
I2b	**U _ to F**	Sam turned to stone.
I3a	**U _ from O into F**	Sam turned from a prince into a frog.
13b	**U _ from O to F**	Sam turned from a prince to a frog.
TR3	**C _ U F.result**	Pat turned Sam blue.
IR2	**U _ F.result**	Sam turned blue.

Table 6.11 (repeated from Table 5.22): Constructional range of the English Change valency frame

Valency Feature	Options	Valency Constructions
Transitivity	Transitive/Causative	T2, T3(a-c), T4(a-b), TR3
	Intransitive/Inchoative	I1, I2(a-b), I3(a-b), IR2
State realization	No states	T2, I1
	Only F	T3(a-c), I2(a-b), TR3, IR2
	both O and F	T4(a-b), I3(a-b)
F realization	intoPP	T3a, T4a, I2a, I3a
	toPP	T3b, T4b, I2b, I3b
	to/so (that) CP	T3c
	Resultative	TR3, IR2

Table 6.12 (repeated from Table 5.23): Categories of VCs according to valency features

For the basic transitivity features of the VCs, or more specifically the configuration of the C and U arguments, the German data included three types:

(a) the transitive "T" type of form [C _ U] in which the C is a nominative subject and U is an accusative object

(b) the reflexive "R" type of form [U _ sich] in which the U is a nominative subject and a reflexive pronoun matching the subject U

(c) the highly infrequent intransitive "I" type of form [C _] in which the C is a nominative subject and the U is not realized

For English, only two transitivity types were identified:

(a) the transitive "T" type of form [C _ U] in which C is the subject and U is the direct object

(b) the intransitive "I" type of form [U _] in which U is the subject and no direct object is realized

It is straightforward to draw parallels between the German transitive "T" VCs and the English transitive "T" VCs, as both VC types realize the C as (nominative) subject and the U as (accusative) direct object and involve the general causative interpretation.[323] As such, they are both formally and semantically equivalent. The German reflexive "R" VCs and the English intransitive "I" VCs are formally distinct, in that the German reflexive VCs include reflexive pronouns as accusative object while the English intransitive VCs have no direct object. Despite the formal difference, the VC types are semantically equivalent, as they express change scenarios which perspectivize only the U argument as it undergoes a change and do not express the cause of the change (or only as an oblique/adverbial phrase). More specifically, the semantic contribution of the reflexive pronoun in the German reflexive VCs is minimal (if anything) but arises from more general grammatical principles, namely that inchoative scenarios are typically encoded in reflexive VC types in German but not in English. As such, I posit that the German reflexive VCs and the English intransitive VCs are semantically equivalent but not formally equivalent.[324]

Finally, the German Intransitive VC type, which was only identified twice in the corpus analysis, is formally related to the English intransitive, as both involve the string [noun + verb], but the two differ semantically as the subject position is filled by the C argument in German and gives a "habitual causative" interpretation while the subject position of the English Intransitive is

[323] In the examples, I employ the following abbreviations: Nom = nominative, Acc = accusative, Sbj = subject, Obj = object.

[324] Of course, this equivalency pertains only to these valency construction types when they occur with Change verbs, and I do not claim that the English intransitive construction corresponds to the German reflexive construction in all contexts. This disclaimer applies to any equivalency pair proposed among German and English VCs.

filled by the U argument and has an inchoative interpretation.[325] Given these drastic semantic differences, I claim that the German intransitive VC type does not have an English equivalent. The equivalency of German and English VCs according to transitivity types are summarized in Table 6.13.

Equivalency pair	Form	Formal. Equiv.	Semant. Equiv.
English Transitive German Transitive	[C.Sbj + verb + U.Obj] [C.Nom + verb + U.Acc]	Y	Y
English Intransitive German Reflexive	[U.Sbj + verb] [U.Sbj + verb + U.Rflxv]	N	Y
No equivalency			
German Intransitive	[U.Nom + verb]	n/a	n/a

Table 6.13: Equivalencies in German-English VC Transitivity types

I now compare the VCs according to the realization of the state arguments F and O in order to determine whether these argument types are expressed similarly across languages. Both languages include VCs that realize no states, only F, and both O and F. I begin by comparing the various realizations of F across German and English VCs as well as the corresponding classes. The German data (in Table 6.9 above) revealed three different realization options for the F argument:

(a) as an *in* PP (with label "a")

(b) as a *zu* PP ("b")

(c) as a subordinate *dass* clause flagged in the main clause with *so* or *dahingehend* ("c")

The realization of F arguments is strikingly similar among the English VCs, which also involves three options:

(a) as an *into* PP (with label "a")

(b) as a *to* PP ("b")

(c) as a subordinate clause (either infinitival or finite and headed by *so (that)*; "c").[326]

[325] As noted in Footnote 23 above, at least one English Change verb (*transform*) may occur in intransitive patterns with C as subject and a habitual reading. I do not address this valency construction in the present analysis, but future work must determine why *transform* may have two different semantic interpretations (habitual vs. inchoative) when it appears in the same syntactic configuration (noun + verb), and how this behavior can be captured when comparing VCs across languages.

[326] I discuss the resultative constructions found only with English *turn* later in this section.

The present analysis does not involve a detailed analysis of possible semantic distinctions between F arguments introduced by *in* PPs vs. *zu* PPs in German, or between *into* PP vs. *to* PP realizations of F in English. As such, I group these realization types together and refer to them as "prepositional F arguments," and posit that the prepositional F argument realizations types of German (as *in* or *zu* PP) correspond to those of English (as *into* or *to* PP). This equivalency is not one-to-one but two-to-two, as each German prepositional F realization type corresponds to two prepositional F realization types in English, and vice versa.

The clausal F realization types of the two languages are semantically equivalent, as both express the purpose or result of the change, describing in a full clause e.g. what the Undergo_change entity may now do that it could not before the change event. Formally, the realization types are similar in that they express the resulting F in a full clause that is independent of the main clause. However, the specific formal apparatus for introducing such 'result/purpose' clause differs across the languages, as German requires the placeholder *so* or *dahingehend* in the main clause to 'foreshadow' the following *dass* clause, which is not required for English *so (that)* clause realizations. Furthermore, English may also express the result in an infinitival clause (e.g. *change X to do Y*), a realization type that was not found in the German data. The relation among clausal F VC types across German and English is thus only semantic equivalency but not (complete) formal equivalency.

With respect to the expression of O arguments, the German data (in Table 6.9 above) included two possible realization types: as an *aus* PP (with label "a") or as a *von* PP ("b"). As with the prepositional F realizations, I did not conduct a semantic analysis to determine possible semantic distinctions among the types of F entities introduced by one preposition vs. the other. In any case, the English data only revealed one possible realization for O, namely as a *from* PP (no label was provided for this realization type given that no other options are available in English). Given that English *from* can be translated as either *aus* ('out of') or *von* ('from/of') in German, I propose that the various O realization types are formally equivalent across the languages. Thus, the English O realization type is related to the two German O realization types in a one-to-two equivalency relation. This relation is formally equivalent but only a more detailed analysis can determine whether the relation is also semantically equivalent. The equivalencies of German and English VCs according to the realization of state arguments are summarized in Table 6.14.

Equivalency pair (with VC label specification)	Form	Formally equivalent	Semantically equivalent
F arguments			
English *into F* English *to F* German *in F* German *zu F*	[into F] [to F] [in F] [zu F]	Y	??
English F.CP German F.CP	[to F] [so (that) F] [dahingehend…, dass F] [so…, dass F]	N	Y
O arguments			
English *from O* German *aus O* German *von O*	[from O] [aus O] [von O]	Y	??

Table 6.14: Equivalencies in German-English realizations of State arguments

I now turn to VC types that do not have clear equivalents across the languages, specifically the "NEG an U" VCs identified with German *ändern* and the two resultative VCs identified with English *turn*. As noted above in this section, German *ändern* was found in VC types that were not found for other verbs. This construction includes a negative polarity item where the U argument is normally found (nominative subject in reflexive VCs, accusative object in transitive VCs) and specifies the U (about which nothing has changed) in an *an* PP. This type of VC was not found in the corpus analysis of English Change verbs, but can be identified in larger corpora such as the internet (e.g. *This changed nothing about the situation*.) These two constructions are semantically very similar, as they describe situations that highlight a change to some entity which may be expected to have occurred but did not. They are also formally quite similar, differing only in the choice of preposition to introduce the U argument. (Of course, given the polysemy of prepositions, there are several contexts in which German *an* corresponds directly to English *about*, so even in this case, formal equivalency is also possible.) Another striking cross-linguistic similarity of this VC type is also evident in that, in both languages, it seems to occur with only one member of the class of Change verbs (German *ändern*, English *change*). The overall frequency of such VCs, however, appears to be much higher in German than in English, as it was found 19 times for German *ändern* (~20% of its analyzed examples) but not at all in the English corpus data.

Another notable difference in the VCs available to Change verbs in the two languages is that the English Change verb *turn* occurs in resultative VCs which realize the F as a bare adjective (or noun) without a preceding preposition (e.g. *She turned it red., It turned red*). While resultative constructions exist in German (Boas 2003), they do not occur with any Change verbs "proper", but instead with the more general verbs *machen* ('make'; for transitive resultatives) or *werden* ('become'; for intransitive resultatives). Of course, when these general verbs are used in resultative constructions, they do in fact exhibit the Change semantics characterizing the "proper" Change verbs analyzed here.[327] In order to account for such data, one could also include *werden* and *machen* as members of the Change verb class, but specify that they only occur in a limited range of VCs. The notions of valency frame and frame-based verb entries introduced in the previous chapter are especially apt to accommodate precisely this type of behavior.

Having identified equivalent features of the VCs across German and English, it is now possible to determine translation equivalents of the specific individual VCs. Table 6.15 shows how individual VCs for expressing Change events match up across the two languages. Each row of the table shows a set or pair of translation equivalents, with the German VC(s) listed in the left column and the corresponding English VC(s) on the right. The table is divided into three sections, with equivalent transitive VCs at the top, equivalent intransitive/reflexive VCs in the middle, and VCs without clear equivalents in the opposite language listed at the bottom (with the other language's cell simply reading "n/a").

[327] As noted in Chapter 5, FrameNet also lists *turn* in the Becoming frame and only includes one annotated sentence of *turn*, which is in the intransitive resultative VC. It is unclear how the frame differs semantically from the Undergo_change frame, apart from in the syntactic realization of the F argument (i.e. intransitive VCs with Change verbs can be interpreted as 'becoming' scenarios even when they include prepositional F realizations: if one transforms into a frog, one becomes a frog). This close relation between 'becoming' and 'changing' may partially account for the appearance of *turn* in both resultative and non-resultative VCs and the use of German *werden* ('to become') to describe resultative change scenarios.

Equivalent Transitive VCs	
German	**English**
T2: C _ U	**T2:** C _ U
T3a: C _ U in F **T3b**: C _ U zu F	**T3a:** C _ U into F **T3b:** C _ U to F
T3c: C _ U dahing/so…	**T3c:** C _ U F.CP
T4aa: C _ U aus O in F **T4ab**: C _ U von O in F **T4ba**: C _ U aus O zu F **T4bb**: C _ U von O zu F	**T4a:** C _ U from O into F **T4b:** C _ U from O to F
Equivalent Reflexive/Intransitive VCs	
German	**English**
R2: U _ sich	**I1:** U _
R3a: U _ sich in F **R3b**: U _ sich zu F	**I2a:** U _ into F **I2b:** U _ to F
R4aa: U _ sich aus O in F **R4ab**: U _ sich von O in F **R4ba**: U _ sich aus O zu F **R4bb**: U _ sich von O zu F	**I3a:** U _ from O into F **13b:** U _ from O to F
Non-equivalent VCs	
German	**English**
T3d: C _ Uneg an U	n/a
R3d: Uneg _ sich an U	n/a
R3c: U _ sich dahing/so,...	n/a
I1: C _	n/a
n/a	**TR3:** C _ U F.result
n/a	**IR2:** U _ F.result

Table 6.15: Equivalent German-English Change VCs and VC groups

Among the transitive VCs, the first equivalent pair involves the T2 VC of German and the T2 VC of English, both of which are simple transitive VCs with no state arguments. The next set of equivalent VCs are those which are transitive and realize F in a prepositional phrase (but not O), here again the VC labels match up, with German T3a and T3b referring to *in* PP and *zu* PP realizations of F, respectively, and English T3a and T3b referring to *into* PP and *to* PP realizations of F, respectively. The next equivalency pair are labeled T3c in both languages and refer to transitive VCs which express the result or purpose of the change in a dependent clause (with slight formal differences, mentioned earlier in this section). The final set of equivalent transitive VCs are those which also realize both the O and the F arguments in prepositional phrases. As discussed above, because German may use two prepositions each to introduce O and

F, while English may use two prepositions for F but not O, there is a two-to-four mapping from the English to the German VCs.

The equivalency sets/pairs of English intransitive and German reflexive VCs, shown in the middle of Table 6.14, largely mirror those of the transitive VCs. The first equivalence pair relates the German simple reflexive (R2) and English simple transitive (I1) VCs, which do not include any additional state arguments. The next equivalency set includes German reflexive and English intransitive VCs which realize the F in a prepositional phrase. As with the transitive VCs, German R3a and R3b refer to reflexive VCs with *in* PP and *zu* PP realizations of F, respectively, and English I2a and I2b refer to English intransitive VCs with *into* PP and *to* PP realizations of F, respectively. Among the VCs which realize both O and F in prepositional phrases, there is again a two-to-four mapping, as English I3a and I3b differ only with respect to the realization of F (as *into* and *to* PPs, respectively), and the German VCs requiring an additional digit in their label, with the final digit "a" referring to *aus* PP realizations of O and final digit "b" referring to *von* PP realizations.

The bottom section of Table 6.14 shows VCs that do not have clear equivalents in the other language. The first two of these are German T3d and R3d, which involve the "NEG an U" VC type describe above. While these potentially have equivalents in the English, such VCs did not occur in the English corpus analysis and appear to be highly infrequent. Another German VC without a clear English equivalent is the German R3c, the reflexive VC with the clausal realization of F. This F realization type was only identified among transitive, but not intransitive, VCs in English.[328] The only English VCs without German counterparts are the transitive resultative (TR3) and intransitive resultative (IR2) VCs found only with *turn*. As noted above, these VC types exist in German, but combine with more general verbs (e.g. *machen* and *werden*, respectively).

Recall from the previous chapter that the verb *transform* was found to occur frequently in which the Undergo_change entity is realized as subject and expressed again as a reflexive pronoun in the object position. This VC type, or more appropriately this valency feature, cannot clearly be compared to the German VCs, as all inchoative change scenarios are expressed in

[328] As noted at the end of Chapter 5, one intransitive VC with clausal F was identified one time among the 206 examples of *metamorphose*, suggesting that this VC type is indeed possible in English but highly infrequent.

reflexive constructions which are formally equivalent to those found with English *transform*. This has implications for the comparison of grammatically relevant meaning components in the following section. Specifically, in Sections 5.3 and 5.5, I hypothesized that the frequency of *transform* in reflexive patterns relates to its meaning component specifying that it (optionally) refers to changes that are deemed positive. Ideally, one could identify German Change verbs that also appear with high relative frequency in reflexive VCs and then determine whether they have the "positive change" meaning component, thus establishing "positive change" as cross-linguistically grammatically relevant. However, this comparison is impossible given that reflexive constructions are employed by default with intransitive uses of German Change and thus not (clearly) associated with any semantic feature.

In summary, this comparison has shown that the valency constructions found among German and English verbs are largely similar to one another. While some construction pairs can be characterized as one-to-one equivalents (e.g. the T2 VC in both languages), the majority of them display one-to-many or many-to-many mappings. Such mappings were frequent among the VCs which include prepositional state arguments, as it is not always straightforward to compare the meanings of prepositions[329] and German allows two preposition options for introducing the O argument compared to only one in English. While some VCs for one language were not identified in the corpus analyses of Change verbs in the other language, even these VC types appear to have translation equivalents, but differ with respect to their overall frequency and distribution across verbs. An example of the former is the "NEG an U" construction found with German *ändern*: while this VC type did not arise in the English corpus data, it seems to occur with the verb *change* (e.g. *change nothing about X*) but at a much lower rate of frequency than the German variant. An example of VCs differing with respect to their distribution across verbs, the resultative patterns found with English *turn* (*turn red; turn something red*) do not occur with prototypical Change verbs in German, but with the more general verbs *werden* ('become') and *machen* ('make'). As with the striking similarity of meaning components identified in the previous section, one must wonder whether the similarity of VCs among these verbs may be due to the highly general nature of the Change semantics. In order to address this question, in Chapter 7 I discuss how a verb class

[329] As noted above, a detailed investigation of the semantic types of O and F arguments occurring with the various prepositions in both languages is necessary to determine how such VCs relate across the two languages.

with much richer semantics, namely Theft verbs, behaves across German and English in comparison with Change.

From a theoretical perspective, this comparison showed the advantages of the Contrastive CxG methodology introduced by Boas (2010b), as it allowed an intuitive comparison constructions that are closely semantically related as they are used to express the same semantic frame. As such, it differs from traditional (even traditional CxG) analyses that investigate more abstractly defined argument structure constructions (Goldberg 1995, 2006) across a range of semantically diverse verbs and verb classes, such as Michaelis and Ruppenhofer (2001), Iwata (2008), and DeClerck et al. (2012). These studies showed rather drastic differences in the distribution and detailed interpretation(s) of related constructions across languages, whereas the present frame-specific analysis revealed that VCs for expressing Change across German and English are very comparable and differ only in specific details. Establishing this range of constructions and their cross-linguistic equivalents opens up windows for new research, specifically focusing on how the syntactic constellations associated with Change VCs occur across other verb classes, including those closely related to Change (e.g. more specific "change of state" verbs) and those less closely related (e.g. Motion verbs; *She turned her car into the driveway*). Another avenue for future research would be to extend this comparison to other, especially less closely related languages, to determine whether those languages also exhibit the same (classes of) VCs to express Change events. More generally, this analysis realizes many of the suggestions arising from work at the intersection of Construction Grammar and Valency Grammar, specifically that contrastive analyses must first be carried out in very specific contexts and that constructions should be defined at varying levels of abstraction (Iwata 2008, Boas 2011a, Herbst 2014).

6.4.2. Grammatically relevant meaning components of German and English Change verbs

6.4.2.1. Method

Having established the meanings of German Change verbs and equivalencies across German and English Change VCs, it is possible to address the third research question of this chapter, namely whether the grammatically relevant meaning components and corresponding sub-classes identified for the English valency frame also apply to the German valency frame. In Chapter 4, I defined a *grammatically relevant meaning component* as an (additional) meaning component that causes verbs that bear it to differ in valency behavior from other verbs in the class

that do not bear it. There, I claimed that when two or more verbs each exhibit a grammatically relevant meaning component, they form a (syntactic-semantic) sub-class: a verb class that captures more fine-grained aspects of syntax and semantic than those of FrameNet or Levin (1993). For example, in Chapter 5, I identified two major sub-classes of Change verbs based on the grammatically relevant meaning components "subtle change" and "drastic change".[330] In addition to these meaning components that enable the formulation of sub-classes, I also identified meaning components that apply to only one of the English change verbs and appeared to influence the valency behavior of that verb. Specifically, I suggested that the "change for a purpose" or "change to make less extreme" meaning component(s) of *modify* may relate to the verb's relatively high occurrence (18%) in VCs with purposive clause F arguments. Additionally, the "positive change" component of *transform* could potentially relate to its relatively high frequency (10%) in VCs including a reflexive direct object referring back to the U subject (*He transformed himself*).[331]

The question thus arises whether these meaning components influence German Change verbs that bear them in similar ways as the English verbs. To test this, we must first identify German verbs with similar meaning components to those English ones just described and then determine the German verbs' valency distribution, before finally determining whether the verb with that meaning component exhibits similar valency behavior as the English verbs with that component. If this is the case, we may propose that this meaning component is *cross-linguistically grammatically relevant* and a potential linguistic universal to be tested on a wider range of languages.

The meaning analysis of German Change verbs in Section 6.3 provides the first step of the analysis, showing generally that the additional meaning components German Change verbs largely parallel those of English Change verbs. Specifically, *abändern, ändern,* and *verändern* were each shown to exhibit the "subtle change" meaning component. As such, we may expect them to exhibit the same valency behavior as English *alter* and *modify*, namely a strong tendency

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330 Specifically, English verbs with the "subtle change" meaning component (*alter, modify*) appear almost exclusively in transitive VCs and in VCs without prepositional state arguments. English verbs with the "drastic change" meaning component (*transform, metamorphose*) showed a relatively high frequency (~10% of analyzed examples) in VCs which include both the O and the F arguments (in prepositional phrase realizations).

331 As noted above, a comparison of the grammatical influence of this meaning component is not possible, because inchoative change scenarios are encoded using reflexive constructions by default in German.

to appear in transitive VCs and VCs without prepositional state arguments. *Verwandeln* and *wandeln* were shown to exhibit the "drastic change" meaning component, thus prompting a comparison with the valency behavior of English *transform* and *metamorphose*, which showed a high frequency in VCs with both O and F prepositional arguments. Finally, the "change to improve" and "change to make less extreme" were identified for German *abändern*, which prompts a comparison with the unique behavior of *modify*, namely a relatively high frequency in VCs with clausal F realizations. The "positive change" meaning component was not clearly identified for any of the German verbs analyzed and its potential syntactic repercussion (i.e. relatively frequent with reflexive objects) is also incomparable across the languages, given that reflexive VCs are always used in German to describe inchoative changes.

6.4.2.2. Valency distribution of German Change verbs

I now discuss the valency distribution of the German Change verbs in the corpus analysis, in order to compare them with the English data. In the following, I describe the valency distribution of each German Change verb based on the corpus analysis following the methodology employed in the previous chapter. After describing each verb's valency distribution, I briefly discuss whether it exhibits the valency behavior expected based on English verb(s) with the same meaning components. After discussing each verb individually, I systematically determine whether the grammatically relevant meaning components of English also influence the German verbs' valency behavior and, if so, whether the influence is similar to that of English.

Ändern

The corpus search for *ändern* resulted in 95 examples that were valid for the present investigation (as described at the beginning of this section and in Chapter 4). The results are presented in Table 6.16, listing the VC type, its overall frequency, its percentage frequency of all analyzed examples of *ändern*, the fully spelled out pattern (with default realizations), and one example per pattern from the DWDS corpus.

VC[332]	# of 95	Freq. (%)	Pattern	Example
T2	41	43%	[C.NP.Nom + verb + U.NP.Acc]	Die Autoren [...] änderten aber die Dramaturgie des Stückes, [...]
T3d	13	14%	[C.NP.Nom + verb + U.NP.Acc + U.anPP.Obl][333]	Und auch ein fetter Hintern und ein gelber Stock änderten nichts an dieser Tatsache.
T4ab	1	1%	[C.NP.Nom + verb + U.NP.Acc + O.vonPP.Obl + F.inPP.Obl]	Ein außerordentlicher Parteitag änderte am 15.2. 1969 den Namen von SED-W in SEW
R2	33	35%	[U.NP.Nom + verb + U.Refl.Acc][334]	Denn der Bezugsrahmen, in dem sich die Bedeutung des Lokalen erweisen muß, ändert sich.
R3c	1	1%	[U.NP.Nom + verb + U.Refl.Acc + F.dahingehendCP.Obl]	[…] wird sich auch das Selbstverständnis global handlungsfähiger Aktoren dahingehend ändern können, daß sie sich zunehmend als Mitglieder einer Gemeinschaft verstehen, [...]
R3d	6	6%	[U.NP.Nom + verb + U.Refl.Acc + U.anPP.Obl][335]	Der Kurs ist klar umrissen worden, und daran wird sich nichts ändern.

Table 6.16: Valency distribution of *ändern*

Of the 95 analyzed examples, 55 exhibit transitive VCs and 40 exhibit reflexive VCs. Among the transitive VCs, 41 are simple transitive VCs without states (T2), while one example realizes the F argument in an *in* PP and O in a *von* PP (T4ab). 13 of the 55 simple transitive patterns exhibit the T3d VC that is found exclusively with *ändern*, in which the object is a negative polarity item and the U argument is specified in an *an* PP.

Of the 40 reflexive/inchoative patterns, 33 are of the simple intransitive VC (R2) without any state arguments. One example is of type T3c, which expresses the result in a clausal phrase headed by *dass*, this time introduced with the word *dahingehen*. Finally, six reflexive examples

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332 In these tables, VCs of type I are listed first, then those of type T, followed by those of type R. VCs with fewer arguments precede those with more arguments. VCs with the third digit "a" (with *in* PP realization of F) precede those of type "b" (*zu* PP for F), which precede those of type "c" (clausal F). For VCs with O arguments, those of type "a" (*aus* O) precede those of type "b" (*von* O).

333 One of the T3d examples of *ändern* exhibits a non-default realization of the subject C as a *dass* clause*: Daß auch der Gastwirt Wolfgang Peters in dem Verfahren gegen Schneider und Fürst als Zeuge vernommen worden war, änderte nichts daran, daß man ihm nicht glaubte*.

334 Five of the R2 examples of *ändern* also include prepositional phrases that express an (indirect) cause of the change. Three of these are introduced with *mit*, while two are introduced with *durch*, as in: *Dies ändert sich schlagartig* ***mit dem Auftritt Schwandas****.; […] dies hat sich auch* ***durch einige Adhoc-Anpassungen der Leistungen*** *in den letzten Jahren nicht grundsätzlich geändert.*

335 One of the R3d examples of *ändern* expresses an indirect cause in a *durch* PP: *Der »liebe B« hat sich im Gefängnis erhängt. An der Rechtslage änderte sich* ***dadurch*** *nichts.*

exhibited the R3d pattern unique to *ändern*, in which the subject is a negative polarity item and the U argument is specified in an *an* PP.

It appears that *ändern* shows a slight preference for transitive patterns (58%) over reflexive patterns (42%), but this preference does not seem to be significant. With respect to State realization, however, *ändern* appears almost exclusively without prepositional State arguments. Only one such example was found among the transitive variants, and none were found with the reflexive variants. One unique property of *ändern* is its relatively frequent occurrence in patterns with a negative polarity item as transitive object or intransitive subject and an *an* PP further specifying the U arguments. These patterns appear at a rate of nearly 19% in the *ändern* examples, but were not identified in the data from other German Change verbs.

Given that *ändern* exhibits the "subtle change" meaning component, one may expect it to exhibit valency behavior similar to English *alter* and *modify*, namely a strong preference for transitive VCs and VCs without prepositional state arguments. With respect to the first property, *ändern* differs from the English verbs, as it is nearly equally frequent in transitive and resultative VCs. However, *ändern* does share with the English "subtle change" verbs a strong preference for VCs without prepositional state arguments, as no such VCs were attested in the data. This suggests that the "subtle change" component may be grammatically relevant in German but with a slightly different effect: it only leads to low frequency in prepositional F VCs but not to a high frequency in transitive VCs. The following section tests this across a larger number of verbs.

Abändern

Abändern appears to be the least frequent verb among the five, as only 95 results were extracted from the DWDS corpus. Of these 95, only 22 were active verbal uses in active sentences not involving non-canonical clause types (e.g. passive, infinitival clauses) that are not analyzed here due to methodological reasons (see Chapter 4). Despite the sparsity of this data, it is possible to identify some trends in the verb's argument realization behavior and to confirm these with a cursory analysis of the COSMAS-II DeReKo corpus. The results of the DWDS analysis are provided in Table 6.17 below. All 22 of the analyzed examples are transitive. 19 of them are of the simple transitive VC type (T2), one also realizes the F argument in a *zu* PP (T3b), and two express the F as a subordinate *dass* clause introduced with *so* (T3c).

VC	Freq.	Freq. (%)	Pattern	Example
T2	19	86%	[C.NP.Nom + verb + U.NP.Acc][336]	Das Gericht kann die Entscheidung auf den weiteren Antrag einer Partei abändern.
T3b	1	5%	[C.NP.Nom + verb + U.NP.Acc + F.zuPP.Obl]	erarbeitete die CDU/CSU Reformpläne, die den Ersatz- zu einem quasi Arbeitsdienst abändern sollte.
T3c	2	9%	[C.NP.Nom + verb + U.NP.Acc + F.soCP.Obl]	[…] er wolle sie so abändern, daß sie seinen persönlichen Wünschen einen Freiraum gewährt.

Table 6.17: Valency distribution of *abändern*

It appears that *abändern* strongly prefers transitive valency patterns, as no reflexive VCs appeared in the corpus. Also, *abändern* seems to be averse to prepositional F and O arguments, although not completely incompatible with them. In order to confirm these general findings, I also analyzed 100 random examples from the COSMAS-II DeReKo corpus. Similar to the DWDS data, only 22 of the 100 examples exhibited active sentences without any valency-changing constructions (e.g. passive, imperative). Of these 22 examples, 20 exhibit the simple transitive T2 VC.[337] In sum, it is safe to say that *abändern* shows a strong preference for simple transitive patterns and is infrequent, but not altogether ungrammatical, with transitive patterns expressing state arguments.

In comparing *abändern*'s valency behavior with English Change verbs, two meaning components may be relevant. The first is the "subtle change" component, which influences a strong preference for transitive VCs and prepositional F VCs in English *alter* and *modify*. Here, the similarities are quite overwhelming, as *abändern* (based on the present data) occurs

[336] One of the T2 examples of *abändern* expresses an indirect cause in a *durch* PP: *Im Jahr 1817 hatte Zar Alexander I. […] das Organische Grundgesetz der Kirche durch die Akte vom 6./18. März in regalistischem Sinne abgeändert.*

[337] The two remaining examples exhibit VCs that are not found in any of the DWDS for any of the German Change verbs. Specifically, these VCs introduce the Final_state in an *auf* PP, rather than an expected *in* PP or *zu* PP. One such example only included this argument in addition to the simple transitive pattern, while the other also included an Original_state argument in a *von* PP. It is also interesting that both of these VC types are attested in the same newspaper (*St. Gallen Tagesblatt*) but nowhere else in the small analyzed portions of both the DWDS and DeReKo corpora. If further analysis shows that these VC types are in fact felicitous with German Change verbs, such as *abändern*, then they should be included in the constructional range (see Sections 4.3 and 5.4), thus necessitating additional categories to subsume VCs with F arguments expressed in *auf* PPs. The relevant DeReKo examples are provided here: *Roland von Mentlen […] musste den Slogan im Lauf der Saison abändern auf «Zug wird von Tag zu Tag besser» und «Zug kann nur noch besser werden...»* (A98/APR.23206 St. Galler Tagblatt, 14.04.1998, Ressort: TB-SPO (Abk.); Zuger Meister-Premiere in Davos); *Er kann […] den Schuldspruch von «Mord im zweiten Grad» zum Beispiel auf fahrlässige Tötung abändern […]* (A97/NOV.33761 St. Galler Tagblatt, 06.11.1997, Ressort: TB-SPL (Abk.); Richter vertagt Entscheidung).

exclusively in transitive VCs and is highly infrequent (5%) in VCs with prepositional F arguments. Thus, unlike *ändern*, *abändern* exhibits both of the valency behavior properties associated with English "subtle change" verbs.

The second meaning component to compare is that of "change for a purpose" or "change to make less extreme", which was identified for English *modify* and speculatively leads to a relatively high frequency (compared with other Change verbs) of this verb in VCs expressing the F in a purposive clause. While only two examples of such VCs are attested, this is a relatively high percentage (9%) of the few attested examples and much higher than that found with any of the other German Change verbs (i.e. such VCs comprise only 1% of the data for *ändern*, *verändern*, and *wandeln*). These findings suggest that this meaning component is grammatically relevant across the languages, as discussed in more detail in the following section.

Verändern

Table 6.18 presents the results for the 77 examples analyzed for *verändern*.

VC	Freq.	Freq. (%)	Pattern	Example
T2	41	53%	[C.NP.Nom + verb + U.NP.Acc]	Diese Globalität verändert unser Denken.
R2	35	45%	[U.NP.Nom + verb + U.Refl.Acc][338]	Mit diesen strukturellen Verschiebungen verändert sich der Weltbegriff.
R3c	1	1%[339]	[U.NP.Nom + verb + U.Refl.Acc + F.dahingehendCP.Obl]	Vielleicht verändert sich die Pyramide so sehr, daß sie dereinst zum Würfel wird?

Table 6.18: Valency distribution of *verändern*

Verändern appears to have a rather narrow valency distribution, as only three VC types are attested with it in the corpus. 41 examples exhibit the simple transitive VC (T2), 35 exhibit the simple intransitive type (R2), and one example exhibits an intransitive pattern with a clausal F introduced by *so…, dass…* (R3c).These data suggest that *verändern* has no preference for either reflexive or transitive patterns, as they each comprise about half of the data. However, *verändern* did not appear with any patterns involving State arguments, either clausal or prepositional, nor with any "special" patterns (e.g. U as *an* PP).

[338] Four of the R2 examples of *ändern* also include prepositional phrases that express an (indirect) cause of the change. Two of these are introduced with *mit*, while two are introduced with *durch*, as in: ***Mit ABIOLAs Tod*** *veränderte sich die innenpolitische Lage in dem afrikanischen Land von neuem* […] ; *Die Situation hat sich wesentlich verändert* ***durch die Initiative zur Begrenzung konventioneller Waffen***, [...]

[339] Because I round the percentages to the nearest full percentage point, the frequency percentages do not always add up to 100%.

Like the previously discussed verbs, *verändern* exhibits the "subtle change" meaning component which influences a preference for transitive VCs and VCs without prepositional states among English verbs. Similar to the English verbs with this component, German *verändern* also strongly prefers VCs without prepositional states, as no such VCs were attested in its data. However, unlike the English "subtle change" verbs, *verändern* shows no preference for transitive or reflexive VCs. As with the comparison of *ändern*, these findings suggest that the "subtle change" meaning component only effects a strong preference for VCs without prepositional F among Change verbs, but not a preference for transitive VCs. This will be tested in more detail in the following sub-section.

Verwandeln

Table 6.19 below presents the results of 114 analyzed examples[340] of *verwandeln*. *Verwandeln* exhibits the greatest syntactic diversity of the five German Change verbs, appearing in nine different VC types. It is the only verb to appear in the simple intransitive VC (I1), with two such occurrences. This VC type is rather unexpected, based on both conversations with native speakers and based on its infrequency in the corpus. It is also worth noting that both examples are from the same (religious) text and may be the product of novel, creative language use. Nevertheless, I include them in the analysis and simply note that they are highly infrequent.

Of the 51 examples exhibiting transitive VCs, 10 are of the simple type with no state arguments (T2). 37 examples realize only the F argument in an *in* PP (T3a), and two realize only F in a *zu* PP (T3b). One example realizes both the O in an *aus* PP and F in an *in* PP (T4aa). 61 instances of *verwandeln* exhibit inchoative/reflexive patterns, 10 of which are of the simple reflexive VC type with no states (R2). 47 realize only F in an *in* PP (R3a), three realize only F as a *zu* PP, and one realizes both O as *von* PP and F as *in* PP.

To summarize the syntactic behavior of *verwandeln*, the data show that this verb exhibits no particular preference for transitive or reflexive patterns. With respect to State arguments, *verwandeln* shows a strong tendency to appear in patterns which express the F argument in a prepositional phrase, as 92 sentences (81%) include this argument while 22 (19%) do not. Among these examples, the most frequent preposition used to introduce F is *in* with 86 attestations, while *zu* introduces F in only four examples. As mentioned above, the data for *verwandeln* also

[340] The data included 12 analyzed examples from 1967-1969 in addition to 104 examples from 1970-2000.

included two intransitive, non-reflexive patterns that are not found with any other German Change verbs, but likely result from creative, literary uses and thus are not common to German Change verbs.

VC	Freq.	Freq. (%)	Pattern	Example
I1	2	2%	[C.NP.Nom + verb]	Liebe verwandelt und heilt.
T2	10	9%	[C.NP.Nom + verb + U.NP.Acc]	[…] die Komödianten haben ihn belehrt und verwandelt.
T3a	37	32%	[C.NP.Nom + verb + U.NP.Acc + F.inPP.Obl]	Wie verwandelt man Blei in Gold?
T3b	2	3%	[C.NP.Nom + verb + U.NP.Acc + F.zuPP.Obl]	[…] daß im Atomzeitalter eine Rückkehr der Supermächte zum Kollisionskurs die menschliche Rasse zu Asche verwandeln könne.
T4aa	1	1%	[C.NP.Nom + verb + U.NP.Acc + O.ausPP.Obl + F.inPP.Obl]	Die fehlerhafte Linie der Führung hat die Partei aus einer politischen Partei und einem von einer Idee durchdrungenen Bund in eine Machtorganisation verwandelt, die [...]
R2	10	9%	[U.NP.Nom + verb + U.Refl.Acc][341]	Während der Sommermonate des Jahres 1948 hatte sich unsere Armee verwandelt.
R3a	47	41%	[U.NP.Nom + verb + U.Refl.Acc + F.inPP.Obl][342]	Prag, Paris und Westberlin verwandelten sich binnen kurzem in Orte der konkreten Utopie.
R3b	3	3%	[U.NP.Nom + verb + U.Refl.Acc + F.zuPP.Obl]	Dabei verwandelt sich die religiöse Glaubensgemeinschaft […] zu einer unter Kooperationszwängen stehenden Kommunikationsgemeinschaft.
R4aa	1	1%	[U.NP.Nom + verb + U.Refl.Acc + O.ausPP.Obl + F.inPP.Obl]	Die Teilnehmer […] können sich aus Exemplaren einer tierischen Spezies mit angeborener artspezifischer Umwelt […] in Angehörige eines Kollektivs mit Lebenswelt verwandeln […]
R4ab	1	1%	[U.NP.Nom + verb + U.Refl.Acc + O.vonPP.Obl + F.inPP.Obl]	Die Augenärztin und ehemalige Hochschullehrerin hat sich […] von einer scheuen Ehefrau […] in eine selbstbewußte Hoffnungsträgerin verwandelt.

Table 6.19: Valency distribution of *verwandeln*

[341] One of the R2 examples of *verwandeln* expresses an indirect cause in a *durch* PP: *Man kann sich also durch Gedankenkraft verwandeln*.

[342] One of the R3a examples of *verwandeln* expresses an indirect cause in a *durch* PP: *So manche holprige und unschöne Rede verwandelt sich durch einen wie Rüdiger Weber in einen gut leserlichen Text,* […]. Two examples exhibit non-default realizations of the subject U argument as a *wh*-clause, and one of these also includes multiple prepositional F arguments: *Was als Unterscheidungsmittel gedacht war, _&_&verwandelte&_&_ sich […] in einen Gegenstand des Spottes, in einen »Bonzenschlitten«*.

The meaning analysis in Section 6.3 showed that *verwandeln* exhibits the "drastic change," which was shown to influence the grammatical behavior of the English verbs *transform* and *metamorphose* such that they appear in VCs with both O and F (in PPs) more frequently than verbs without this component. As we have established the valency distribution of *verwandeln*, we may now determine whether it also exhibits this valency behavior in order to test whether "drastic change" is a grammatically relevant meaning component in both languages. While *verwandeln* is highly frequent in VCs with prepositional F arguments at a rate of 81%, it is not strikingly frequent in VCs expressing both the O and the F arguments, as such VCs are only found in three examples in the dataset (< 3%). As such, it does not appear that the "drastic change" meaning component influences German verbs the same as English verbs, if at all.[343]

Wandeln

Table 6.20 below presents the results of 87 analyzed examples of *wandeln*. *Wandeln* also exhibits a wide range of valency behavior, with a total of eight different VC types attested. Only eight sentences exhibited transitive patterns, six of which realized no additional arguments (T2) and two of which realized F in a *zu* PP (T3b). Of the 79 inchoative/reflexive examples, 56 realized no additional arguments (R2). Two examples realize only F in an *in* PP (R3a), 11 realize only F in a *zu* PP, and one realizes F as a clause introduced by *so…, dass…* (R3c). One example realizes both O in an *aus* PP and F in an *in* PP (R4aa), while seven realize both O in an *von* PP and F in a *zu* PP (R4bb).

In summary, it appears that *wandeln* shows a preference for reflexive patterns, as they comprise 79 of the 87 examples (91%), but transitive patterns were also attested. *Wandeln* also appears much more frequently in patterns without prepositional F arguments, which comprise 63 of the 87 examples (72%). Another interesting aspect of *wandeln* is that it realizes F in a *zu* PP more frequently than any other German Change verb. 20 of the 23 (87%) patterns including prepositional F arguments employ *zu* PPs, while such phrases appear only five times with *verwandeln* (4% of all prepositional F arguments), which has the second most frequent instances

[343] The comparison here is somewhat problematic. Specifically, the English "drastic change" verbs could be compared with "general change verbs" *change* and *turn*, which differed in their distribution across prepositional state VCs. In contrast, given that there are no "general chang" verbs in German, the German "drastic change" verbs can only be compared against the "subtle change" verbs, which were shown to rarely appear with prepositional state arguments. One could thus posit that the "drastic change" meaning component is grammatically relevant in German, in that verbs bearing it are felicitous in prepositional state VCs, which is not the case for "subtle change" verbs.

of F as *zu* PP. Finally, *wandeln* appears to be most frequent among the analyzed verbs in patterns with both the O and the F argument, as these comprise over 9% of its examples (eight total of 87), but are found only once each with *ändern* and *verwandeln* in the entire analyzed corpus.

VC	Freq.	Freq. (%)	Pattern	Example
T2	6	7%	[C.NP.Nom + verb + U.NP.Acc]	[…] und seine Tätigkeit im Club d'essai wandelten dann grundlegend seinen Stil [...]
T3b	2	2%	[C.NP.Nom + verb + U.NP.Acc + F.zuPP.Obl]	[…] , daß er den Front National zu einer salonfähigen konservativen Partei wandeln wolle.
R2	57	66%	[U.NP.Nom + verb + U.Refl.Acc][344]	Am Ende des 18. Jahrhunderts allerdings wandelte sich das Leseverhalten der ländlichen Bevölkerung.
R3a	2	2%	[U.NP.Nom + verb + U.Refl.Acc + F.inPP.Obl]	Die Gunst des Königs wandelt sich in Zorn, […]
R3b	11	13%	[U.NP.Nom + verb + U.Refl.Acc + F.zuPP.Obl][345]	Nach der Gründung des Staates Israel wechselte er ins sozialistische Lager und wandelte sich zum engagierten Publizisten und Schriftsteller.
R3c	1	1%	[U.NP.Nom + verb + U.Refl.Acc + F.soCP.Obl]	[…] , sollten die Verhältnisse sich so wandeln, "daß einer Vertragspartei das Festhalten an der ursprünglichen Regelung nicht zugemutet werden kann".
R4aa	1	1%	[U.NP.Nom + verb + U.Refl.Acc + O.ausPP.Obl + F.inPP.Obl]	Erst in der entwickelten KP. würde sich die Arbeit aus einer Existenznotwendigkeit in ein erstes Lebensbedürfnis wandeln.
R4bb	7	8%	[U.NP.Nom + verb + U.Refl.Acc + O.vonPP.Obl + F.zuPP.Obl]	Der ältere Diener des hugenottischen (protestantischen) Edelmanns Raoul de Nangis wandelt sich vom fanatischen Eiferer zum mitleidenden Gläubigen, […]

Table 6.20: Valency distribution of *wandeln*

As with *verwandeln*, *wandeln* is also associated with the "drastic change" meaning component, which brings about a relatively high frequency of VCs realizing both the O and the F arguments in English Change verbs. While *verwandlen* was found to occur frequently in VCs realizing only the F in a prepositional phrase but infrequently with VCs realizing both state

344 Three of the R2 examples of *wandeln* express an indirect cause in a *durch* PP, as in: *Nach dem 1. Weltkrieg wandelte sich die Geschäftslage durch Loslösung von der brit. Muttergesellschaft Gramophone Co*.

345 One of the R3b examples of *wandeln* expresses multiple prepositional F arguments: *Und auf diese Weise _&_&wandelte&_&_ sich manch ein Saunamuffel zu einem begeisterten Saunafreund, ja zu einem glühenden Propagandisten für einen besseren Lebensstil*.

arguments, *wandeln* exhibits a rather different behavior. Specifically, VCs with prepositional state arguments (including only F and both O and F) comprise only 27% of the examples of *wandeln*, while VCs realizing both O and F in PPs comprise 9% of the analyzed examples, a much higher frequency than with any other German Change verb.[346]

6.4.2.3. Summary of valency behavior of German Change verbs and comparison of GRMCs

Having established the exact valency distribution of each the German Change verb, we can now systematically compare the grammatically relevant meaning components identified for English Change verbs to determine if they have the same effect, if any, on German verbs exhibiting these meaning components. I first summarize the precise valency distribution of German Change verbs and describe in more general terms their tendencies according to individual features of the VCs. I then carry out the cross-linguistic comparison of GRMCs. Here, I first summarize the meaning components identified in both languages and describe the valency effects of these meaning components on the English verbs bearing them. I then discuss how the German verbs exhibiting these meaning components behave with respect to valency constructions and determine whether they exhibit the same tendencies as the English verbs, in which case I posit a potential *cross-linguistically grammatically relevant meaning component*.

I begin by summarizing the precise distribution of each Change verb across the VCs in Table 6.21. From a bird's eye perspective, the table demonstrates that German Change verbs also exhibit drastic differences in the number, types, and frequency of VCs they occur with. Only one VC type, the simple transitive VC (T2) appears with all five of the analyzed verbs, but several other VCs occur with only one of the verbs under analysis (I1, T3a, T3d, T4aa, T4ab, R3d, R4ab, R4bb). This great diversity of valency distributions was also identified for the English Change verbs in the previous chapter and emphasizes the idiosyncratic nature of the meaning-valency relationship and the need for verb-specific valency descriptions, in line with the findings of Faulhaber (2011).

[346] It is puzzling why *verwandeln* is highly frequent in VCs with F but not in those with both O and F and *wandeln* being much less frequent in VCs with only the F but much more frequent in VCs with both state arguments.

	abändern	ändern	verändern	verwandeln	wandeln
I1: C V				2%	
T2: C V U	86%	43%	53%	9%	7%
T3a: C V U in F				32%	
T3b: C V U zu F	5%			3%	2%
T4aa: C V U aus O in F				1%	
T4ab: C V U von O in F		1%			
(T4ba: C V U aus O zu F)					
(T4bb: C V U von O zu F)					
T3c: C V U dahing/so…	9%				
T3d: C V Uneg an U		14%			
R2: U V sich		35%	45%	9%	66%
R3a: U V sich in F				41%	2%
R3b: U V sich zu F				3%	13%
R4aa: U V sich aus O in F				1%	1%
R4ab: U V sich von O in F				1%	
(R4ba: U V sich aus O zu F)					
R4bb: U V sich von O zu F					8%
R3c: U V sich dahing/so,...		1%	1%		1%
R3d: Uneg V sich an U		6%			

Table 6.21: Distribution of valency constructions with German Change verbs

In order to compare the valency behavior of the individual verbs, Table 6.22 extrapolates the data from the above table to show how each verb behaves with respect to specific features of the VCs. The first distinction is the relative frequency of each verb in transitive vs. reflexive VCs (second column). The next column shows the verbs' distribution across VCs with vs. VCs without prepositional state arguments (including those with only F and with both O and F). The fourth column shows the frequency with which *in* vs. *zu* introduces the F argument (with the first number showing the frequency with that preposition and the number after the slash showing the total number of prepositional F arguments attested for that verb). The final column lists any other unique behavior observed for the German Change verbs.

With respect to the transitive-reflexive distinction, three types of behavior are observable. For *ändern, verändern*, and *verwandeln* there is no strong preference for transitive or reflexive patterns. *Abändern* occurs only in transitive patterns, while *wandeln* appears much more frequently in reflexive patterns than transitive patterns.

Verb	Transitive – Reflexive	Prepositional F vs. no prep. F	F realization	Other
abändern	100% - 0%	5% - 95%	*zu* (1/1)	Frequent with clausal F (9%)
ändern	58% - 42%	2% - 98%	*in* (1/1)	Frequent in [NEG *an* U] (20%)
verändern	53% - 46%	0% - 100%	0	
verwandeln	46%-54%	80% - 20%	*in* (87/92) *zu* (5/92)	2 intransitive (I1)
wandeln	9% - 91%	26% - 74%	*in* (3/23) *zu* (20/23)	8 w/ O (9%)

Table 6.22: Major trends in valency behavior of German Change verbs

Each verb shows some preference for VCs with or without prepositional (Final) State arguments. *Abändern, ändern,* and *verändern* each appear almost exclusively with VCs without prepositional F arguments. *Wandeln* is also more frequent in VCs without prepositional F, but to a lesser extent than the three verbs just mentioned. *Verwandeln*, on the other hand, is the only verb which appears more frequently in VCs including prepositional F arguments than those without. Looking at the specific preposition which introduces the F argument, it is worth noting that *in* is much more frequent than *zu* with *verwandeln*, but the opposite is true for *wandeln*, which frequently appears with *zu*. A more detailed comparison of the semantic types of F arguments occurring with *zu* and those occurring with *in* may reveal a semantic distinction between *wandeln* and *verwandeln* that is not captured in any of the lexical resources reviewed above.

Also worth noting is that *abändern* appears most frequently in patterns in which F is expressed in a purposive clause, with such patterns comprising over 9% of the data for *abändern*, but not more than 1% for any of the other verbs. Other notable behavior includes the relatively high frequency of *an* PPs introducing the U argument with *ändern* (20% of its examples), the two uncommon intransitive patterns with *verwandeln*, and the relative frequency of O arguments with *wandeln* (9%). Table 6.23 summarizes these specific valency features and the verbs that exhibit them.

Valency Feature	Category	Verbs
Transitivity	no clear tendency	*ändern, verändern, verwandeln*
	only transitive	*abändern*
	(almost) only reflexive	*wandeln*
State arguments	(almost) always no State	*abändern, ändern, verändern*
	preference for State	*verwandeln, wandeln*
F PP realization	none	*abändern, ändern, verändern*
	prefer *in*	*verwandeln*
	prefer *zu*	*wandeln*
	frequent purposive clausal F	*abändern*
Unique behavior	frequent U as *an* PP	*ändern*
	intransitive patterns	*verwandeln*
	frequent O prepositions	*wandeln*

Table 6.23: Classes of German Change verbs according to valency behavior

Having summarized this valency behavior, I now turn to the comparison of GRMCs across Gemran and English Change verbs. As discussed above, three meaning components applied to verbs of both languages: "subtle change" (*alter, modify, abändern, ändern, verändern*), "drastic change" (*transform, metamorphose, verwandeln, wandeln*), and "change for a purpose/to make less extreme" (*modify, abändern*). I now address each of these cross-linguistically shared meaning components in the order they were introduced.

The "subtle change" meaning component was found to be grammatically relevant in English, in that the two verbs bearing it (*alter, modify*) appear almost exclusively in transitive VCs and in VCs without prepositional F (or O) arguments. This component applies to German *abändern, ändern,* and *verändern,* so I now discuss the behavior of each of these verbs with respect to these valency features. The VCs in the *abändern* data were all transitive VCs, and only one of its examples included a prepositional F argument. As it exhibits both the properties identified for English "subtle change" verbs, the data for *abändern* support the hypothesis that this component has the same grammatical effect in German. Moving on to *ändern*, this German verb actually shows no preference for transitive VCs over reflexive VCs, thus differing from the English "subtle change" verbs. However, *ändern* does seem highly infelicitous in VCs with prepositional F arguments, as with the English verbs, as no such VCs were found in its 95

analyzed examples. *Verändern* is very similar to *ändern*, as it also appears equally frequent in transitive and reflexive VCs but shows a strong preference for VCs without prepositional F arguments. Given these data, it appears that the "subtle change" meaning component is grammatically relevant across German and English, but does not have precisely the same effect on valency behavior. Specifically, it only effects a strong preference for VCs without prepositional F arguments, but not a strong preference for transitive VCs.

Moving on to the "drastic change" meaning component, I demonstrated in Chapter 5 that this component corresponded to a relatively high frequency (vs. other Change verbs without this component) in VCs which include both the O and the F arguments (each in prepositional phrases). I now determine whether the German verbs with this component, namely *verwandlen* and *wandeln*, also show high frequency in such VCs. Of the 114 analyzed examples for *verwandeln*, only three (< 3%) included both the O and the F arguments. While this is relatively frequent compared with the German verbs without the "drastic change" meaning component, which each exhibited zero such VCs, the low overall frequency of such VCs with *verwandeln* makes it difficult to claim that the occurrence in VCs with both O and F is characteristic of *verwandeln*. On the other hand, *verwandeln* does exhibit a much higher relative frequency in VCs with both O and F, as such VCs were found in eight of its 87 analyzed examples (> 9%). As such, it is not clear whether the "drastic change" meaning component has the same grammatical effect on Change verbs across German and English, namely high relative frequency in VCs with both O and F. While *wandeln* clearly exhibits this behavior, such VCs comprised less than 3% of the *verwandeln* data, which is higher than the other German Change verbs, but still not high enough to make substantial claims. Thus, the "drastic change" meaning component cannot be posited as cross-linguistically grammatically relevant based on the present data, but perhaps a more comprehensive analysis including many more corpus examples will better support such a finding.

Finally, both English *modify* and German *abändern* were associated with the same meaning component (or two closely related meaning components), specifying that they refer to changes that are carried out for a specific purpose and/or to make something less extreme or more acceptable. The valency analysis of English *modify* revealed a high frequency in VCs expressing the F in a purposive subordinate clause relative to the other English Change verbs which did not exhibit this component. I suggested that this valency behavior could potentially be connected to the "change for a purpose/to make less extreme" meaning component. I now investigate the

behavior of German *abändern* to determine it if also exhibits this valency behavior, which would support the hypothesis that this meaning component is not just grammatically relevant, but also cross-linguistically grammatically relevant (see definitions at beginning of this sub-section and in Chapter 4). The data for *abändern* do in fact include a relatively high frequency in such purposive clause VCs, which comprise 9% of its data but at most 1% of the examples for the other German Change verbs. These correspondences between English *modify* and German *abändern* therefore suggest that the "change for a purpose/to make less extreme" is cross-linguistically grammatically relevant and has the same effect across languages, namely a high relative frequency in VCs expressing F in a purposive clauses.[347] Of course, a generalization based only on two verbs in different languages is not particularly useful, so future work would need to identify other verbs (even perhaps verbs in other classes) with a "for a purpose" meaning component and establish whether these also occur frequently with purposive subordinate clauses.

The results of the comparison of grammatically relevant meaning components across German and English are summarized in Table 6.24.

GRMC	**English**	**German**	Relevant x-lg	Same effect
"subtle change"	Verbs: *alter, modify* --strong preference for transitive VCs --strong preference for VCs without F PP	Verbs: *abändern, ändern, verändern* --strong preference for VCs without F PP	Y	N
"drastic change"	Verbs: *metamorphose, transform* --relatively frequent in VCs with both O and F	Verbs: *verwandlen, wandeln* --occur in VCs with both O and F	??	??
"change for purpose"	Verb: *modify* --relatively frequent in VCs with clausal F	Verb: *abändern* --relatively frequent in VCs with clausal F	Y	Y

Table 6.24: Grammatically relevant meaning components across German and English

The first column lists the meaning component found among verbs of both languages. The second and third columns lists the German and English verbs exhibiting this component, respectively, as well as the shared valency behavior identified for these verbs. The fourth and fifth columns list

[347] As noted in the previous chapter, the relation between the "purposive change" meaning component and the corresponding frequency in VCs with purposive clauses exhibits the "chicken and egg" problem. Specifically, one may attribute the syntactic behavior to the verb meaning or one may attribute the meaning component to the verbs based on their syntactic behavior. This issue is also addressed in Barðdal (2001).

whether the meaning component is grammatically relevant across languages and if it has the same effect on verb valency behavior across languages, respectively.

One observation from the data ist that the "subtle change" meaning component appears to be grammatically relevant across the two languages but with a slightly different effect in both languages. Specifically, English verbs with this component have two shared valency properties: strong preference for transitive VCs and strong preference for VCs without prepositional F (or O) arguments. German "subtle" change verbs, on the other hand, only show a strong preference for VCs without prepositional F (or O) arguments, but do not display noteworthy behavior with respect to transitivity. As such, "subtle change" is cross-linguistically grammatically relevant but has a slightly different effect across the two languages. The "drastic change" meaning component was traced to a relatively high frequency in VCs with both O and F (in prepositional realizations) among English verbs, but only one of the two German verbs with this component (*wandeln*) exhibited such behavior, while the other (*verwandeln*) could not clearly be associated with such behavior. As such, until a more comprehensive corpus analysis is undertaken, the data do not clearly show that "drastic change" is cross-linguistically grammatically relevant. Finally, the "change for a purpose/to make less extreme" meaning component(s), found with English *modify* and German *abändern,* appears to influence a relatively high frequency in VCs expressing the F in a purposive clause. As such, this meaning component is cross-linguistically grammatically relevant and has the same effect across the two languages, but ideally such a generalization would rely on and apply to a wider set of verbs than just one in each language.

The comparison of grammatically relevant meaning component among German and English Change verbs was less conclusive than the prior comparisons of verb meanings and valency constructions, given the limited set of verbs to compare and the relatively small amount of corpus data to draw on. At the same time, the methodology and preliminary results of the analysis show promise for future applications and advantages over existing comparisons of GRMCs. Specifically, traditional comparisons of GRMCs (Croft 2012, Levin 2013) focus on highly abstract meaning components[348] that cross-cut more intuitively defined verb classes,[349]

[348] Levin and Rappaport Hovav (2013) discuss the complications of determining whether a verb is a result verb or a manner verb.

[349] See Levin and Rappaport Hovav (2005: 16–18) and Levin (2013) for a discussion of how grammatically relevant meaning components may be found among verbs of very different semantic classes, be they FrameNet classes or even the coarser-grained classes identified by Fillmore (1968).

such as the result/manner distinction, causal chains, and verbal aspect. Such meaning components are thus very difficult to compare empirically and often rely on elusive intuitive judgments. As these studies compare a wide range of typologically diverse languages, they are complicated by the cross-linguistic variation in grammatical constructions (see Croft 2001), making it difficult to determine the precise effects that the meaning components have on valency behavior. The present approach differs from such studies in that it involves clearly defined and comparable semantic features (at both the frame level and the verb-specific additional meaning components) and valency constructions, as the comparison relies on the semantic frame as a tertium comparationis. As such, the present methodology allows claims to be made about how specific intuitively and empirically identifiable meaning components delimit the specific VCs within a clearly defined range of VCs individual verbs may appear in. This fine-grained perspective also makes it clear what aspects of verb meaning and valency behavior are comparable and which are not.[350]

6.4.3. A brief excursion on syntactic sub-classes and German verbal prefixes

In this section, I briefly discuss two topics that arise from the discussion of German Change verbs. First, I assess the possibility of positing syntactic German Change verbs, as I did for the English Change verbs in the previous chapter. In Section 6.4.3.2, I then investigate whether the verbal prefixes found with German Change verbs determine any aspects of the verb's meaning or valency, and compare these findings with those of Motsch (1999). As these topics are not directly relevant for the contrastive research questions of this chapter, they are only very cursorily addressed here.

6.4.3.1. Syntactic sub-classes of German Change verbs

Having established the valency distribution of German Change verbs, it is now possible to propose syntactic subclasses of German Change verbs based on their argument realization behavior. While no verbs exhibit (near) identical behavior, some possible groupings may be proposed. Both *ändern* and *verändern* show no preference for transitive or reflexive VCs, and they both consistently appear in VCs without State arguments, suggesting a syntactic sub-grouping. The only difference between these two verbs involves the frequent occurrence of *ändern* in VCs specifying the U argument in *an* PPs. *Abändern* is similar to these two verbs in

[350] For example, it was not possible to compare the relation between the "positive change" meaning for English *transform* and the relatively high frequency of this verb with reflexive objects referring back to the subject U argument, with the German data, because all inchoative change events are expressed in VCs including reflexive objects.

that it also does not appear with prepositional F arguments. However, it differs in that it shows a strong preference for transitive over reflexive patterns and frequently occurs with clausal purposive F arguments. A possible explanation for the behavior of these verbs is a proposed connection between not realizing prepositional states (e.g. changing into something else) and the "minor change" meaning component identified for these three verbs in the previous sub-section. Similar behavior was noted for the English Minor Change verbs *alter* and *modify*, discussed in the previous chapter. With respect to the frequency of purposive F clauses with *abändern*, this may be traced to its meaning component of improving or making something more acceptable, similar to that identified for English *modify* which also appeared with purposive F clauses.

Verwandeln and *wandeln*, on the other hand, share some similarities with one another that set them apart from the three other verbs. Both verbs frequently appear with prepositional F arguments and, to varying extents, with prepositional O arguments as well. A relevant difference between the verbs is that *verwandeln* shows no preference for transitive or reflexive patterns, while *wandeln* is much more frequent with reflexive than transitive patterns. Less significantly, these verbs differ in the exact preposition which introduces the F, as *verwandeln* is much more frequent with *in* PPs while *wandeln* appears more frequently with *zu* PPs. Although they display these differences, it is possible that their shared behavior of frequently realizing prepositional states (e.g. changing into something else) is related to the "drastic change" meaning component observed for these verbs in the previous sub-section.

In sum, while no verbs exhibited identical argument realization behavior, *ändern* and *verändern* share many similarities that suggest a syntactic sub-class, particularly as they shown no preference for transitive or reflexive VCs and they almost exclusively appear in VCs without prepositional state arguments. *Abändern* could also possibly be included in this sub-class due to its aversion to VCs with prepositional F arguments, but it also differs with respect to transitivity and the realization of purposive F clauses. In contrast to these verbs, *verwandeln* and *wandeln* both frequently realize prepositional F arguments, suggesting a syntactic sub-class, but they differ with respect to transitivity and the choice of preposition that introduces Final_state argument. I leave further discussion of this topic for future work, as it does not directly relate to the contrastive research questions central to this chapter.

6.4.3.2. The contribution of German verb roots and prefixes

An obvious difference in the lexemes of English and German change verbs is seen in the verbal root and prefix system of German. Whereas all of the analyzed English Change verbs had unique phonological forms, the analyzed German verbs exhibit two distinct roots (*änder-*, *wandel-*) and two distinct verbal prefixes (*ab-*, *ver-*), plus unprefixed variants. This discussion of German Change verbs begs the question of the influence of verbal prefixes on verb meaning and argument structure.

Based on the preceding discussion of syntactic sub-classes, it does not appear that the prefixes have a clear effect on the valency behavior of the verb bearing it. Specifically, the two potential classes included a prefixed and unprefixed variant of the same verbal root, with *verwandeln* and *wandeln* forming one sub-class, and *ändern* and *verändern* the other. Indeed, *ändern* and *verändern* only differ in that the former may appear in the (*nichts ändern an etw.*) construction, and *abändern* and *verändern* only differ in that the former occurs more frequently in constructions expressing the Final_state in a subordinate clause. As such, it appears that verb prefixation has no predictable effect on the valency behavior of German Change verbs.

Based on the meaning analysis in Section 6.3, it appears that the root *wandel-* is associated with drastic changes, while *änder-* is associated with minor changes in attributes. The contribution of verbal prefixes *ab-* and *ver-*, however, is less clear. For instance, the verbs *verändern* and *verwandeln* differ from their non-prefixed counterpart in having the prefix, but no notable semantic differences exist between these verb pairs, suggesting that *ver-* does not have a predictable (or any) semantic contribution.[351] The prefix *ab-* may contribute something to the semantics of the root *-änder-*, as it implies very minor changes that improve an existing entity (particularly texts). However, to adequately establish the prefix's contribution, I would first need to analyze other verbs with this prefix (e.g. *abwandeln*).

I now briefly compare this finding with that of Motsch (1999). In his discussion of German word formation, Motsch (1999: 152-153) posits meanings for various German verbal prefixes. For *ver-*, Motsch identifies 18 different senses. The meanings which are relevant for Change verbs are listed in (6.32).

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[351] Of course, a deeper and larger corpus analysis may well reveal semantic distinctions between these verbs that were not apparent from the dictionary analysis.

(6.32) Meanings attributed to *ver-*
a. Etwas vollständig tun: *versprühen, verstreuen* (‘Do something completely’)
b. Endphase eines Geschehens: *verblühen, verglimmern* (‘End phase of an event’)
c. Aktanten nehmen Eigenschaften an: *verarmen, sich verdichten* (‘Participants take on properties’)
d. Verursachen, dass ein Aktant Eigenschaften annimmt: *verdünnen* (‘Cause a participant to take on properties’)

Of these four meaning attributions, (6.32a) and (6.32b) seem to only apply to some instances of Change verbs observed in the corpus. With respect to (6.32a) ('do something completely'), some of the changes described by *ver-* Change verbs can be viewed as “complete” changes, but this is not always the case. In particular, while examples of *verwandeln* are typically complete and dramatic changes, those with *verändern* are not always complete, as seen in (6.33).

(6.33) Weil sie sich täglich *um eine Winzigkeit* verändert, verkörpert sie in meinen Augen den Ablauf der Welt.
‘Because she changes *just a tiny bit* every day, in my eyes she embodies the cycle of the world.’

As for (6.32b), while some *ver-* Change verbs may refer to the end phase of a change event, they typically refer to the change as a whole. The final two meaning components (6.32c) and (6.32d) ([cause to] take on properties) appear to characterize Change verbs in general in both their inchoative/reflexive (6.32c) and transitive (6.32d) uses. That is, even the unprefixed verbs *ändern* and *wandeln* refer to situations in which something (causes something) to take on properties.

The meanings attributed by Motsch (1999: 153) to the prefix *ab-*, significantly overlap with those found for *ver-*. Although *ab-* is only associated with eight total meanings (as opposed to 18 for *ver-*), the four that pertain to Change verbs, listed in (6.34), are the exact same components identified for *ver-*.

(6.34) Meanings attributed to *ab-*
a. Etwas vollständig tun: *absitzen, abbummeln* (‘Do something completely’)
b. Endphase eines Geschehens: *abklingen, abrudern* (‘End phase of an event’)
c. Aktanten nehmen Eigenschaften an: *abstumpfen, abmagern* (‘Participants take on properties’)
d. Verursachen, dass ein Aktant Eigenschaften annimmt: *abbalgen, abbeeren* (‘Cause a participant to take on properties’)

The same problems mentioned for *ver-* above also apply to the *ab-* meanings with respect to Change verbs. In fact, the (6.34a) components actually appear less applicable to the one *ab-* verb analyzed. Specifically, *abändern* is associated with minor changes in attributes, rather than drastic changes, thus the 'do something completely' component seems invalid for this verb. For (6.34b), the same issues as with *ver-* apply: not all examples appear to refer to the end phase of the (minor) change event. The reflexive/inchoative "Change" meaning specified in (6.34c) also seems somewhat invalid, as all of the *abändern* examples were in transitive patterns, specifying that something or someone causes the change. As such, (6.34d), the transitive "Change" meaning component, appears to be the only component that accurately applies to *abändern.*

Motsch's characterizations of the semantic contribution of *ab-* and *ver-* contrasts with the present data. Namely, he attributes the same meanings to both of the prefixes, and these meanings seem applicable to both prefixed and unprefixed variants with the same root (as with *verändern, verwandeln, ändern, wandeln*) or to only minimally characterize the verb bearing the prefix (*abändern*). Note, however, that the examples provided by Motsch (1999: 152-153) appear to differ from the prefixed Change verbs, as Motsch's examples include the verbal prefix and stems that are derived from adjectives (*arm, dicht, dünn*) rather than the verbal roots found among Change verbs (*-änder-, -wandel-*). As such, Motsch may not be addressing the same type of phenomenon as that investigated here.

To conclude this brief section, it appears that future research is necessary to establish the semantic or syntactic influence of verb prefixation among German Change verbs. At present, however, it does not appear that verb prefixation is a regular, predictable process. These findings correspond to those of Lüdeling (2007), who shows that verb particle constructions must be specified for individual items and do not have a predictable effect.

6.5. CONCLUSION

This chapter compared the meanings, valency constructions, and grammatically relevant meaning components of German and English Change verbs. The meaning comparison revealed strikingly few differences across the languages. Not only is the general semantics shared by all verbs of the class(es) virtually identical across German and English, but there are also very few differences in (additional) meaning components and their distribution across verbs. The German verbs differed from one another only in that some are associated with subtle changes and some

with drastic changes. English Change verbs were also associated with either subtle or drastic changes, but two English Change verbs were semantically general as they were not restricted to either of these change types, which was not the case for any German verbs. The only other differences identified are that German *abändern* is semantically restricted to changes in specific (text-like) entities whereas the English "subtle change" verbs can occur with a wide range of Undergo_change entities, and that English *transform* is associated with "positive" changes, a meaning component which was not clearly identified for any German Change verbs.

The valency constructions (VCs) associated with Change verbs were also demonstrated to be largely parallel across the two languages. Apart from the systematic formal difference in expressing inchoative change events (using intransitive VCs in English and reflexive VCs in German), other differences between the VCs related primarily to their distribution or frequency. For one, in German the Original_state argument could be expressed with either *von* or *aus*, whereas English only allows the preposition *from* to introduce this argument. A detailed analysis of the types of Original_state entities introduced by the two German prepositions, as well as the types of Final_state entities introduced by two prepositions in each language (Eng. *into/to*, Ger. *in/zu*) English must be conducted later to identify how closely these sets of VCs relate across the languages. While in some cases a VC did not appear to have a clear parallel in the other language, a more detailed corpus analysis revealed that comparable VCs do exist in the other language but are either expressed with different (non-Change) verbs or they are highly infrequent and thus not identified in the limited corpus data employed here. An example of the former is the resultative VC found with English *turn*, which occurs with highly general verbs in English such as *machen* ('make') or *werden* ('become'). An example of the latter is the "NEG an U" construction found with German *ändern*, a closely related VC type can be found with English *change* (e.g. *This changes nothing about the situation*). In sum, very few significant differences were found in the argument realization patterns for expressing Change events in German and English.

Finally, the comparison of grammatically relevant meaning components (GRMCs) was fairly limited, given the small number of GRMCs, verbs bearing them, and corpus data in both languages. However, the three GRMCs tested in the most detail appear to be grammatically relevant in both languages, even if their grammatical effect is not identical across the languages. Specifically, the "subtle change" meaning component restricts verbs from appearing in VCs with prepositional Final_state arguments, the "drastic change" meaning component lead to a relatively

high frequency in VCs expressing both the Original_state and Final_state arguments, and the "change for a purpose" meaning component correlates with relatively high frequency of VCs expressing the Final_state argument in a subordinate clause.

In sum, the comparison of German and English Change verbs revealed surprisingly few differences in terms of either meaning or valency behavior. This similarity may relate to the close genetic relation between English and German. Another potential reason for the similarity identified in this chapter is the highly general nature of Change verbs. In the next chapter, I determine whether the latter is the case by comparing the findings of Change verbs discussed in this and the previous chapter with a semantically much richer class, namely Theft verbs. Specifically, I investigate whether one class has a wider and/or richer range of meaning components and valency constructions, as well as whether verb meanings and valency constructions differ more across languages for one verb class or the other.

Chapter 7: Comparing Theft Verbs to Change Verbs

7.1. INTRODUCTION

7.1.1. Overview

In the previous two chapters, I analyzed a set of semantically related verbs, namely Change verbs, from a language-specific and contrastive perspective. This chapter determines the extent to which the findings for Change verbs also apply to another, semantically distinct verb class, namely Theft verbs. In addition to filling a research gap, as few existing studies specifically compare the frame semantics and valency behavior of semantically diverse verb classes,[352] the present comparison takes a broader-scale view of the now well-established fact that semantically related verbs exhibit both similar and divergent behavior. Specifically, I compare two semantically unrelated verb classes (Theft and Change verbs) in order to address the following research question.

> **Research Question 4:** To what extent do verb classes of different semantic domains differ with respect to their semantic and syntactic behavior? Do different semantic domains exhibit different degrees of cross-linguistic variation?

From a language-specific perspective, I look at the number and types of meaning components and valency constructions associated with each class. From a cross-linguistic perspective, I determine whether Change or Theft verbs exhibit greater cross-linguistic differences in individual verbs' meanings and the valency constructions in which these verbs appear.

While it is obvious that verbs with different meanings behave differently, research suggests that a verb's descriptivity level (i.e. semantic weight) may determining the range of scenarios it may describe (Snell-Hornby 1983) and the number of constructions it may appear in (Boas 2008a). I scale up those analyses, which focus on individual verbs within a given semantic class, by comparing two classes of verbs which differ greatly with respect to their level of descriptivity. In Section 7.1.2, I elaborate on Snell-Hornby's and Boas's verb descriptivity research and demonstrate that Change verbs have a much lower descriptivity level than Theft

[352] While there are several resources which investigate numerous verb classes (e.g. Levin 1993, FrameNet), I am not aware of any studies that compare verb classes of different domains against one another. A Google Scholar search (on February 3, 2016) for "comparing verb classes" or "differences across verb classes" did not reveal any relevant sources, but returns more general theoretical research on verb classes (e.g. Levin 1993) and other studies from other fields, primarily computational linguistics or child language acquisition.

verbs. I then describe the methodology and outline of this chapter in Section 7.1.3, and present existing classifications of Theft verbs in Section 7.1.4.

7.1.2. Verb descriptivity of Change and Theft verbs

One reason to suspect that the Change and Theft verb classes may behave differently relates to the general 'richness' of their semantics, or their degree of descriptivity in terms of Snell-Hornby (1983).[353] Snell-Hornby (1983: 34-35) claims that verbs with more descriptive meanings have a much narrower *range of application* than non-descriptive verbs, where range of application refers to the number and types of scenarios to which they may refer. Drawing on two verbs with the same Act Nucleus, namely "produce sound," Snell-Hornby points out that *shout* may be used in more contexts than *grovel*, because *shout* only specifies that the sound is loud, whereas *grovel* specifies not only that the sound is 'obedient' in some way, but also that it has a negative connotation and involves two participants in which the speaker groveling is subservient to the addressee. While Snell-Hornby's characterization of a verb's range of application applies merely to the (semantic) range of scenarios the verb may refer to, Boas (2008a) investigates the syntactic consequences of verb descriptivity (see also Sections 3.2 and 6.1). Specifically, Boas (2008a) notes that, among verbs evoking the `Self_motion` frame, those with higher descriptivity (e.g. *crawl, wander, stagger*) occur in a narrower range of argument structure constructions than low-descriptivity verbs such (e.g. *walk, run*), as seen for instance in their occurrence in the Resultative construction (*Pat walked/?jogged/*crawled/*staggered Sam off the sidewalk*). It is possible to draw a connection between Boas's findings on descriptive verbs' constructional behavior and Snell-Hornby's 'range of application,' especially given the understanding that constructions have meaning. Specifically, different constructions are used to describe different types of scenarios, and if high-descriptivity verbs apply to a narrower range of scenarios, then we may expect them to appear in a narrower range of valency constructions as well.

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[353] Snell-Hornby's (1983) study on verb descriptivity is discussed in detail in Section 3.2 and 6.1. As a brief review of those discussions, a verb's degree of *descriptivity* refers to its semantic richness, as defined by the number of meaning components it is associated with. For instance, among verbs referring to taking events, *take* has low descriptivity because it does not specify the event any further, whereas *shoplift* has high descriptivity because it contains additional meaning components such as "illegal taking" (i.e. "stealing"), "take from a store", "pretend to be a customer", and so forth. Snell-Hornby (1983: 25f.) refers to the basic meaning of a descriptive verb as the Act Nucleus and the additional meaning components as Modificants (e.g. for *shoplift* the Act Nucleus is "take" and the Modificants are "from a store," etc.).

The present analysis aims to scale up Boas's and Snell-Hornby's fine-grained analyses of verbs of varying descriptivity levels within a single class to a comparison of two verb classes of varying descriptivity levels. In Chapter 5, I noted that the meaning of the Change frame and the verbs evoking it is highly general, describing scenarios in which some entity (of virtually any ontological type) undergoes a change (in virtually any of its attributes or features), which may be brought about by some other entity (again, of virtually any ontological type). The semantics of the Theft frame and its corresponding verbs are much more detailed and describe a more clearly defined (range of) scenario(s): an animate agent takes something which does not belong to them from an animate victim or a location, with associations that the agent acts illegally and/or secretively (see Section 7.2.1 below).

The intuitively apparent difference in semantic richness (i.e. descriptivity) between the frames can also be established by looking at relations with other verbs, especially as established by lexical resources such as WordNet (Miller 1995, Fellbaum 2008) and FrameNet (Ruppenhofer et al. 2010). The generality of Change is also observed in that numerous verbs of more specific classes ('change of state' verbs) draw on the general Change semantics and specify various aspects of it, such as the entities undergoing change the various scales along which things change. Among the numerous senses WordNet identifies for *change*, three correspond directly to the Change semantics defined in Chapter 5. One of these senses ('cause to change; make different; cause a transformation'), a surprising total of 401 troponyms, which are verbs sets[354] that include the meaning of *change* but specify more details. In FrameNet, the `Cause_change` frame is only three levels down from the top-level `Event` frame.[355] As noted in Section 5.1, for the `Cause_change` frame FrameNet shows only three daughter frames (which inherit from `Cause_change`),[356] but theoretically numerous other frames should inherit from this frame, as well as `Undergo_change`, as argued for by Osswald and Van Valin (2013).

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[354] Each node within WordNet corresponds to a *synset* ('synonym set'), which are "words that denote the same concept and are interchangeable in many contexts" (https://wordnet.princeton.edu/).

[355] `Cause_change` inherits from `Event` (with LUs *happen* and *occurrence*), which inherits from `Objective_influence` (*impact, influence*), which inherits from `Transitive_action` (which is not evoked by any LUs but needed to capture similarities between lower-level frames).

[356] The frames inheriting from `Cause_change` are `Exchange_currency`, `Change_event_time`, and `Chang_event_duration`. Those which are in a "Used by" relation to `Cause_change` are `Adjusting` and `Reforming_a_system`.

On the other end of the spectrum is the Theft frame: while the verb *steal* is indeed much less descriptive than other Theft verbs such as *embezzle* or *shoplift*, it is difficult to find any "general" verbs that have a more specific meaning. WordNet lists only thirteen troponym categories for *steal*, opposed to the 401 for *change*, none of which do appear to be more general than *steal* (with the exception of *rob*, to be discussed below). FrameNet shows no daughter frames for Theft, and only the Robbery frame is related to it horizontally in a Perspective_on relation. As for mother frames, Theft inherits from both the Taking and the Commiting_crime frames, each of which is again more semantically general than the Change frame(s).[357] Thus, based on both intuition and two lexical resources, we may conclude that the Change verb class is much less descriptive than the Theft verb class.

7.1.3. Outline of chapter

I now outline the steps I take in comparing various features of the Change and Theft frames and verb classes. After introducing the classification and characterization of Theft verbs in Levin (1993) and FrameNet, I begin with the English-specific comparison of (additional) meaning components across Change and Theft verbs. The English Change analysis revealed few major semantic differences among individual verbs, with "subtle change" and "drastic change" applying to multiple verbs and the "purposive/improve change" and the "positive change" components applying only to *modify* and *transform*, respectively. Assuming a difference in additional meaning components between the two verb classes, one may expect that Theft verbs will be associated with a richer set of additional meaning components. To compare the meanings across the classes, I draw on a dictionary analysis (as described in Chapter 4 and carried out in Chapters 5-6), intuition and native speaker consultations, and the findings of Dux (2011), to establish the additional meaning components of Theft verbs and the specific verb(s) to which they apply. I conclude the meaning comparison by addressing the number and nature of the meaning

[357] The box below shows the frames which Theft inherits from. Frames left of the "<" arrow inherit from those on the right, and additional lines were added for frames that inherit from two other frames.

```
Theft < Commiting_crime < Misdeed < Event
Theft < Taking < Getting < Event
Theft < Taking < Intentionally_affect < Transitive_action
Theft < Taking < Intentionally_affect < Intentionally_act < Event
```

components for each class and proposing a classification system to account for different meaning component types.

I then turn to the comparison of valency constructions across the classes based on a corpus analysis of five English Theft verbs, again as described in Chapter 4 and undertaken in Chapters 5-6. The Change analysis revealed a wide range of valency constructions, which could nonetheless easily be classified according to specific features (transitivity, realization of state arguments, etc.). Given the findings of Boas (2008a), we may expect the high-descriptivity Theft verbs to appear in a narrower range of VCs than Change verbs. In comparing the number of VCs for each class, I also address methodological issues surrounding the analysis of the syntax-semantics interface which complicate the delineation and enumeration of VCs. I also investigate differences between specific VCs and features of VCs to show how similar syntactic forms involve different interpretations depending on the verb (class) they occur with.

To conclude the English-specific comparison of the classes, I demonstrate that the two classes are similar in that individual members of the class differ from one another with respect to their specific meaning and valency distribution. I then briefly describe how the valency frame/frame-based verb entry approach, carried out for Change verbs in Section 5.4, also accurately captures both generalizations and idiosyncrasies among Change verbs.[358]

In Section 7.3, I investigate similarities and differences in the German-English comparison of the two classes. With respect to verb meanings, the comparison of Change verbs in Chapter 6 showed that both languages had nearly identical sets of additional meaning components with only very minor differences in their distribution across verbs. Again drawing on a dictionary analysis of German Theft verbs, I determine the extent to which the English Theft meaning components correspond to those for German and identify potential translation gaps or complications. Given the semantic richness of Theft verbs, we may expect the range of meaning components to differ more significantly across the two languages than those for Change, leading to difficulties in translation. I then compare the valency constructions of German and English Theft verbs, again drawing on a corpus analysis. The German-English comparison of Change valency constructions showed that virtually all of the VCs of each language has a clear counterpart in the other language, with only subtle differences in form, frequency and/or

[358] I do not address grammatically relevant meaning components and sub-classes for Theft verbs, as demonstrated for Change verbs in Chapter 5.

distribution. If the difference in descriptivity across the two classes corresponds to differing valency behavior, we may expect that the VCs associated with Theft verbs show greater cross-linguistic variation than those for Change verbs.

7.1.4. Theft verbs in Levin (1993) and FrameNet

Before carrying out the analyses, I first introduce the classification of Theft verbs in Levin (1993) and FrameNet. Theft verbs are included in Levin's (1993: 128-129) class of *Steal* verbs along with numerous other verbs.[359] Levin characterizes these verbs not according to alternations in which they participate, but ones in which they do not participate.[360] As noted for Levin's characterization of the *Turn* class, the semantic description of her *Steal* class is not particularly rich, noting only that "[t]hese verbs primarily describe the removal of something from someone's possession" (1993: 129). Drawing on data from FrameNet and native speaker consultations, Dux (2011) points out several issues with Levin's treatment of Theft verbs. For one, the verbs within the class are semantically quite heterogeneous, including not only Theft verbs but also more general Taking verbs such as *capture*, *take*, and *withdraw*. Also, other verbs not included in her class, such as *borrow*, *transport*, or *save*, exhibit the same alternating behavior that Levin uses to characterize *Steal* verbs but not the semantic properties she attributes to such verbs. The verbs in her class are also syntactically heterogeneous, as a careful analysis reveals differences in the verbs' participation not only in the alternations used to define the class, but also in additional constructions not employed in Levin's classification. In Section 2.2, I identified many of these same issues in Levin's characterization of Change verbs and argued against an

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[359] The following verbs are included among Levin's (1993: 128) *Steal* verbs: *abduct, cadge, capture, confiscate, cop, emancipate, embezzle, exorcise, extort, extract, filch, flog, grab, impound, kidnap, liberate, lift, nab, pilfer, pinch, pirate, plagiarize, purloin, recover, redeem, reclaim, regain, repossess, rescue, retrieve, rustle, seize, smuggle, snatch, sneak, sponge, steal, swipe, take, thieve, wangle, weasel, winkle, withdraw, wrest*.

[360] The basic pattern of Levin's *Steal* verbs and the alternations which characterize them are listed here.

Basic Pattern:	The thief stole the painting from the museum.
Locative:	The thief stole the painting from the museum.
	*The thief stole the museum of the painting.
Benefactive:	The thief stole the painting for Mr. Smith.
	*The thief stole Mr. Smith the painting.
Conative:	The thief stole the painting from the museum.
	*The thief stole at the painting.
Causative:	The thief stole the painting from the museum.
	*The painting stole from the museum. (Levin 1993:129)

alternation-based approach to verb classification based on these findings. Given these issues, I rely primarily on the FrameNet classification of Theft verbs.

FrameNet offers a semantically richer and more homogeneous grouping of Theft verbs than that provided by Levin (1993). FrameNet's definition of the `Theft` frame is given in (7.1) and the Frame Element descriptions are given in Figure 7.1.[361]

(7.1) These are words describing situations in which a PERPETRATOR takes GOODS from a VICTIM or a SOURCE. The MEANS by which this is accomplished may also be expressed (Ruppenhofer et al. 2010).

GOODS [Goods]
Goods is anything (including labor, time, or legal rights) that can be taken away.
PERPETRATOR [Perp]
Semantic Type: Sentient
Perpetrator is the person (or other agent) that takes the goods away**.**
SOURCE [Src]
Semantic Type: Source
Source is the initial location of the goods, before they change location**.**
VICTIM [Vict]
Victim is the person (or other sentient being or group) that owns the goods before they are taken away by the perpetrator.

Figure 7.1: Frame Element Descriptions for the Theft frame (Ruppenhofer et al. 2010)

While the precise wording of the `Theft` Frame Description does not directly mention certain aspects central to Theft[362] events (e.g. GOODS do not belong to PERPETRATOR, PERPETRATOR acts illegally), these meaning aspects are captured through the Frame Element Descriptions and through Inheritance relations. As noted above in the demonstration of the semantic richness of Theft verbs, the `Theft` frame in FrameNet inherits semantics from both the `Taking` and the `Committing_crime` frames, thus capturing the fact that theft scenarios involve an illegal act

[361] FrameNet identifies the following lexical units that evoke the Theft frame (with the letter after each lexical unit referring to its part of speech and the verbal lexical units marked in bold): **abstract.v, cop.v**, cutpurse.n, **embezzle.v**, embezzlement.n, embezzler.n**, filch.v**, **flog.v**, heist.n, kleptomaniac.n, larceny.n, **lift.v**, light-fingered.a, **misappropriate.v**, misappropriation.n, **nick.v**, peculation.n, pickpocket.n, **pickpocket.v**, **pilfer.v**, pilferage.n, pilferer.n, pilfering.n, **pinch.v, purloin.v, rustle.v**, **shoplift.v,** shoplifter.n, shoplifting.n, snatch.n, **snatch.v**, snatcher.n, **snitch.v, steal.v**, stealer.n, stealing.n, stolen.a, **swipe.v,** theft.n, thief.n, **thieve.v**, thieving.a, thieving.n.

[362] Recall that FrameNet frame titles are in Courier_new font and FrameNet FE names are in small caps. I do not use these fonts when I refer to the present analysis of Theft verbs and constructions.

of taking. While simple taking events involve an Agent taking a Theme from a SOURCE, the combination of this frame with `Committing_crime` leads to different characterizations of the FEs. Specifically, the Agent of the `Taking` frame corresponds to the Perpetrator of the `Theft` frame, and the Theme of `Taking` corresponds to the GOODS of `Theft`. The more generally defined SOURCE of the `Taking` frame corresponds to two FEs in the `Theft` frame: the VICTIM FE refers to the animate entity that originally possesses the GOODS, while the SOURCE FE refers to the original (inanimate) location of the GOODS. While this distinction is clear in most cases, as with *steal from the table* (SOURCE) vs. *steal from the man* (VICTIM), there are other cases in which this entity can be conceived as either a SOURCE or a VICTIM, particularly with institutions such as banks, stores, or businesses, as with *steal from Wal-Mart*.[363] In this case, *Wal-Mart* is both a SOURCE, as the store is the original location of the GOODS, and VICTIM, as the company is the original owner of the GOODS and loses possession of them. Given this ambiguity, the present analysis employs a fifth FE when necessary, namely "Source/Victim." The refined FEs in this analysis are provided in Table 7.1.

FE Name	FE Abbrev.	Example
Perpetrator	P	**The thief** stole a book.
Goods	G	The thief stole **a book.**
Source	S	The thief stole it **from the table.**
Victim	V	The thief stole it **from the woman**.
Source/Victim	S/V	The thief stole it **from Wal-Mart.**

Table 7.1: Refined FEs in the Theft frame

Closely related to verbs of Theft are verbs such as *rob* and *mug*, which also refer to scenarios of illegal taking but differ in their perspective of these events. Specifically, these verbs entail that the theft involve some aggression and a close interaction between the perpetrator and the victim. This meaning component has a syntactic repercussion in that the victim rather than the goods is realized as direct object. Such verbs are placed in a separate class from the more general Theft verbs in both Levin (1993: 128, *Cheat* verbs) and FrameNet (the `Robbery` frame, which is

[363] The relation between SOURCE and VICTIM is captured in FrameNet by means of a "core set", in which two FEs express different sub-types of a broader semantic role and are typically not able to co-occur (e.g. *He stole it from the woman off the table*). The implications of core-sets for the definition and delineation of valency constructions is discussed in more detail below in Section 7.2.2.2.

in a Perspective_on relationship to the Theft frame).[364] The present analysis focuses only on Theft verbs.

While the FrameNet Theft frame provides a much more semantically uniform classification of Theft verbs than Levin's (1993) *Steal* class, semantic and syntactic differences between individual verbs of the frame are easy to find. As a brief preview of the analyses in Section 7.2, compare for instance the meanings of *embezzle* and *snatch*. Although they are both LUs of the Theft frame, these verbs cannot (or very rarely) be used in the same contexts, as *embezzle* is associated with serious theft events in which someone takes (normally abstract) financial goods from another person or commercial entity that has entrusted the embezzler with the goods, whereas *snatch* typically refers to less serious theft events involving concrete goods. Syntactically, these two verbs differ in that *embezzle* but not *snatch* can appear without the Goods argument (*She embezzled/*snatched from her employer*), whereas *snatch* but not *embezzle* may realize locational sources in *off (of)* PPs (*She snatched/*embezzled it off of the table*). As discussed in Chapter 3 and demonstrated for Change verbs in Chapters 5-6, such semantic and syntactic differences among verbs of the same class are the norm. I investigate such differences among English Theft verbs and compare the in-class similarity of Theft verbs against that found for Change verbs in the previous chapters.

7.2. COMPARING THEFT AND CHANGE IN ENGLISH

7.2.1. Comparing the meanings of English Theft and Change verbs

7.2.1.1. Meanings of English Theft verbs

For the English analysis, I have chosen the verbs *embezzle, pilfer, shoplift, snatch* and *steal*.[365] I begin by describing the additional meaning components that set these five verbs apart from one another. I only present the results of the dictionary analysis and do not describe the methodology in detail, given that this chapter focuses on the Change-Theft comparison and that

364 In Section 3.2, I discuss in detail Goldberg's (1995: 45-48) analysis of these two verb types and their related constructions.

365 I chose these verbs for the analysis because, in future work, they can each be compared to other Theft verbs not analyzed here which share similar meaning components in order to identify grammatically relevant meaning components and sub-classes, as I showed for Change verbs. For example, *embezzle* and *misappropriate* each involve financial goods being stolen by a perpetrator who was entrusted with the goods, usually by the victim. *Pilfer* shares with *filch* the specification that the goods are small in value (according to the FrameNet definition). *Shoplift* and *pickpocket* both encode the source, not only conceptually but also in their form. *snatch* can be related to a number of other theft verbs which focus on the action of the perpetrator's hand in the event, such as *swipe, pinch* and *lift*.

the precise methodology for identifying additional meaning components of individual verbs was demonstrated in the Chapters 5-6. Appendix B1 describes the dictionary analysis in more detail. Table 7.2 shows the meaning components that embellish on the basic semantics of *steal* for the verbs analyzed and connects each component to the FE it relates to.

LU	Meaning Component
steal	n/a
embezzle	**Goods**: (abstract) money or property
	Source/Victim: belongs to an org. or business
	Perpetrator: entrusted with Goods
	Manner: fraudulently
	Purpose: for one's own / personal use
pilfer	**Goods**: in small amounts
	Goods: small items
	Goods: low value
	Manner: stealthily
	Iteration: often again and again
shoplift	**Goods**: displayed goods / merchandise
	Source: a shop or store
	Perpetrator: (pretends to be) a customer
snatch	**Manner**: quickly or with a sudden movement
	Manner: (using force)[366]
	Manner: (unexpectedly, abruptly, etc.)

Table 7.2: Meaning components for English Theft verbs as they apply to FEs (adapted from Dux 2011: 37)

Steal is the most general of the Theft verbs and is not clearly associated with any additional meaning components that set it apart from the general Theft semantics described in example (6.1) above. Its definitions and the examples within them include a very wide range of Goods object types (e.g. *car, liberty, ball, election*) and adverbial phrases describing potential manners in which a theft event can be carried out (e.g. *secretly/surreptitiously, artfully, by trickery, by skill, by force, by unjust means*). Furthermore, the definitions (in at least one, but normally in all three dictionaries) for all of the other analyzed verbs employ the verb *steal* and further specify it with additional phrases. *Embezzle* specifies that the Goods are most frequently

366 The final two components for *snatch* were extracted from senses that embellish the base verb *take* rather than *steal*. I also excluded any extended, metaphorical uses of *snatch* such as *snatch some sleep* or *snatch a glance*.

money but possibly some other abstract type of assets, that the Goods are entrusted to the Perpetrator, and that the Perpetrator steals the Goods and uses them for their own personal use. The analysis of definitions for *pilfer* shows that it refers to theft scenarios in which the stolen Goods are small, in small amounts, or of low value. It also has two optional meaning components, one stating that the Perpetrator acts stealthily, and one, which typically applies to intransitive uses, that the pilfering is done repeatedly (i.e. again and again). *Shoplift* is associated with a highly rich meaning component which states that it applies to theft events in which (someone pretending to be) a customer takes concrete goods on display from a store, shop, or other business, without paying for them. As such, *shoplift* is similar to *embezzle* in that it refers to a very specific type of stealing event. The definitions for *snatch* list several adverbs associated with speed or quickness, such as *suddenly, eagerly, hurriedly*, or *with a sudden movement*, among others.[367] Further, one of the definitions specifies that it is often done *by using force*. Given these meaning components, it appears that *snatch* is primarily a verb of taking or grasping, but can also be used to describe acts of theft, particularly those involving suddenness or a use of force.[368]

Two observations arise from the analysis of the meanings of English Theft verbs. As I will demonstrate below, the specific meaning components are much richer and more numerous, and thus the meanings of individual verbs are much more diverse than those of Change verbs. The second observation is that many of the meaning components pertain to specific aspects or participants (i.e. Frame Elements) of the Theft frame, rather than characterizing the Theft event as a whole. This, too, stands in contrast to findings for Change verbs and points to the need for a richer typology of meaning component types, a first approximation of which will be presented in Section 7.2.1.3.

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[367] *Snatch* is slightly different from the other verbs in that the three dictionaries characterize most of its senses as senses of taking, grabbing, or seizing, rather than stealing per se. However, *snatch* is associated with a Theft interpretation when it occurs in specific linguistic and/or extra-linguistic contexts. In the syntactic analysis, it is not always easy to distinguish whether *snatch* is used to describe a theft or a simple act of taking. I have relied primarily on intuition to distinguish these two interpretations and tried to exclude any examples which were not clearly some act of taking something which does not belong to the agent.

[368] Dux (2011) provides a detailed account of the degree of descriptivity (in the sense of Snell-Hornby 1983 and Boas 2008a) of Theft verbs. Specifically, he concludes that *steal* is the most general Theft verb, that *pilfer* and *snatch* are medium-descriptivity as they specify the manner of the theft and the general properties (size, value) of the Goods, and that *embezzle* and *shoplift* are high-descriptivity as they specify detailed background knowledge such as the relation between client and representative or between customer and stores, respectively.

7.2.1.2. Comparison of English Theft and Change meanings

The discussion of English Theft verb meanings above shows a wider range of meaning components and significant semantic diversity among individual verbs. While it seems intuitively apparent that the Theft verb class exhibits richer and more diverse semantics than Change verbs, here I establish the difference in semantic diversity by comparing across the two (English) verb classes the number of meaning components, the richness of the meaning components and the range of scenarios each verb may refer to. After this discussion, I discuss the need for a richer typology of meaning components.

The English Change meaning analysis revealed between four and six additional meaning components, depending on whether one conflates closely related meaning components or treats them separately. The most prominent two meaning components were "subtle change," which applies to *alter* and *modify* and specifies that they refer to minor and/or non-categorical changes, and "drastic change," which applies to *transform* and *metamorphose* and specifies that they refer to more significant and/or categorical changes. The "positive change" meaning component applies to *transform* and specifies that it (potentially) refers to changes that are evaluated positively (e.g. improving one's habits or looks). The remaining meaning components, "change for a purpose," "change to improve/amend," and "change to make less extreme/more acceptable" were all identified in definitions for *modify*. These components are very closely related, as they each specify the notion of "purpose" in varying detail: either for just any purpose in general, purposes for making something better (which is typically the reason for intentionally changing something), or purposes for making something better by making it more acceptable (to users, audiences, etc.) The close relationship among these meaning components makes it difficult to determine whether to interpret it as a single complex meaning component or as two or three separate meaning components. Nonetheless, even if one counts each of these meaning components separately, a total of merely six meaning components can be identified for English Change verbs.

In contrast, the Theft verb class is associated with a much wider range of additional meaning components. Some verbs specify, with more or less leniency, that the theft involves "concrete goods" (*pilfer, snatch, shoplift*) or "abstract goods" (*embezzle*), or that it involves "low-value goods" (*pilfer, snatch*) or "high-value goods" (*embezzle*), and some verbs specify even more detail about the goods, such as "goods on display in store" for *shoplift* or "financial assets"

for *embezzle*.[369] Some Theft verbs specify in more or less detail the precise source or victim of the stolen goods, such as the "store as source" meaning component for *shoplift* or the "pocket or purse as source" for *pickpocket*. Other meaning components refer to the Manner in which the theft is carried out, with adverbial meaning components such as "quickly" or "violently" with *snatch*, "repeatedly" with *pilfer*, or "while pretending to be a customer" for *shoplift*. Finally, other meaning components specify certain relations between individual aspects or participants (FEs) of the theft scenario, such as the "goods entrusted to perpetrator by victim" component for *embezzle* or the "perpetrator has easy access to goods" for *pilfer*. While one could potentially identify numerous other meaning components among Theft verbs, this survey alone noted 14 distinct meaning components that further elaborate the base/core meaning of the Theft frame (see Table 7.2 above), whereas the Change meaning analysis only revealed four to six meaning components: "subtle change", "drastic change", "positive change" and "purposive change" (which is closely related to "change to improve" and "change to make less extreme").

Not only do the two classes differ with respect to the number of meaning components, but also with respect to the overall richness and general nature of these components. Specifically, most of the meaning components for Change are fairly abstract and vague and thus open to subjective interpretation rather than empirically testable. For instance, one may imagine a nearly infinite range of change scenarios that are compatible with a "subtle change" meaning component, such as a leaf changing color, a text being slightly reworded, or a person changing their clothing style. The same can be said for the "drastic change" meaning component and the "change for a purpose/to improve" meaning component(s), as a vast array of change scenarios may be viewed as drastic or as having a specific purpose. Furthermore, individual speakers may differ in their interpretation of a specific change scenario as being subtle or drastic, or purposive or non-purposive.[370]

On the other hand, the (additional) meaning components for Theft verbs are much clearer and empirically testable. For instance, except on extremely rare occasions, speakers agree on whether an entity falls in the category of "concrete goods" or "abstract goods," and the same is also generally true (though likely with more inter-speaker differences) for the "high-value goods"

[369] The verb *rustle* also has a very specific type of Goods, namely cattle or other livestock.
[370] See also the discussion in Section 5.1 of why the FrameNet distinction between certain FEs such as Attribute and Category are difficult to test empirically.

or “low-value goods” meaning components. Furthermore, of all the possible theft scenarios, speakers will have a very clear understanding of which scenarios can be described by *shoplift* and which can be described by *embezzle*.

One may also notice that many of the Theft meaning components apply specifically to individual FEs of the Theft frame (e.g. small goods for *pilfer*; store as location for *shoplift*), including non-core FEs such as the Means and Manner in which the theft takes place (e.g. suddenly for *pilfer*). This stands in contrast to the meaning components for Theft verbs, which primarily characterize the event as a whole and cannot clearly be attributed to specific participants of the event. For instance, in comparing a “drastic change” scenario to a “subtle change” one, the cause/agent (if there is one) likely exerts more effort in bringing about the change, the undergoer/theme changes more drastically, and the original and final states of the theme are less closely related to one another.

Another difference between the meaning components across classes pertains to their distribution among individual verbs of the class. The six Change verbs discussed in Chapter 5 clustered into three groups of two verbs with virtually no (clearly identifiable) semantic difference. *Change* and *turn* exhibited no clear additional meaning component, *transform* and *metamorphose* both referred to “drastic changes” with *transform* also associated with “positive changes”, and *alter* and *modify* both refer to “subtle changes” with *modify* also associated with “purposive changes.” Looking at the relation between verbs and the scenarios they describe (its ‘range of application’), the Change analysis showed that very specific change scenarios may map to a single verb (e.g. alter clothes), but that verb is also associated with many other change scenarios (e.g. alter one’s opinion, alter a machine, etc.). Conversely, a single change event may often be expressed with multiple Change verbs: a witch may change, turn, or transform a prince into a frog; and the weather may alter, modify, or change the color of leaves. On the other hand, the five Theft verbs defined above each showed very distinct meanings: while the general verb *steal* is interchangeable with each of the other verbs, those four verbs refer to quite different types of theft events. In contrast, certain Theft verbs, such as *embezzle* and *shoplift*, refer only to very specific theft scenarios and cannot be used for other theft events that differ from that scenario (**She embezzled the TV from Wal-Mart*; *She shoplifted my wallet from my room*). Having discussed the differences in (additional) meaning components across Change and Theft verbs in

English, I conclude that those of Change verbs are fewer in number and more abstract and general in nature than those of Theft verbs.

7.2.1.3. Towards a classification of (additional) meaning components

The discussion above revealed that (additional) meaning components differ from one another in various ways. To demonstrate this more clearly, consider for example the various meaning components of *transform* and *shoplift*. *Transform*, in addition to its general Change meaning, also specifies that the change be drastic rather than subtle, and it is optionally associated with changes that are deemed positive. *Shoplift* does not refer any general Theft scenario, but specific scenarios in which the Perpetrator is or pretends to be a customer at a store, that the Goods are located (on display) in the store, and thus that the Goods are both concrete and small enough to be carried. Several differences in the individual meaning components of these verbs can be observed. For one, while the *transform* meaning components characterize the Change event as a whole and do not restrict specific participants of the scene (FEs), many of the *shoplift* meaning components refer to specific FEs of the Theft frame (e.g. concrete Goods, Perpetrator is customer). A further difference among meaning components is that some of them appear to involve scales or binary options that differentiate the verb from others in the class: That is, the drastic change meaning component of *transform* contrasts with the subtle changes of *alter* and *modify*, and the specification of concrete Goods for *shoplift* contrasts with the abstract goods of verbs like *embezzle* or *misappropriate*. These types of meaning components differ from those that do not involve binary options or scales, such as the "from a store" or "while pretending to be a customer" meaning components of *shoplift*. Yet another difference between the meaning components relates to whether or not they are obligatory, applying to all uses of a verb. While the meaning components of *shoplift* all seem to be obligatory (i.e. *shoplift* cannot be used if the Theft event being described does not fulfill all of the criteria specified in the meaning components), the "positive change" meaning component of *transform* does not apply in all situations. This "positive change" meaning component also represents a further distinction from the others, in that it relates to the evaluative judgment of the speaker, rather than to (any aspect of) the Change event itself. These differences in the nature of (additional) meaning components suggest that there are different classes or types of meaning components.

While several works have identified types or classes of verbal meaning components, most of these are much coarser-grained than the types of verb meanings treated here. For instance, one

of the most well-studied distinctions in verb meanings is that between manner and result verbs (Fillmore 1968, Rappaport Hovav and Levin 2010), which differentiate verbs throughout a large portion of the entire verbal lexicon and have been shown to be grammatically relevant both in English and cross-linguistically (Levin fc.). However, due to their highly general and abstract nature, these meaning components and their precise syntactic repercussions can be difficult to establish empirically.[371] As discussed in detail in Chapters 2 and 3, there is reason to believe that meaning components and their influence on valency behavior can be identified more intuitively (and empirically) with finer grained verb classes such as Levin (1993) and FrameNet, than with broad, abstractly defined classes such as Manner/Result or the aspectual classes. However, the present analysis of subtle meaning differences among near-synonymous requires an even finer-grained level of analysis.

While little research has specifically investigated the types of meaning components that differentiate near-synonymous verbs in a given verb class, Snell-Hornby (1983) offers some insights into the detailed meanings of closely related verbs. In her discussion of various types of verb descriptivity in English and German, Snell-Hornby (1983: 28f.) posits a distinction between direct and indirect descriptivity, whereby direct descriptivity specifies a given event/scenario as a whole and indirect descriptivity specifies individual participants involved in or circumstances surrounding the event. Comparing two verbs with the shared semantics of "produce sound," she notes that *shout* only exhibits direct descriptivity in that the "loudly" meaning component refers only to the act of speaking itself. *Scream*, on the other hand, exhibits not only direct descriptivity, specifying that the "produce sound" event is "loud", but also that the screamer is experiencing some extreme emotions (e.g. fear, anger, excitement). Another specific type of verb meaning identified by Snell-Hornby (1983: 25) relates to the evaluative judgment of the speaker, rather than to the event described by the speaker. For example, *whine* not only refers to a communicative act of complaining, but also implies that the speaker views the complaining negatively. While the distinctions in verb meaning identified by Snell-Hornby (1983) seem to apply well to the present data, it appears that more categories are necessary to clearly distinguish all of the meaning component differences observed for *transform* and *shoplift* above.

[371] See Baker and Ruppenhofer (2002), Boas (2008b), and Fillmore and Baker (2010).

In an attempt to systematically account for the different types of meaning components found with Theft and Change verbs, I now outline a preliminary classification of meaning component types that draws on the observations of Snell-Hornby (1983) and integrates them into the theory of Frame Semantics. While this proposal is very preliminary and must be tested on a wide range of verbs, the striking differences in meaning components across the two classes may shed light on the structure of the lexicon and may potentially reveal highly fine-grained grammatically relevant meaning component types.

The first major distinction involved whether the MC applies to the event/situation as a whole, as with "drastic change" for transform, or to specific participants or circumstances of the event (i.e. FEs), as with the "concrete Goods" of *shoplift*. This distinction closely parallels Snell-Hornby's (1983) observation of direct and indirect descriptivity. To restate this distinction in terms of Frame Semantics, one may say that Snell-Hornby's direct descriptivity relates to meaning components which characterize the entire event described by the Frame Definition, whereas indirect descriptivity relates to meaning components which characterize individual Frame Elements of the frame, including both core FEs ("participants" in Snell-Hornby) or non-core FEs such as Means, Manner, or Iteration ("circumstances"). In order to redefine these terms using concepts from Frame Semantics, I posit a difference between *event-related meaning components*[372] (i.e. direct descriptivity) that characterize the event as a whole and *FE-related meaning components*, which apply to a specific participant (core FE) or circumstance (non-core FE) of the event (frame).

Applying this distinction to the MCs of Change and Theft verbs, event-related FEs are "subtle change", "drastic change", and "positive change" for the Change frame. As shown in Table 7.2 above, virtually all of the meaning components for Theft verbs appear to be related to specific FEs of the event. One exception may be the "steal using force" meaning component for *snatch*, because it involves more force by the perpetrator, more resistance by the victim, and (potentially) the inaccessibility of the goods (e.g. if they are in someone's hand or purse).[373] FE-

[372] The meaning component categories proposed here are marked off using italic font. The label "event-related" is only an arbitrary label. It is actually somewhat misleading, because "events" are characterized by FEs, and thus even "FE-related" meaning components are by nature "event-related".

[373] Another exception might be the full semantics of the verbs *shoplift* or *embezzle*, but I argue below that the meaning components of such semantically rich verbs must be treated separately from the types posited here.

related changes include the "change for a purpose/to improve" meaning component(s) of *modify*, which specify the (non-core) Purpose FE of the Change frame, as well as nearly all of the meaning components of Theft, such as the "concrete goods" that characterizes the Goods FE of *snatch* and *shoplift*, "from a store" that characterizes the Source FE of *shoplift*, and "repeatedly" that characterizes the (non-core) Iteration FE of *pilfer*.

Another difference observed in the MCs applies to both event- and FE-related MCs and seems to have been overlooked by Snell-Hornby (1983). As noted above, the "drastic change" event-related meaning component does not specify the exact nature or type of change, but instead relies on a scale of drastic to subtle changes (that characterize all possible Change events) and specifies that the verb may only be used for those Change events that are drastic, as opposed to subtle. In contrast, the "from a store" FE-related meaning component of *shoplift* does not involve a continuum but instead specifies a precise type of entity. To account for this difference, I propose a distinction between binary meaning components and adverbial components, whereby *adverbial meaning components* specify the precise nature or type of an event or an FE involved in the event and *binary meaning components* only specify that the event or FE be located on one end or another of a given scale or continuum. Other examples of adverbial meaning components include "change for a purpose" and "change to improve" for Change verbs, and "Goods belong to an organization or business," "stealthily," "repeatedly," or "Perpetrator pretends to be a customer", among others, for Theft. Other examples of binary meaning components include "positive change" and "subtle change" for Change verbs, and "small Goods," "Goods in small amounts," "abstract Goods," and "quickly" for Theft verbs.

The scales and/or continua associated with the binary meaning components listed above also appear to differ in nature. For example, the distinction between "concrete Goods" and "abstract Goods" is clearly testable and there is (virtually) no gray area between entities that are concrete and those that are abstract. In contrast, the "subtle change" and "drastic change" meaning components are less clearly delineated and it is easy to think of several cases which could be viewed as either a drastic or a subtle change. As this distinction has not been identified in the previous literature, even in Snell-Hornby (1983), I refer to these meaning components as polar and scalar, respectively, whereby *polar (binary) meaning components* involve a distinction with only two options while *scalar (binary) meaning components* involve a range of options (typically organized along some continuum). Other examples of scalar (binary) meaning

components are “positive change” for Change verbs, and “low-value goods” and “high-value goods” for Change verbs (where a car is likely of high value, a pen is of low value, and something like furniture or a book is somewhere in between). Another example of polar meaning components are the “concrete goods” of *snatch* and *pilfer* and the “abstract goods” of *embezzle*, in that all goods types (and likely all entity types) are either abstract or concrete and do not fall along a continuum.

A further distinction among meaning components is required to account for those meanings which involve evaluative judgments of speakers describing an event and do not relate to the described event itself, as was observed for the “positive change” component of *transform*. These were identified by Snell-Hornby’s (1983: 25) on the basis of verbs such as *whine*, and I therefore adopt her terminology and refer to these as *evaluative meaning components*. Another example of such meaning components are the “serious offense” and “unserious offense” of *embezzle* and *pilfer/snatch*, respectively. To demonstrate, given a theft event in which a student takes books from a library without paying or checking them out, a speaker who does not view such thieving as a problem (e.g. a fellow student, or better yet, a bank robber) would use the verb *pilfer* for this scenario, whereas a speaker who views such thieving as serious (e.g. a librarian or book publisher) would prefer to use a verb without the “unserious offense” evaluative meaning component, such as *steal*. As evaluative meaning components tend to be the exception and most meaning components relate to the events themselves, I do not formally posit an additional category for “objective” meaning components.

Another distinction among meaning components is rather elusive in nature and relates to whether they apply to all instances of a verb’s uses or only apply in certain situations or contexts. For example, the “positive change” MC of *transform* and the “repeatedly” MC of *pilfer* are not obligatory as speakers may use these for changes not deemed as positive and for one-time theft events, respectively, without them being infelicitous. I refer to these as *optional meaning components* and do not posit a contrasting category as MCs are by default obligatory and not optional. While various types of optional MCs are widely discussed as in concepts such as connotation, implication, or collocation, I do not address such subtle distinctions at present, but see Snell-Hornby (1983: Ch. 3) and Cruse (1986) for more on these distinctions.

Finally, the verbs *shoplift* and *embezzle* in the Theft frame stand out from the rest, in that they exhibit highly rich meanings that place numerous restrictions and specifications on several

aspects of a given event, making it difficult to tease apart interrelated meaning components. As an example, the meaning of *shoplift* could on the one hand be viewed in terms of a large set of distinct meaning components, such as "Perpetrator is human and pretends to be a customer", "Goods are concrete and are on display", "Source is a store or shop", "Manner is often sneaky and/or well-planned", etc. However, in these cases, it may be more appropriate to characterize such meanings that cannot easily be isolated into separate components differently than those meaning component types described above. I thus posit another category which I call *rich meaning components*, which are actually comprised of several MCs that are dependent on one another. Verbs with such rich components may also be viewed as evoking a different, more specific frame than less descriptive verbs within the same class.[374]

To demonstrate this typology of meaning components on the basis of English *transform*, the verb is associated with a meaning component stating that it refers to drastic changes. This component is event-related and not FE-related, as it relates to the entire changing event and thus to multiple FEs (i.e. the causer must do more to bring about the change, the undergoer changes more drastically, the final state is more different than the original state, etc.). It is also a binary rather than adverbial meaning component, as the "drastic change" meaning contrasts with the "subtle change" meaning associated with verbs such as *alter* and *modify*. This meaning component is not optional, as the component was listed in each of the dictionary definitions of *transform*, none of which were qualified by words such as *often* or *sometimes*, and it appears to characterize most uses of the verb found in the corpus. *Transform* is also associated with the "positive change" meaning component. This meaning component is also event-related, as it pertains to the entire change event and not one specific participant or circumstance. It is also binary in that it contrasts with a (potential but non-existent) meaning component specifying that the change is judged negatively, and it is scalar (not polar) as changes may be judged more or less positively or involve no judgment at all. It is also evaluative, as it relates to the speaker's evaluation rather than the change event itself, and it is optional, in that not all uses of *transform* entail that the speaker views the change as positive.

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[374] "All the LUs in a frame should allow the same set of entailments and inferences, although they may exhibit some idiosyncratic differences. Strictly speaking, every word (sense) would evoke its own frame. FrameNet balances the need to capture detailed semantic differences against the utility of generalizing across the vocabulary." (Hasegawa et al. 2011: 107).

To summarize the different MC types identified above, *event-related MCs* characterize the situation as a whole while *FE-related MCs* apply to a single participant or circumstance of the situation. Cross-cutting this distinction is that between *binary MCs*, that can be characterized in terms of a range on some continuum and are typically described using adjectives, and *adverbial MCs*, which cannot and are typically described using adverbs. Binary MCs can be further sub-classified between *polar MCs*, which refer to two one of two opposite sides of a binary value (e.g. abstract vs. concrete), while *scalar MCs* refer to ranges of values on a continuum with mediating ranges between them (e.g. low-value vs. high-value). *Evaluative MCs* do not refer to the activity itself or any of its participants, but rather to the value judgment of the speaker who uses a given verb. Each of the aforementioned MCs can be specified as *optional MCs*, in which case they do not necessarily apply to all uses of the verb bearing them but only some uses. I do not propose a category contrasting with optional MCs, as MCs are obligatory by default. Finally, *rich MCs* are extremely detailed as they define many aspects of the event as a whole and specify various entities involved in the event.

The meaning component types sketched above are only a first step in capturing the highly subtle semantic differences found among near-synonymous verbs evoking the same semantic frame. They differ from well-studied but highly abstract MCs such as the manner/result distinction or the aspectual classes, in that they rely on a well-defined semantic frame and specify how individual verbs differ in their perspective or construal of the frame. By identifying types of meaning components, we may gain a better understanding of how individual verb classes (i.e. semantic frames) differ from one another. For example, a cursory comparison of the MC types of Change and Theft verbs suggests that Change verbs are associated primarily with event-related MCs characterizing the change event as a whole, whereas Theft verbs are more frequently associated with FE-related MCs specifying individual participants or circumstances of the theft event. The Theft verb class also includes multiple verbs with rich MCs, such as *embezzle*, *misappropriate*, *pickpocket*, and *shoplift*, whereas the Change verb class (treated here)[375] do not show any such verbs. Such comparisons may also shed light into the conceptual nature of semantic frames – for instance that Theft involves highly specific argument types whereas

[375] Of course, it is highly likely that the more specific change of state verbs inheriting from the highly general Change frame(s) treated here will exhibit different types of MCs, including rich MCs, than the general Change verbs.

Change may occur with arguments of an extremely wide range of semantic types. Future research must also determine whether the MC types proposed here adequately account for all types of (additional) meaning components across different semantic frames or if more categories or finer-grained distinctions among the proposed categories are necessary. I leave these questions aside and turn now to the comparison of the valency behavior of Change and Theft verbs.

7.2.2. Comparing English Theft and Change valency constructions and their features

As noted in Section 7.1, the data seem to suggest that Theft verbs appear in a more restricted range of valency constructions, because they have a higher degree of descriptivity, which was shown by Snell-Hornby (1983) and Boas (2008a) to correspond with a narrower range of constructions in which the verbs may appear. The methodology used to identify English Theft valency constructions and describe the VCs identified in the analysis is discussed in Section 7.2.2.1. I then compare the number and types of VCs across the classes in general and address specific differences among individual VCs and features of VCs in Section 7.2.2.2,

7.2.2.1 Valency constructions of English Theft verbs

I investigated the valency behavior of English Theft verbs using data from the *Corpus of Contemporary American English* (COCA). I documented the valency construction of 58 to 110 examples of the five verbs *embezzle, pilfer, shoplift, snatch,* and *steal*. The exact number of examples analyzed for each verb is provided in Table 7.3.

Verb	# analyzed
Embezzle	103
Pilfer	58
Shoplift	64
Snatch	86
Steal	110
Total	**421**

Table 7.3: Number of corpus examples analyzed for English Theft verbs

The methodology for documenting valency behavior parallels that introduced in Chapter 4 and undertaken in Chapters 5 and 6. Specifically, after randomly extracting 200 examples for each verb, I then discarded examples which involve non-Theft senses (e.g. *steal across the room*) or complex syntactic structures such as relative clauses or infinitival phrases.[376] The numbers above

[376] Because this chapter's focus is on comparing the general valency behavior of the entire verb classes, I draw on fewer corpus examples than in the previous chapters and do not discuss the valency distribution of

thus represent the number of examples out of the 200 which are active sentences involving basic valency constructions with the proper (Theft) sense (see Chapter 4 and Section 5.3.1 for more details on which example types are analyzed and which are not). As in the previous chapters, valency constructions are documented by identifying the phrase type and grammatical function of each core FE (as defined in Table 7.1 above). (7.2) demonstrates how the valency construction of a simple Theft sentence is documented.

(7.2)	Pat	stole	money	from Sam.
	P	verb	G	V
	NP		NP	fromPP
	Sbj		Obj	Obl

(7.3) a. [P.NP.Sbj + verb + G.NP.Obj + V.fromPP.Obl
b. [P _ G from V]

In (7.2), *Pat* instantiates the Perpetrator FE and is syntactically a subject noun phrase, *money* instantiates the Goods FE and is a nominal object, and *from Sam* instantiates the Victim FE and is an oblique PP headed by *from*. The fully spelled out formalization of the VC is provided in (7.3a) and the shorthand label for the VC is given in (7.3b).[377]

The full list of VCs with simple examples demonstrating them is provided in Table 7.4. I list intransitive VCs before transitive ones, and VCs realizing oblique Source, Victim, and Source/Victim FEs in that respective order. The end of the table (#14-#17) lists VCs that are infrequent and seem unusual for Theft verbs in some way.

Theft verbs in detail, but refer the reader to Appendix C3, which shows the analyzed sentences and their valency constructions.

[377] In the present analysis, I do not posit separate VCs for cases in which one FE occurs within the phrase instantiating another FE, typically as a possessor using a possessive form (*He stole her goods/the woman's goods*) or an *of* PP (*He stole the goods of the woman*). I discuss the implications of this choice later in this section.

#	Valency construction	Example
1	P _	Pat stole.
2	P _ from S	Pat stole from the house.
3	P _ at S	Pat stole at the house.
4	P _ from V	Pat stole from Sam
5	P _ from S/V	Pat stole from Wal-Mart.
6	P _ G	Pat stole the jewelry.
7	P _ G from S	Pat stole jewelry from Sam.
8	P _ G at S	Pat stole jewelry at the house.
9	P _ G off (of) S	Pat stole off (of) the table.
10	P _ G out of S	Pat stole out of the box.
11	P _ G from V	Pat stole jewelry from Sam.
12	P _ G away from V	Pat stole jewelry away from Sam.
13	P _ G off (of) V[378]	Pat stole jewelry off (of) Sam.
14	P _ G from S/V	Pat stole jewelry from Wal-Mart.
15	P _ S	Pat pilfered the store.[379]
16	P _ S/V	Pat pilfered the company.[380]
17	P _ through G	Pat stole through the jewelry.[381]

Table 7.4: Valency constructions of English Theft verbs

I begin by briefly summarizing the major features and categories of English Theft VCs. One distinction among the VCs is between intransitive (#1-#5 and #17 in Table 7.4) and transitive (#6-#16) VCs. Intransitive VCs consistently realize the Perpetrator as subject (with the exception of #17, as discussed below), while transitive VCs realize the Perpetrator as subject and the Goods as direct object (with the exception of #15 and #16, as discussed below). Another distinction is between VCs that involve only the transitivity portion of the construction and no oblique arguments (#1, #14-#16) and VCs that additionally realize an oblique argument (#2-5, #7-14, #17). VCs that include oblique arguments can be classified according to the Frame Element expressed in the phrase, including oblique Source FEs (#2, #3, #7-10), oblique Victim FEs (#4, #11-13) and oblique Source/Victim FEs (#5, #14).

[378] While this pattern was not attested in the main dataset, examples such as the following are found in COCA: Lou **snatched** the rifle **off me** and buggered around with the bolt. Hayes **snatches** the gun **off him**...; *Intransitive:* That's not the point, but she has **stolen off of me** before.

[379] An example of this VC is: now that they can stay with me in these conditions, pilfer the garbage dumps, collect bottles, scraps of metal, […] (COCA)

[380] An example of this VC is: *Someone is attempting to pilfer this company!* (COCA)

[381] An example of this VC is: *And not five minutes after their son died, they were pilfering through things (their son) owned*. (COCA)

Among VCs involving oblique FEs, distinctions can be made between the specific prepositional realizations of each of the FEs. Oblique Source FEs can be realized in a *from* PP (#2, #7), an *at* PP (#3, #8), an *off (of)* PP (#9), or an *out of* PP (#10). Oblique Victim FEs are typically realized in *from* PPs (#4, #11) but may also appear in *away from* PPs (#12) or *off (of)* PPs (#13) with certain Theft verbs. The Source/Victim FE is consistently realized in a *from* PP (#5, #14).

There are also three interesting patterns that are highly infrequent and were found only with the corpus data of *pilfer*. These include a transitive VC that realizes the Source as direct object (#15), and a transitive VC that realizes the Source/Victim as direct object (#16). These constructions are identical to those observed for verbs in the Robbery frame, such as *rob* and *mug*, as discussed in Section 7.1 (see also Goldberg 1995/2006, Dux fc.). *Pilfer* was also found in an intransitive VC in which the Goods is realized in a *through* PP (#17).[382]

It should be noted that the characterization of these valency constructions relies not only on syntactic features, but also semantic features. That is, a single syntactic configuration may be listed multiple times as different valency constructions, because of the fine semantic differences between the Source, Victim, and Source/Victim FEs. For instance, VCs #2, #4, and #5 all have the same syntactic form, namely [N V from N], but are posited as different VCs because of differences in the semantic type of the entity (e.g. location, animate entity, abstract entity such as a business, respectively). While these different role types could be viewed as instances of a single role, as they all express the original location or possessor of the stolen goods, the semantic differences between the roles leads to different behavior with respect to other valency features. For instance, Source FEs can be expressed with (at least) three different prepositions (*from, off (of), out of*), Victim FEs are normally expressed in *from* PPs but may also be expressed in *off (of)* PPs in certain contexts, while Source/Victim FEs may only be expressed in *from* PPs. I thus follow suggestions from recent work in Valency Grammar (esp. Faulhaber 2011) which emphasizes the importance of distinguishing valency patterns (her terminology) with respect to fine-grained semantic role distinctions, and I posit different VCs for the each of the three role types. However, this methodology has implications for establishing the precise number of VCs available to Theft verbs, as described in the following sub-section.

[382] This VC is likely only possible with specific theft scenarios, such as those in which a perpetrator may choose from multiple items to steal.

7.2.2.2. Comparing English Theft and Change VCs and issues in delimiting VCs

Having established the range of VCs for English Theft verbs and discussed various properties thereof, I now compare these against the VCs associated with Change verbs. I begin by discussing the overall number of VCs for each class and the difficulties in establishing this number precisely. I then address several specific differences in the nature of the VCs and the features that characterize them. To aid the reader, the VCs identified for Change verbs in Chapter 5 are given again in Table 7.5.

	Pattern	Example
T2	**C _ U**	Pat changed Sam.
T3a	**C _ U into F**	Pat changed Sam into a frog.
T3b	**C _ U to F**	Pat turned Sam to stone.
T3c	**C _ U F.CP**	Pat changed it to do something different.
T4a	**C _ U from O into F**	Pat changed Sam from a person into a frog.
T4b	**C _ U from O to F**	Pat changed Sam from a prince to a frog.
I1	**U _**	Sam changed.
I2a	**U _ into F**	Sam changed into a frog.
I2b	**U _ to F**	Sam turned to stone.
I3a	**U _ from O into F**	Sam turned from a prince into a frog.
13b	**U _ from O to F**	Sam turned from a prince to a frog.
TR3	**C _ U F.result**	Pat turned Sam blue.
IR2	**U _ F.result**	Sam turned blue.

Table 7.5: Valency constructions of English Change verbs (repeated from Table 5.23)

The first observation in comparing the VCs across classes is that only two syntactic configurations appear with both verb classes.[383] These are the simple intransitive (labeled #1 for Theft, I1 for Change) and simple transitive (labeled #6 for Theft, T2 for Change) constructions with the form [N V] and [N V N], respectively. These are likely the most common active constructions in English, as they occur with virtually every intransitive and transitive verb, respectively. Apart from these two constructions, no other VCs are syntactically identical. This vast discrepancy suggests that verb classes are in fact syntactically relevant. That is, while the previous chapters emphasized that classes of semantically related verbs exhibit significant

[383] I use the terms *syntactic configuration* or *construction* to describe constellations of phrase types and grammatical functions independent of the FEs/semantic roles they instantiate. These terms are distinct from *valency construction*, as I focus on a specific syntactic configuration across different verb classes. See Sections 3.3 and 4.1 for more on these terms.

differences in valency distribution when compared against one another, a comparison against Theft verbs and their VCs shows that the valency behavior of a verb class is highly uniform. That members of verb classes exhibit syntactic and semantic uniformity or diversity, depending on whether they are compared against one another or against other classes, emphasizes the need for analyses at varying levels of granularity (see Croft 2003, Boas 2011b, Herbst 2014, and the discussion in Chapter 3). In Section 5.4, I proposed that the valency frame/FBVE approach to describing verb classes fulfills this need, as it captures both the uniformity and diversity of verb classes. Specifically, the valency frame is needed to distinguish the entire verb class from other classes, describing the shared semantics of a verb class as well as specifying a range of constructions (out of all those possible in English) in which its members may appear. To distinguish individual verbs within a class, the frame-based valency entries draw on information inherited from the valency frame and point to more specific features to show how it differs.

While it is plain to see that the syntactic forms of Change and Theft VCs are very different, comparing the number of VCs for the two verb classes is complicated by various factors. The analysis above identified 17 distinct VCs for English Theft verbs, whereas the Change analysis revealed 13 distinct VCs. Thus, at first glance it appears that Theft has a wider range of VCs than Change. However, a direct comparison of this type is not so straightforward. Three issues complicate establishing the precise number of VCs for each class: argument types that are closely related but not identical in meaning and realization, different phrase-type realizations of a single FE, and the status and nature of infrequently occurring VCs. I address each of these issues below, before answering the question of which class exhibits greater options for argument realization.

The first issue relates to the degree to which FEs are characterized according to semantic features (e.g. semantic role (sub-)types) or syntactic features. As noted in the last sub-section, several Theft VCs exhibit the same syntactic form but differ only with respect to the semantic type of arguments. For instance, the transitive [N V N from N] pattern and the intransitive [N V from N] pattern each correspond to three different VCs, depending on whether the *from* PP argument realizes the Source, Victim, or Source/Victim role. If one were to conflate such VCs, given their closely related meanings, the number of VCs for Theft verbs would be lowered from the 17 proposed above to 10, which is lower than the 13 found for Change verbs. Table 7.6 shows

what the constructional range of Theft would look like if these three FEs were conflated into a single FE, which I label O (for Original Location/Owner).

P _
P _ from O
P _ at O
P _ through G
P _ G
P _ G from O
P _ G at O
P _ G off (of) O
P _ G out of O
P _ G away from O

Table 7.6: VCs of Theft verbs with Source, Victim, and Source/Victim conflated to one FE

Also recall that, in my analysis of Change verbs, I eschewed several semantic role distinctions posited by FrameNet, as discussed in Section 5.1. These include FrameNet's distinction between animate AGENT and inanimate CAUSE FEs, which I conflate into coarser-grained Cause_change FE. I also conflate FrameNet's distinction between ENTITY FEs (which undergo categorical changes) and ATTRIBUTE FEs (which change only with respect to some value) into a single coarser-grained Undergo_change FE. If one were to posit distinct VCs for each of these FE pairs (as with the Source, Victim, and Source/Victim roles of Theft in Table 7.4), then the number of intransitive Change VCs would double (requiring separate VCs for ENTITY and ATTRIBUTE subjects) and the number of transitive Change VCs would quadruple. (And this does not even take into account FrameNet's distinctions for my Intitial_state and Final_state arguments.) As such, by looking only at the syntactic form of VCs, the number identified for Theft would decrease slightly, and by accounting for subtle semantic distinctions among roles, the number of VCs for Change would increase dramatically.

The second issue surrounding the enumeration of VCs for a given class relates to potential differences in the phrase types which may realize a given FE. For the Change VCs, I noted that the arguments of a given VC have "default" realization types (e.g. NP for Cause_change, NP for Undergo_change, *from* N for Original_state) but may also appear in "non-default" realizations in which the phrase type is different, as in *Learning German changed how I think* or *He changed from sad to happy*. I did not posit separate VCs for each of the possible non-default realizations, as this would have greatly increased the number of VCs (and consequently

decreased the clarity of the analysis). To briefly demonstrate the degree to which the VC number would increase, let us consider some of the possible realizations of only two of the four Change FEs. The Cause_change FE, which consistently appears as the subject of transitive VCs and has a default realization of NP, may also appear as a gerundial verb phrase (7.4a), an infinitival verb phrase introduced by *to* (7.4b), an infinitival clause of the form *for N to V* (7.4c), a *that* clause (7.4d), or as a *wh-* clause (7.4e)

(7.4) a. *Doing it this way* would change everything.
b. *To do it this way* would change everything.
c. *For him to do it this way* would change everything.
d. *That he did it this way* changed everything.
e. *What you did* changes everything. (invented examples)

Similarly, while the Final_state argument by default appears as a noun when it occurs in an *into* or *to* PP, it may also appear as an adjective (7.5a), as a *wh-* clause (7.5b), or as a direct quote (7.5c) within the PP. Furthermore, some examples involved multiple PPs expressing various Final_states in a series of changes (7.5d).

(7.5) a. The leaves are turning from red *to blue*. (COCA)
b. you don't want to have anything turn *into where NASCAR does have to police things* (COCA)
c. when cocktail-party chatter turned *to "Why haven't you ever married?"* (COCA)
d. The wheel turns girl *to woman to widow to girl*. (COCA)

Given the wide variety of potential phrase types for these two arguments alone, it becomes clear that the number of VCs for the Change frame would be much larger if separate VCs were posited for each distinct realization type. For example, rather than positing a single simple transitive VC (i.e. [Cause_change + verb + Undergo_change]) and stating that Cause_change has a default realization of NP, one would posit at least five separate VCs to account for the NP realization and the four non-default realizations of Cause_change shown in (7.4) above. These five VC types would then again need to be specified multiple times for all the potential phrase type realizations of the other FEs occurring in the VC. This would thus result in a list of Change VCs numbering well above 100.

With the Theft frame, however, such non-default realizations are extremely rare, and each argument is almost always a noun (sometimes in a PP).[384] However, the VC list of Theft verbs shown in Table 7.4 above could be increased if one were to posit different VCs to capture cases in which a FE occurs within the phrase that instantiates another FE. Specifically, some FEs of Theft can be realized as a possessor of another FE, in which case they appear as a genitive possessor or an *of* PP that is embedded within the NP expressing the other FE. Such possible combinations include the Victim possessing the Goods (7.6a), the Victim possessing the Source (7.6b), the Source/Victim possessing the Goods (7.6c), and the Source/Victim possessing the Source (7.6d).

(7.6) a. Pat stole *Sam's wallet / the wallet of Sam*.
b. Pat stole money *from Sam's wallet*.
c. Pat stole *the company's money / the money of the company*.
d. Pat stole money from *the company's account*.

However, apart from these possible additions to the VC list of Theft verbs, I did not identify any other candidates for additional VCs based on phrase type distinctions or possessive incorporation. Thus, by splitting the proposed VCs into separate VCs based on such features, the number of VCs for the Theft frame would only increase by four (or by six if one distinguishes the genitive -*'s* and the *of* PP possessive forms). This increase is drastically lower than that noted for Change verbs above.

To demonstrate that Change VCs are more formally diverse than Theft verbs with respect to the phrase types in which arguments are realized, Table 7.7 shows the phrase type realizations (and combinations thereof) that are possible in the simple transitive construction [NP V NP] for both Change and Theft verbs. The VC labels in the first and third columns list only the arguments' FE label and phrase type, but not the grammatical function (subject, object) specifications). For the Theft verbs, I listed various possessive constructions (e.g. *my wallet; the wallet of the woman*) as different variants of the simple transitive construction.

[384] The difference in the number of phrase types that can realize arguments of Change and Theft is likely related to how changes can be caused and undergone by virtually anything (even abstracta), and states can be realized in very different ways. In contrast, theft events almost always involve concrete entities (human/animate perp's, human victims, concrete goods, etc.) This observation is interesting because the PT-changes appear at first glance to follow from non-semantic, grammatical principles (e.g. construing a verb phrase as a noun), but this comparison shows that they are not possible with all verbs/frames.

Phrase type options for Change simple transitive VC [U _ C]	Examples	Phrase type options for Theft simple transitive VC [P _ U]	Examples
[C.NP _ U.NP]	*It changed everything.*	[P.NP _ G.NP]	*He stole it.*
[C.VPing _ U.NP]	*Doing it this way would change everything*.	[P.NP _ V.poss G.NP]	*He stole my wallet*.
[C.toVP _ U.NP]	*To do it this way would change everything.*	[P.NP _ G.NP V.ofPP]	*He stole the wallet of the woman*.
[C.for-toVP _ U.NP]	*For him to do it this way would change everything.*	[P.NP _ G.whCP]	*He stole what I had*.
[C.thatCP _ U.NP]	*That he did it this way changed everything*.		
[C.whCP _ U.NP]	*What you did changed everything*.		
[C.NP _ U.whCP]	*It changed how I think.*		
[C.VPing _ U.whCP]	*Doing it this way would change how I think.*		
[C.toVP _ U.whCP]	*To do it this way would change how I think.*		
[C.for-toVP _ U.NP]	*For him to do it this way would change how I think.*		
[C.thatCP _ U.NP]	*That he did it this way changed how I think.*		
[C.whCP _ U.NP]	*What you did changed how I think.*		
12 total		**4 total**	

Table 7.7: Phrase type realizations of simple transitive VCs for Change and Theft

The table demonstrates that, for a single valency construction identified for each class, Change verbs allow a much wider range of phrase type realizations of both the subject and object than Theft verbs. Specifically, given the wide variety of phrase types that may instantiate the C and U arguments of Change verbs, the single simple transitive construction can be seen as a generalization over (at least) 12 different specific constructions. For Theft, however, the subject P argument may only be realized as a NP, and the object G argument may only occur as one of four different phrase types. As such, the Theft simple transitive construction is a generalization over only four more specific constructions. Thus, as noted in the discussion of fine-grained semantic distinctions of FEs, changing the methodology of enumerating VCs by positing different VCs for different phrase type realizations would lead to a highly significant increase in Change VCs and a

minimal increase in Theft VCs. Here again, it appears that Change verbs are more flexible than Theft verbs with respect to valency behavior.[385]

A final factor that complicates the enumeration of VCs for a given verb class relates to the frequency of VCs. Specifically, I included every distinct VC (not regarding the subtle distinctions in phrase types mentioned above) in the VC list of that class regardless of its overall frequency in the corpus analysis. However, the analyses in Chapters 5-6 made it clear that VCs vary greatly in their overall frequency and that certain VCs are highly infrequent. Here, I cursorily discuss the frequency of VCs for each verb class and note the implications for the enumeration of VCs. Of the 17 VCs identified for Theft, a total of 10 VCs occurred four or fewer times in the corpus analysis of 421 examples.[386] If such VCs were removed from the analysis due to their low frequency, we would be left with a mere seven distinct VCs for the Theft frame. If we also eschew the semantic distinctions between the Source and Victim role types, as described above, only four formally distinct VCs would remain for the Theft frame, with the syntactic forms: [N V], [N V from N], [N V N], and [N V N from N].

The Change VCs would also decrease if one were to remove VCs that are highly infrequent. Of the thirteen VCs listed in Table 7.4 six of them occurred fewer than seven times in the 549 analyzed English Change examples.[387] The remaining seven VCs, however, were each formally distinct, so Change is associated with seven frequently occurring and formally distinct VCs, as opposed to four for the Theft verbs. Furthermore, based solely on my native speaker intuitions, several of the infrequent VCs of Theft do indeed sound somewhat odd (e.g. *He pilfered the garbage dump; He pilfered through the jewelry*) but the infrequent Change VCs sound quite natural and their infrequency came as a surprise to me (e.g. *She turned him to stone* (2 occurrences in corpus), *She changed him from a prince into a frog* (6 occurrences), *He turned to*

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385 Such possessor relations could also be identified for Change verbs if one were to employ the rich set of FEs posited by FrameNet. Specifically, in a sentence such as *He changed his appearance*, the entire object noun phrase instantiates an ATTRIBUTE FE and the possessive pronoun instantiates the ENTITY FE. Here again, an equal treatment of the two frames would lead to a much wider range of VCs for the Change verbs than Theft.

386 Pattern #15 (in Table 7.4) occurred four times in the corpus analysis. #3, #9, #10, and #12 each occurred three times. #16 occurred twice. #5, #8, and #17 each occurred only once. #13 was not identified at all in the main corpus analysis, but only through a manual search of COCA.

387 The data included six instances of the T4a VC, five instances each of T4b and I2b, four instances of I3b, two instances of T3b, and zero instances of I3a, which was identified through a manual search of COCA.

stone (5 occurrences), *He changed from a prince into a frog* (0 occurrences). In sum, this discussion of the frequency of VCs shows that Theft events are frequently expressed in only four distinct syntactic configurations and the infrequently occurring VCs sound unnatural, while Change events are frequently expressed in seven distinct syntactic configurations and the infrequently occurring VCs do not sound unnatural. Here again, the data suggest that Change verbs exhibit a much wider range of valency behavior than Theft verbs.[388]

In summary, several complications arise in precisely determining the number of VCs available to a given verb class. While a cursory look at the VCs for each class suggested that Theft verbs appear in a wider range of VCs than Change verbs, a closer investigation of methodological issues surrounding the definitions and granularity levels of VCs suggested quite the opposite. The first issue relates to sets of FEs that are conceptually closely related (or "coresets" in FrameNet terminology). In Table 7.4, I had originally defined the Theft VCs using a splitting approach to the three types of "source" roles (Source, Victim, and Source/Victim) and thus posited multiple VCs for a single syntactic configuration, but I employed much coarser-grained roles than those identified by FrameNet in the analysis of Change VCs and thus posited only one VC for each syntactic configuration, as in Table 7.5. The second issue involved differences in the phrase type used to express a given FE: while Theft FEs may only appear as nouns (or nouns within PPs), many of the Change FEs can be expressed using a wide variety of phrase types. Because I posited "default" realization types for the Change FE/VC combinations, a great deal of syntactic variation among related VCs was not accounted for in determining the number of VCs for Change verbs. The final issue pertained to the relative frequency of VCs: while most of the VCs identified for Theft occurred very infrequently in the corpus, most of the Change VCs were found numerous times in the corpus analysis. These three factors taken together give a very different picture than that shown in the beginning of this section and demonstrate that Change verbs have a much wider range of options for argument realization than Theft verbs. As such, these findings suggest that Boas's (2008a) observations that high verb descriptivity corresponds to narrow constructional distribution applies not only to distinct verbs within a given class, but also to distinct classes of verbs.

[388] Recall that the analysis of *metamorphose* in Section 5.5 revealed three additional VC types that were not identified in the main corpus analysis and thus not included in the constructional range table that is repeated in Table 7.5. These VCs provide even further evidence that Change is associated with a broader range of VCs than Theft.

7.2.2.3. Frame-sensitive syntactic features

Having discussed in general the number and nature of Change and Theft VCs, I now address some interesting differences among formally related (or identical) phrases that likely result from their co-occurrence with verbs of different semantic frames. I first discuss differences in the semantics of intransitive constructions, relating these differences to which aspects of the semantic frame the construction profiles across classes. I then discuss the number and types of prepositions that introduce FEs of the two frames, specifically the *from* PP which occurs with both verb classes. Finally, I discuss differences in the interpretation of purposive subordinate clauses and the implications for identifying and positing valency constructions.

Among the numerous Change and Theft VCs, only two syntactic configurations characterize VCs of both classes: the simple transitive [N V N] and simple intransitive [N V] constructions.[389] While the interpretation of the transitive construction is relatively comparable across the two verb classes, the intransitive construction exhibits different semantics across the classes which can only be accounted for with reference to a semantic frame and the constructional range associated with it. To demonstrate, the transitive construction can be described at a coarse-grained level such that it accurately describes the interpretation of the construction when it appears with verbs of either class. Specifically, the construction [N_1 V N_2] can be interpreted as: N_1 acts on N_2 in the way described by the verb, and N_2 changes as a result of the action. For Change verbs, N_1 changes N_2 and N_2 becomes different; for Theft verbs, N_1 takes/steals N_2 and N_2 changes with respect to who possesses it.

However, the intransitive construction does not permit a (useful) uniform semantic interpretation that accounts for its meaning across the verb classes. The subject of intransitive Change VCs (*Pat changes*) becomes different in some way and does not have an agentive interpretation, whereas the subject of intransitive Theft VCs (*Pat steals*) does not become different but instead has an agentive interpretation.[390] Here, it is difficult to posit a definition that accounts for both interpretations the intransitive construction, even using highly abstract characterizations such as "N does something," "something happens to N," or any others. This

[389] See Footnote 32 above on my use of the term "construction" in this context. For more on different types of transitivity constructions, see Comrie (1978), Dixon (1979, 1994), and Croft (2001: Ch. 4).

[390] Depending on the extra-linguistic and linguistic context (especially with respect to tense-aspect-modality features, intransitive VCs with Theft verbs may involve a habitual interpretation (*He always steals*) or describe a specific event without mentioning what the stolen goods are (*He stole from me*).

demonstrates that a single syntactic configuration has very different meanings when it combines with verbs evoking different frames. It is also necessary to observe other constructions used with verbs of a given frame in order to describe the semantic interpretation of the intransitive. By comparing the intransitive to the transitive construction, it is clear that the transitive object of Change [C V U] becomes subject of the intransitive construction [U V], whereas the subject remains consistent across transitive and intransitive constructions among Change verbs [P V G] vs. [P V].

Semantically, the two intransitive VCs (intransitive Change and intransitive Theft) can be characterized by which aspects/portions of the semantic frame they highlight. This is demonstrated in (7.7) below, which provide the two frame definitions using the Frame Elements. The portion of the frame profiled by the intransitive construction is marked in bold, the portions of the frame that are not expressible using the intransitive construction are set off in square brackets, and the portions that are compatible with the intransitive construction in that they may appear as additional oblique arguments are marked in italics.

(7.7) a. **Perpetrator takes** [Goods] *from Victim or Source*

b. [Cause_change acts such that] **Undergo_change changes** *from Original_state to Final_state*

Here, we see that the Theft intransitive VC focuses on the Perpetrator and the act of taking/stealing, the Goods are out of focus in this VC, and the original Source or Victim of the frame may combine with the intransitive VC. On the other hand, the Change intransitive VC focuses on the Undergo_change participant and the fact that it changes, the Cause_change participant is out of focus, and the Original_state and Final_state may combine with the simple intransitive VC. These data show that the different semantic interpretations that arise when highly abstract argument structure constructions (such as the simple transitivity constructions) occur with different types of verbs are easily accounted for with reference to the verb's semantic frame. This constructional polysemy was observed already by Goldberg (1995) (see Section 3.2) and viewed in terms of Frame Semantics by Boas (2008b, 2011a) and Dux (fc.).

The second comparison pertains to the types of prepositions used to introduce oblique arguments across the two classes. While the Change verbs had a limited set of PPs to introduce O

(*from*) or F (*in, into*), the PPs for introducing Victim and Source can be more varied. Specifically, the Source/Victim VE can be expressed only in a *from* PP, the Victim FE can be expressed in a *from* PP or less frequently in an *off (of)* PP or an *away from* PP, while the locational Source FE allows a wider range of PPs expressing direction, namely *from*, *off of, out of*. This wider variety of prepositions for Theft FEs may be due to the "spatial" semantics of stealing, where things can be stolen *from* or *off of* tables; *from* or *out of bags*; etc., whereas the State FEs of Change refer to more general states and categories and are thus expressed with a narrower range of generic 'grammatical function' prepositions.

The *from* PP occurs in both verb classes, introducing the Original_state of Change and the Victim/Source of Theft. I thus investigate the degree to which these FEs are semantically related. At a highly abstract level, the noun within the *from* PP is similar across the classes in that it refers to a property of another argument and that this argument no longer exhibits the property expressed by *from* N after the event. However, the property in question differs drastically across the two classes. For Theft verbs, the property expressed by the *from* PP is the original possessor (Victim) or location (Source) of the Goods FE, with the Goods no longer being possessed by or located at the entity expressed in the *from* PP. On the other hand, the property expressed by *from* PPs with Change verbs is semantically much more general, referring to the category or a value of one of the attributes of the Undergo_change FE.

The *from* PP arguments also differ across the two classes with respect to their occurrence with other FEs. Specifically, the Undergo_change argument expressed by the *from* PP must co-occur with both the Undergo_change and the Final_state. In contrast, the Source and Victim FEs expressed by the *from* PP typically only need to co-occur with the Perpetrator FE, but in some cases no other FE need be expressed.[391] This discussion has shown that, while the *from* PP exhibits similar semantics across the classes at a very abstract level, its specific interpretation and relation to other arguments/roles differs drastically across the two classes. As with the discussion of basic transitivity constructions, this discussion also showed that the interpretation of a given syntactic structure (i.e. *from* PP) depends on the meaning of the verb it occurs with and can easily be captured using a frame-semantic approach.

[391] The following sentences identified in COCA include only the *from* PP argument (Source or Victim) and no other FEs: *Stealing from robots was easy pickings, the kind of pickings Gil liked best.*; *The Corporation will not be stolen from.* ; *You're the one afraid of being stolen from.*

To conclude the comparison of specific syntactic features across Change and Theft verbs, I discuss differences in the interpretation of purposive subordinate clauses when they occur with verbs of the two classes.[392] Purposive clauses, such as those introduced by phrases such as *(in order) to* or *so (that)* are generally viewed as 'adjuncts' that can occur with virtually any sentence and have a consistent interpretation across contexts. However, the precise nature and interpretation of such clauses exhibits interesting differences when they occur with Change and Theft verbs. Consider the two sentences in (7.8), which each include a purposive clause and differ only with respect to the verb. The interpretation of the purposive clause is given after the arrow.

(7.8) a. Pat modified the clothes to look better. → The clothes look better.[393]
b. Pat stole the clothes to look better. → Pat looks better.

With the Change verb in (7.8a), the purposive clause applies to the object of the sentence, specifying that the clothes look better as a direct result of the change. In contrast, the purposive clause with the Theft verb (7.8b) applies to the subject, specifying that Pat will look better at some point after the stealing event (e.g. when Pat puts on the stolen clothes).

In the Change analysis, I posited a separate VC type for sentences with a purposive clause expressing what the Final_state argument does differently after the change event. I argued that these clauses express a core FE of the frame, namely F, and thus characterize the change frame evoked by the Change verb. In contrast, I did not posit additional VCs for Theft sentences including purposive clauses. These clauses have a different interpretation than those found with Change verbs, in that they relate to the subject argument, specifying the purpose or motivation that the Perpetrator steals. The clause thus expresses an event that is independent of the event expressed by the Theft verb in the main clause. As the Reason is not a core FE of the Theft frame, they do not have status as VCs of the Theft frame. This comparison of purposive clause interpretation across two verb classes again demonstrates that formally identical syntactic

[392] See Jackendoff (1990: 183-184) and Croft et al. (2001: 588) for more on the purposive semantic role.
[393] In some cases, the purposive clauses occurring with Change verbs have the more general interpretation referring to the purpose or motivation of the subject Cause_change argument, as in *The woman changed her work ethic to get a raise*. Here the work ethic does not get a raise, but the woman does.

categories exhibit different semantics when combined with verbs evoking different semantic frames.[394]

7.2.3. Variation among Change and Theft verbs and the need for frame-based verb entries

The preceding sections emphasized the differences between Change and Theft verbs with respect to their meanings and valency constructions. However, the two classes also exhibit an important similarity. Specifically, the verbs within each class share several properties but also differ from one another with respect to their specific meanings and precise valency distributions. I established the semantic and syntactic diversity of Change verbs in Chapter 5 and the semantic diversity of Theft verbs in Section 7.2.[395] Table 7.8 shows the frequency with which each verb appears in the VCs presented in Table 7.4 above.[396]

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[394] Given the limited dataset of this analysis, I do not address grammatically relevant meaning components for Theft verbs, but merely list some observed tendencies for the English Change verbs.

a) Highly general verbs (*steal*) and (some) highly descriptive verbs (*shoplift*) can be used in the simple intransitive VC: *He {steals/shoplifts/pickpockets/??embezzles/??pilfers/*swipes} all the time*.

b) "Hand-motion" taking verbs (*swipe, snatch, pinch, lift*) cannot omit the Goods/must be used transitively. (Also in Dux 2011)

c) "Hand-motion" taking verbs (*swipe, snatch, pinch, lift*) and general *steal* can realize the Victim in *off (of*) PPs rather than just *from* PPs. (Also in Dux 2011)

d) Semantically rich verbs (*pickpocket/embezzle/shoplift*) tend to realize only one of the Victim or the Source, but not both. (Also in Dux 2011)

e) Some verbs (*pilfer, pickpocket*; not sure what meaning component this would be) can realize the Source or Victim as the direct object, similar to the Robbery frame/constructions. (Also in Dux 2011)

[395] I forego a detailed discussion of the valency behavior of English Theft verbs and only present the results of the valency distribution analysis to demonstrate the verbs' syntactic diversity.

[396] The number in parentheses after the verb in the first row correspond to the number of examples analyzed. Of course, the low number of examples do not allow a comprehensive and accurate account of the verbs' valency distribution, but merely serve to give a picture of the diversity in the verbs' valency behavior.

		***embezzle* (103)**	***pilfer* (58)**	***shoplift* (64)**	***snatch* (76)**	***steal* (110)**
1	**P _**	7%	9%	61%		7%
2	**P _ from S**	1%	5%	3%		2%
3	**P _ at S**	1%		3%		
4	**P _ from V**	3%	4%			2%
5	**P _ from S/V**	1%				
6	**P _ G**	50%	50%	22%	39%	73%
7	**P _ G from S**	11%	16%	9%	30%	6%
8	**P _ G at S**			2%		
9	**P _ G off S**				3%	1%
10	**P _ G out of S**				4%	
11	**P _ G from V**	5%			20%	8%
12	**P _ G away from V**				4%	
13	**P _ G off (of) V**[397]					
14	**P _ G from S/V**	22%	2%			1%
15	**P _ S**		10%			
16	**P _ S/V**		4%			
17	**P _ through G**		2%			

Table 7.8: Valency distribution of English Theft verbs

The data show that Theft verbs differ (sometimes drastically) in the frequency with which they occur in each of the VCs. The syntactic diversity of Theft verbs, however, seems to be less striking than that of Change verbs. While a more comprehensive analysis is necessary to arrive at conclusive results, here I point to a few observations in comparing the valency distributions of Theft and Change verbs. For one, none of the Change VCs was found to occur with all five of the analyzed verbs, whereas two Theft VCs occur with all of the verbs (#6, #7) and two others occur with four of the five verbs (#1, #2). These four VCs account for at least 68% of the examples for each of the five verbs. Also, all of the nine Theft VCs occurring with only one or two verbs (#3, #5, #8-10, #12, #15-17) occur very rarely for each verb and in the analyzed corpus overall. These findings, along with the discussion in 7.2 of the syntactic uniformity of Theft verbs, suggest that in the vast majority of cases, Theft verbs appear in a narrower range of VCs than Change verbs.

Nevertheless, a proper account of Theft verbs should capture the precise behavior of individual verbs and the shared behavior of all verbs in the class. As described in Sections 4.6 and 5.4, I propose that the valency frame captures the shared behavior and that frame-based verb entries capture the verb-specific behavior. Because I offered an extensive discussion of this

[397] While this pattern was not attested in the main dataset, examples such as the following are found in the COCA corpus: *Lou **snatched** the rifle **off me** and buggered around with the bolt. Hayes **snatches** the gun **off him**. That's not the point, but she has **stolen off of me** before.*

approach in Section 5.4, here I only discuss the frame-based verb entry for the verb *shoplift* (see Table 7.9) to demonstrate the approach and its advantages.

Valency Frame	Theft
Sub-class	n/a
Semantics	Goods: concrete Perpetrator: human, (pretends to be customer) Source: a store or shop, typically on display Victim: rarely expressed (indirectly the owner of the store)
Syntax	Distribution: #1 (61%), #6 (22%), #7 (9%), #2 (3%), #3 (3%), #8 (2%) --highly frequent in intransitive VCs --occurs only with Source FE and not the Victim or Source/Victim FE
Other	--Often has an interpretation of being a habitual activity of a person, especially in simple intransitive (#1) VCs.

Table 7.9: Frame-based verb entry for *shoplift*

The first part of *shoplift*'s FBVE states that its "Valency Frame" is Theft, thus stating that the verb exhibits the semantics of the Theft frame (as defined in (7.1) above) and its associated FEs (see Table 7.1) and that it may occur in (a subset of) the Theft VCs (see Table 7.4 above). The Valency Frame specification captures the behavior shared by all members of the Theft verb class, while additional specifications are required to capture how *shoplift* differs from other Theft verbs.[398] The next level of the FBVE shows the "Sub-class" of the verb and is left "n/a" because I do not analyze potential grammatically relevant meaning components in detail here, but see Section 5.4 to see how I arrived at sub-classes of Change verbs.[399]

The final three portions of the FBVE capture verb-specific properties of *shoplift*. The "Semantics" category describes the meaning of *shoplift*, particularly with reference to the FEs of the Theft frame. Specifically, it states that the Goods are concrete items, the Perpetrator is a human that is (pretending to be) a customer at a store, the Source is a store or shop (more specifically a shelf, rack, or other display area in a store), and the Victim is indirectly the store owner but rarely expressed in utterances with *shoplift*. The "Syntax" category summarizes the frequency with which the verb occurs in each of the Theft VCs (based on the small analysis

[398] The relation between the valency frame and the FBVE can be viewed in terms of a (default) inheritance relationship, as discussed in Section 3.2.

[399] A cursory look at the data and intuitions suggest that *shoplift* could potentially be grouped in a sub-class with *pickpocket*, as both specify the source/location of the goods, and both appear to be used frequently in intransitive VCs.

discussed above) and offers more general statements summarizing this behavior. Here, it states that 61% of the corpus examples for *shoplift* exhibited VC #1 (in Table 7.4, the simple intransitive VC as in *He shoplifts*), 22% of its examples exhibited VC #6 (*He shoplifts goods*), and so forth. More generally, it states that *shoplift* is highly frequent in intransitive VCs and that it does not occur in VCs including the Victim or Source/Victim FEs. The "Additional" category lists additional properties that do not clearly fall into the "Syntax" or "Semantics" categories, including pragmatic, collocational, interpretational, or other properties. Here, the category notes that *shoplift* often has an interpretation of being a habitual activity of a person, especially in simple intransitive (#1) VCs.

Thus, this frame-based verb entry captures a great deal of the semantic and argument realization behavior of the verb *shoplift*. It offers a coarser-grained description of the verbs meaning and syntactic potential that allows for the identification of verb classes. The valency frame verb classes offer richer semantic and more systematic syntactic information than existing classifications such as Levin (1993) and FrameNet, as laid out in Sections 4.3 and 5.4. The remaining categories are required to accurately describe the idiosyncratic verb-specific syntactic and semantic properties of *shoplift* and address the observations in Valency Grammar research, especially Faulhaber (2011), that verb valency is not predictable from its meaning.

7.2.4. Summary of English-specific class comparison

This section compared the meanings and valency constructions of Theft and Change verbs. After establishing that Theft verbs are more descriptive (semantically rich) than Change verbs in the previous section, in Section 7.2.1 I investigated the (additional) meaning components that set Theft verbs apart from one another. A comparison against Change verbs showed that Theft verbs exhibit a much larger number of meaning components, leading the individual verbs to be more semantically diverse than Change verbs. The nature of the meaning components also differed in various ways from those of Change verbs; for instance, some Theft meaning components related directly to specific FEs of the frame rather than characterizing the event as a whole. Differences such as these led me to outline the first steps towards a typology of meaning components.

In Section 7.2.2, I identified the valency constructions of Theft verbs and compared them with those of Change verbs. The comparison revealed that the VCs are drastically different across the class, with only two constructions ([N V], [N V N]) characterizing VCs in both classes, thus

suggesting that verb classes, as characterized by semantic frames, are grammatically relevant. In comparing the number of VCs for each class, I discussed several issues surrounding the delineation and enumeration of VCs before concluding that Change verbs exhibit a much more diverse range of options for argument realization than Theft verbs. This finding corroborated Boas's (2008a) verb-class-specific findings that more descriptive verbs appear in fewer constructions than low-descriptivity verbs and corroborated them on a broader scale by comparing distinct verb classes. I concluded this sub-section by showing how the same syntactic form involves different interpretations when it co-occurs with verbs of different classes.

Finally, in Section 7.2.3, I discussed an interesting, but (to some) obvious similarity of the two classes, namely the semantic and syntactic variety within each class. In both classes, the individual verbs are not identical but exhibit differences in meaning and in distribution across constructions. This fact provides support for the need for multiple levels of analysis, as provided by the valency frame and frame-based verb entry approach developed in Chapter 5.

7.3. COMPARING CHANGE AND THEFT VERBS FROM A CONTRASTIVE PERSPECTIVE

7.3.1. Introduction

7.3.1.1. Purpose and outline

In the previous section I compared Change and Theft verbs from an English-specific perspective, showing that Theft verbs exhibit a wider range of additional meaning components, resulting in greater semantic differences between individual verbs, and that Theft verbs occur in drastically different valency constructions than Change verbs and are more restricted in their possibilities for syntactic expression. In this section, I compare the two classes from a contrastive German-English perspective. For one, comparing the two classes in German allows us to determine whether the differences in the meaning and valency of the two classes are specific to English or potentially cross-linguistically relevant. From a more general perspective, I compare the results of the contrastive analyses of Theft verb meanings and valency with the contrastive findings for Change verbs arrived at in Chapter 6. That comparison revealed surprisingly few differences across German and English in the meaning components and overall meanings of Change verbs, as well as in the valency constructions in which Change verbs appear. As discussed in Section 7.1, one may hypothesize that the cross-linguistic uniformity of Change verbs relates to their highly general meanings and that Theft verbs will exhibit greater cross-

linguistic differences than Change verbs, because of the richness of their meanings (i.e. their high level of descriptivity).

I begin the comparison by discussing the meaning (component)s of German Theft verbs, arrived at through a dictionary analysis (and some corpus analysis), as outlined in Chapter 4 and carried out in Sections 5.2 and 6.3. I then compare the meanings of Theft verbs across English and German in order to determine whether they are more diverse across the languages than those of Change verbs. I then describe the valency constructions associated with German Theft verbs and compare them with those identified for English Theft verbs, in order to determine whether the set of Theft VCs and the features that characterize them is more diverse across the languages than those of Change verbs.[400] The analysis draws primarily on the German verbs *stehlen* ('steal'), *klauen* ('steal/snatch'), *mopsen* ('steal/snatch'), *stibitzen* ('steal/swipe/pilfer'), *entwenden* ('steal/run off with') and *unterschlagen* ('steal/embezzle').[401] Each of these verbs evoke the Theft frame and construe the general Theft semantics in slightly different ways, similar to the English Theft verbs, as shown in 7.3.2. Before conducting the analysis, I first present some previous studies that compare verb classes, particularly Theft verbs, across languages.

7.3.1.2. Review of existing contrastive studies on Theft verbs and other verb classes

Given that no studies exist which compare the meanings of Theft verbs across German and English and that studies comparing other verb meanings across languages were introduced in Section 6.1, in this literature review I focus instead on contrastive studies of valency within verb classes. Before discussing studies focusing on Theft verbs, I first contrast the method and results of two recent studies of valency behavior of a given verb class across languages. As these studies were introduced in detail in Section 6.1, here I only summarize the results as they pertain to the present analysis. Winkler (2015) investigates the valency behavior of verbs of creation, which occur in German equivalents of the constructions associated with the product/material alternation (*make X out of Y; make Y into X*; Levin 1993: 55f.) These verbs include *machen* ('make'), *bauen* ('build'), *formen* ('form'), and *herstellen* ('produce'), each of which are very general, meaning

[400] I do not discuss grammatically relevant meaning components or sub-classes of German Theft verbs, nor do I present the valency frame and frame-based verb entries, as these were discussed in detail in the analyses of the preceding sections and chapters.

[401] As in Chapter 6, the glosses provided here should not be viewed as precise translation equivalents but only serve to give a general picture of how the German verbs' meanings relate to individual English Theft verbs.

only that "someone creates some product using some material." These verbs can thus be viewed as having a low degree of descriptivity, like the Change verbs investigated here. In contrasting their valency behavior (specifically with respect to the material/product alternation), Winkler observes very few syntactic differences across the languages, the primary one being that German may express the material in either a *von* ('from'), *aus* ('out of'), or *mit* ('with') PP, whereas English only allows *out of* or, less frequently, *from*. In contrast, Meliss (2015) compares the valency behavior of verbs of smelling (such as those related to English *smell*, *stink*, and *sniff*) across German and Spanish. This class is arguably semantically richer than the creation verbs noted above, as they describe situations in which "something gives off a scent that is perceived by an animate entity" and thus involve much more specific roles (e.g. smeller, smell, smelly thing). Meliss's comparison revealed rather significant differences in the precise construction types available to equivalent verbs in the two languages as well as in the verbs' distribution across those constructions. Thus, a cursory comparison of these two studies suggests that verb classes of higher descriptivity (e.g. scent verbs, Theft verbs) exhibit more drastic cross-linguistic differences with respect to their valency behavior than verb classes of low descriptivity (e.g. creation verbs, Change verbs). This finding leads me to hypothesize that Theft verbs will be more syntactically diverse across German and English than change verbs were shown to be in Section 6.4.

Indeed, various existing studies have documented cross-linguistic differences in the syntactic behavior of Theft verbs. Dux (fc.) points to two German Theft construction types that differ greatly from English. The first is the ditransitive (a.k.a. dative object) construction, in which the Victim who loses the Goods is expressed as a dative object, as shown in (7.9).[402] In English, the first object in the English ditransitive construction is consistently interpreted as a Beneficiary of the Theft event, rather than the Victim.[403]

(7.9) Er stiehlt mir ein Buch. → He steals a book from me.
He steals me a book.

[402] While the dative object of such German constructions typically instantiates the Victim, it may also be interpreted as a Beneficiary in certain contexts.

[403] DeClerck and Colleman (2009) and Colleman (2011) investigate diachronic change of the semantics of the dative/double object construction in English and Dutch. They show that earlier stages of English did in fact allow verbs of dispossession to occur in the construction, but the (English) construction's semantics shifted (more precisely, narrowed) to no longer allow such verbs. Some vestiges of this usage remain in English, as in *to deny someone something*.

The second construction type which is possible for German Theft verbs but not English ones is the applicative construction (or *be-* prefix construction; see Michaelis and Ruppenhoer 2001). Specifically, (virtually all) German Theft verbs may be combined with the *be-* prefix, in which case the Victim (rather than the Goods) is the accusative direct object and the Goods may (optionally, with some verbs) be expressed as an oblique genitive object, as shown in (7. 10).

(7. 10) Er bestiehlt den Mann seines Geldes.
He be-steals the man (acc.) his money (gen.).

This construction closely resembles the valency behavior documented for Robbery verbs, particularly *rob*, which also realizes the Victim as direct object and the Goods in an *of* PP (which corresponds to German genitive case in many contexts), as in (7.11).

(7.11) He robs the man of his money.

Dux (fc.) observes that the lexical distinction and corresponding classification (see Section 7.1.4) in English between Theft and Robbery verbs does not exist in German, but instead is triggered by combining a Theft verb (which in German includes *rauben* ('rob')) with the *be-* prefix, which associates it with the meaning and form of the applicative construction. These findings will be corroborated in Section 7.3.3 below and suggest that Theft verbs differ dramatically with respect to their valency behavior.

The valency differences among Theft verbs are not only documented across German and English, but are also found with Theft verbs across other language pairs. Enghels and Wylin (2015), for instance, discuss the constructions found with French *voler* and Spanish *robar*, which are equivalents of both *rob* and *steal* in English. In reviewing the various constructions found with Theft verbs in other languages, particularly Germanic languages, they identify the simple transitive construction (with Goods as direct object and Victim/Source as a PP), the ditransitive construction (with Goods as direct object and the Victim as a dative or first object), and the applicative construction (with Victim as direct object and Goods optionally expressed as an oblique phrase) which is triggered lexically in English but via the applicative (*be-* prefix) construction in German and Dutch. Drawing on translations of English *rob* and *steal* in the Harry Potter book series, they identify even more constructions for expressing Theft events. Among the

various constructions discussed, including both passive and active as well as two- and three-participant constructions, Enghels and Wylin (2015) single out two language-specific constructions that are used to profile the victim of the Theft event, i.e. to emphasize that it is negatively affected.[404] This is expressed using the clitic doubling construction in Spanish (7.12) and using the pronominal factitive construction in French (7.13)

(7.12) En Jezabel *le roba el marido* a otra mujer.
"In Jezebel she steals the husband from another woman." (Enghels and Wylin 2015: 116)

(7.13) [La mère de Christian] P3, depuis qu'elle a fêté ses quatre-vingts ans, *s'est fait voler* deux fois [son sac à main] P2.
"Christian's mother, since she celebrated her 80th birthday, has been robbed two times of her handbag." (Enghels and Wylin 2015: 109)

Thus, the cross-linguistic diversity of constructions used with Theft verbs does not appear to be limited to Germanic languages, but is found in other less closely related languages as well.[405] Section 7.3.3 investigates differences in Theft VCs across German and English in more detail to provide further evidence that these verbs are cross-linguistically syntactically diverse.

7.3.2. Comparing the contrastive analyses of Theft and Change verb meanings

7.3.2.1. German Theft meanings

I now discuss the meanings of German Theft verbs in order to compare them with English Theft meanings in order to determine whether Theft verbs exhibit greater semantic diversity across languages than Change verbs. Following the same method employed in Section 6.3, I describe the meanings of German Theft verbs based on their definitions in four dictionaries: *Duden Deutsches Universalwörterbuch* (7th edition; D), *Wahrig Deutsches Wörterbuch* (W), the online *Digitales Wörterbuch der Deutschen Sprache* (DW), and the bilingual *Langenscheidts Grosswörterbuch Deutsch-Englisch* (1st Edition; L). Here, I only discuss the results of the

[404] Enghels and Wylin also emphasize that the "source" type arguments differ in their syntactic possibilities, depending on whether the entity is (construed more as) an inanimate location, a mere possessor of the Goods, or a highly affected victim. These suggestions further support my method of splitting these argument types into a Source FE, a Victim FE, and a Source/Victim FE.

[405] Enghels and Wylin point to Margetts and Austin's (2007) observation that the cross-linguistic diversity in the syntactic expression of three-participant events may relate to the cognitive difficulty of expressing events with more than two participants. They also point to the difference between Theft (or, more generally, Taking) events and Giving events, namely that the third object of Giving events is a recipient, which is typically associated with a specific grammatical features (e.g. *to* PP, dative/first object), rather than a source or original location.

dictionary analysis, which is summarized in more detail in Appendix B1. In addition to the meanings identified in the dictionaries, some meaning components were arrived at by analyzing corpus data from the COSMAS-II DeReKo corpus or through native speaker consultations, as noted in the table below. The set of meaning components identified for the six verbs under analysis are given in Table 7.10, with the verb in the left column and its corresponding meaning components and the participant or aspect of the theft event to which they apply in the right column.

Verb	Meaning components
stehlen	n/a
klauen	**Goods:** small things[406] **Pragmatic:** informal[407]
mopsen	**Goods:** small things **Goods:** low value **Manner:** secretively/unnoticed **Pragmatic:** humorous*[408] **Pragmatic:** informal
stibitzen	**Perpetrator:** (frequently) animal* **Manner:** using cunning/trickery **Goods:** minor, small, low-value **Pragmatic:** humorous **Pragmatic:** informal
unterschlagen	**Goods:** (abstract) financial assets or property **Goods:** high value* **Purpose:** for own purpose **Situation:** Victim entrusts Goods to Perpetrator **Pragmatic:** formal*
entwenden	**Situation:** take advantage of opportunity **Manner:** unnoticed/easily **Manner:** secretively **Pragmatic:** formal

Table 7.10: Meaning components of German Theft verbs

406 The "small things" meaning component of *klauen* appears to be an optional meaning component, as native speaker consultations and corpus data suggest that *klauen* may also be used for goods of high value, such as cars.

407 The label "Pragmatic" in these tables typically refers to register and formality features of the relevant verb.

408 Meaning components marked with an asterisk were not directly identified through the dictionary definitions, but rather through native speaker consultations and the analysis of corpus data.

The most general (least descriptive) of the German Theft verbs is *stehlen*, which was not clearly related to any additional components and typically defined using German equivalents of *take* along with phrases denoting that the taken item does not belong to the agent, as well as adverbials with translations such as *illegally*, *secretively*, or *for one's own use*. These definitions correspond closely with the semantics of the Theft frame, as defined in Section 7.1.4 above. A further reason to classify *stehlen* as a highly general Theft verb is that most of the definitions for other verbs employ the verb *stehlen* and specify it further. *Klauen* is also a highly general Theft verb. It has an (optional) meaning component stating that it occurs with Goods that are small, but this meaning component is only a weak association at best. It appears that *klauen* differs from *stehlen* only pragmatically in that it is informal. *Mopsen* is an informal and humorous German Theft verb with various meaning components that apply to the Goods FE, specifying that it be small, insignificant, and/or of low value. *Mopsen* also has an optional meaning component that the theft is secretive or unnoticed. *Stibitzen* is closely related to *mopsen*, in that both are informal and/or humorous. It is also associated with theft events that are undertaken with cunning or trickery, typically involving Goods that are insignificant or of little value. Furthermore, the corpus data suggests that many uses of *stibitzen* involve animal Perpetrator arguments. *Unterschlagen* is a semantically rich verb closely related to English *embezzle*: it refers to situations in which someone takes money or other financial properties, which are typically in large amounts (or of high value) and abstract (e.g. funds in a bank account). These goods are typically entrusted to the Perpetrator (an employee, politician, or financial agent), who uses the Goods for his/her own use. It is a highly formal and/or legalistic term that is not frequent in colloquial registers. *Entwenden* is a (slightly) formal Theft verb with associations that Perpetrator takes advantage of an opportunity to steal something, and thus takes little effort to steal the thing. Related to this, the theft is often secretive and goes unnoticed.

A comparison of the meanings of German Theft verbs against German Change verbs reveals the same differences as those identified in the English-specific comparison in Section 7.2.1.2 above. Specifically, while the German Change verb analysis revealed only a handful of meaning components, many of which applied to multiple verbs, the German Theft verbs are associated with a much wider range of meaning components (including pragmatic features such as formality or humor specifications) which are distributed more diversely across the individual verbs. This further supports the observation that, within a given language, verbs evoking a more

descriptive semantic frame exhibit greater semantic diversity amongst themselves. I now turn to the contrastive comparison of the classes by describing how German Theft verbs relate to English Theft verbs and then determining whether they exhibit more semantic diversity cross-linguistically than Change verbs.

7.3.2.2. Are Theft verbs more semantically diverse across languages than Change verbs?

In Chapter 6, I showed that the meanings and specific meaning components of Change verbs exhibited very few and minor differences across the two languages. Nearly all of the meaning components identified for English Change verbs also characterized the German Change verbs. These meaning components include "subtle change", "drastic change", "change for a purpose/to amend", and "positive change."[409] Furthermore, nearly all of the verbs could be associated with translation equivalents in the other language: *alter* and *modify* correspond to *abändern, ändern,* and *verändern* as they all refer to subtle changes, while *transform* and *metamorphose* correspond to *verwandeln* and *wandeln* as they all refer to drastic changes. Only two subtle differences stood out in the analysis. English has two general change verbs (*change, turn*) that are not restricted to subtle or drastic changes, while all German verbs were associated with one of these meaning components. These English verbs could nevertheless be clearly mapped to an equivalent German verb, provided the context of its use is known. The other subtle difference is that German *abändern* has a narrower range of application than *alter* or *modify*, as it is typically used to describe subtle changes to rules, policies, or other abstract "text-like" entities. As noted above, the cross-linguistic uniformity of Change verb meanings likely relates to the low descriptivity of the verb class as a whole. Conversely, one would expect that verb classes with higher descriptivity, such as Theft verbs, exhibit more drastic differences in verb meanings across languages.

To test this hypothesis, I now compare the meanings associated with German Theft verbs with those identified for English Theft verbs in Section 7.2.1.1 above. Rather than addressing the individual meaning components in detail,[410] I point out translation gaps between the languages, in

[409] The "positive change" meaning component found with English *transform* was only indirectly identified for the German verb *verwandeln* through native speaker consultations rather than the dictionary analysis.

[410] It appears that the set of meaning components are not drastically different across the two languages as compared to their actual distribution across individual Theft verbs. This is likely a result of the nature of theft events and the cultural and world knowledge surrounding them: Perpetrators typically act in a secretive or cunning manner, Goods come in varying sizes and values, and various relations between

which a verb of one language exhibits a set of meaning components that is not identical to any verb of the other language. I begin by discussing German verb (meanings) that do not have equivalents in English.

German *klauen* is both informal and general: it may describe virtually any type of theft event but it is restricted to informal colloquial registers. While (American) English has informal Theft verbs (e.g. *swipe, pilfer, filch*), each of these is restricted to a specific range of theft scenarios. I am unaware of any verbs that are informal but may be used to describe all types of theft events.[411] German *entwenden* is both formal and associated with Theft events in which it is easy for the Perpetrator to steal the Goods. While I am unaware of any English verbs that are strongly associated with such Theft events, English expressions that seem to best describe such scenarios (*swipe, pilfer, run off/away with*[412]) are all of informal registers. Another difference involves the verb *stibitzen*, which frequently occurs with animal perpetrators. Again, no English Theft verbs seem to be strongly associated with such Theft events. Finally, German *unterschlagen* (and possibly the related verb *veruntreuen*), while closely related to English *embezzle*, refers not only to cases where an employee takes financial goods, but also where they simply 'hold them back' from the rightful owner.[413]

Taking the opposite perspective, several English Theft verbs also lack clear translation equivalents in German. Most notably, *shoplift* and *pickpocket* do not exist as verbs in German. However, these concepts are expressed in the German lexicon as nouns describing the perpetrator or the act itself: as *Ladendieb* ('shoplifter'), *Ladendiebstahl* ('shoplifting'), *Taschendieb* ('[one who] pickpocket[s]'), *Taschendiebstahl* ('pickpocketing'). To express the same concept as the single English verbs, German must use more complex expressions, such as *Ladendiebstahl begehen* ('commit shoplifting') for *shoplift* or *aus Taschen stehlen* ('steal from bags/purses') for

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participants are characteristic of theft events (e.g. trust between Victim and Perpetrator; Perpetrator has easy access to Goods).

411 In British English the verb *nick* is used in a similar way to German *klauen* (e.g. someone can 'nick' a car), which is not felicitous in (my variety) of American English.

412 See Glynn (2004) for a discussion of metaphorical expressions used to describe Theft events. German also has the expression *mitgehen lasssen* ('allow to go with') that also seems to emphasize the easiness of the Theft.

413 *Unterschlagen* is polysemous with a "not mention" meaning where people hold back unpleasant facts, with negative connotations. In fact, several native speaker informants were reluctant to categorize *unterschlagen* as a Theft verb because it seems to be more frequently associated with the wrongful withholding of information. Of 161 active sentences with *unterschlagen* analyzed from the COSMAS-II DeReKo, only 41 have the Theft meaning but 120 have the "withhold information" meaning.

pickpocket.[414] Another translation gap involves the set of "hand-motion" verbs discussed in Section 7.2.1.1. English fairly productively uses verbs with more general 'taking' meanings, especially those focusing on the motion of the taker's hand, to describe Theft events (e.g. *snatch, swipe, pinch, lift*), with the semantic restriction that the goods are concrete and able to be held in one's hand and the syntactic restriction that the Goods FE may not be omitted. However, German Taking verbs that focus on the motion of the hand (e.g. *greifen, grabschen, packen, schnappen*)[415] do not also evoke the Theft frame.

This cursory survey of differences in Theft verb meanings across German and English and the resulting translation gaps clearly demonstrates that Theft verbs are cross-linguistically diverse in their specific meanings across languages. While the Change verbs could all be associated with one or more equivalents in the other language with no striking semantic differences, the Theft verbs are much more difficult to translate directly to other verbs. The semantic differences between Theft verbs of the two languages also exhibited different natures and degrees of difference. Some verbs exhibit meaning components which are found in both the languages but differed in their precise distribution (e.g. *klauen* as both "general" and "informal"), some verbs exhibited meaning components that were not identified for the other language (e.g. "easy to steal" for *entwenden*), some verb meanings could not be expressed with a single verb in the other language (e.g. *pickpocket, shoplift*), and in one case, an entire productive sub-classes of Theft verbs did not have equivalents in the other language (English "hand-motion" verbs). In conclusion, the meanings of Theft verbs across German and English are much more different than the meanings of Change verbs. This result was expected based on the relative descriptivity of the two classes, as I hypothesized that high-descriptivity verbs (such as Theft verbs) would be more semantically diverse cross-linguistically than low-descriptivity verbs (such as Change verbs). In order to determine whether this cross-linguistic finding is a potential universal, similar analyses must be conducted on a wider range of verb classes and a more diverse array of languages.

7.3.3. Comparing the contrastive analyses of Theft and Change VCs

Having just demonstrated that Theft verbs are cross-linguistically more diverse in their meanings than Change verbs, I now turn to the contrastive analysis of Theft VCs in order to

[414] Some American English native speakers do not consider *pickpocket* a verb, but only a noun that refers to people who pick pockets.

[415] These verbs are all listed as translations for both English *snatch* and English *grab* in the online bilingual dictionary dict.cc (www.dict.cc).

determine how the verb classes differ with respect to valency behavior. In Section 7.2.2 I demonstrated that English Change verbs had a much wider range of valency constructions than Theft verbs, so I first briefly compare the number of VCs across German Theft and Change verbs to see if the same relation holds among the two German verb classes as well. Then, I investigate the similarity in the types of VCs of Theft verbs across German and English. I specifically determine whether Theft VCs are as comparable across languages as Change VCs were shown to be in Chapter 6. Given that the two classes have exhibited differences in both the language-specific meaning and VC comparisons in Section 7.2 and in the cross-linguistic meaning comparison in Section 7.3.1, there is reason to assume that Theft VCs will differ more significantly across the languages than Change VCs. This hypothesis is also supported by the existing research discussed in Section 7.3.1.2.

7.3.3.1. German Theft VCs vs. German Change VCs

The VCs identified for German Theft verbs are provided in Table 7.11, which includes an arbitrary label number, the short-hand notation, and an invented example for each VC. The "*V.dat*" found in VCs #13-15 signifies that the Victim appears as a dative object. The VCs are ordered as follows: intransitive VCs (#1-4) precede transitive ones (#4-17). VCs with oblique Source FEs (#2-3, #6-8), precede those with oblique Victim FEs (#4, #9-10), which precede those with Source/Victim FEs (#11-12). The list concludes with VCs which express the Victim as a dative object (#13-15).

#1	P _ [416]	*Jan stiehlt.*
#2	P _ in S	*Jan stiehlt in Läden.*
#3	P _ von S[417]	*Jan stiehlt von Läden.*
#4	P _ von V	*Jan stiehlt von Leuten.*
#5	P _ G	*Jan stiehlt Sachen.*
#6	P _ G von S	*Jan stiehlt Sachen von Läden.*
#7	P _ G aus S	*Jan stiehlt Sachen aus Läden.*
#8	P _ G in S	*Jan stiehlt Sachen in Läden.*
#9	P _ G von V	*Jan stiehlt Sachen von Leuten.*
#10	P _ G bei V	*Jan stiehlt Sachen bei Leuten.*
#11	P _ G von S/V	*Jan stiehlt Sachen von Geschäften.*
#12	P _ G bei S/V	*Jan stiehlt Sachen bei Geschäften.*
#13	P _ V.dat G	*Jan stiehlt dem Mann die Sachen.*
#14	P _ V.dat G aus S	*Jan stiehlt dem Mann die Sachen aus der Hand.*
#15	P _ V.dat G von S	*Jan stiehlt dem Mann die Sachen vom Tisch.*

Table 7.11: Valency constructions of German Theft verbs[418]

To briefly address the relative number of VCs for German Theft and Change verbs, compare the table above with the VCs identified for German Change verbs in Section 6.4, which are provided again in Table 7.12 below. There are 15 Theft VCs and 19 Change VCs, suggesting that German Change verbs have only a slightly wider range of valency options than German Theft verbs, as was found in the English comparison of the classes in 7.2.2 above. Of course, it should be noted again that I posited separate Theft VCs when a given syntactic configuration differed only with respect to the semantic type of the Source and Victim role types. For instance, #3 and #4 have the same form, and #6, #9, and #11 have the same form but differ with respect to whether the Source, Victim, or Source/Victim is expressed in the prepositional phrase. If one

[416] The P before the _ slot representing the verb specifies that the Perpetrator is a nominative argument (which need not always precede the verb in German). The G following the _ (or following the V.dat in #13-15) specifies that the Goods is an accusative argument.

[417] Most of the VCs were identified through an analysis of data provided in Appendix C4. The examples were drawn from the COSMAS-II DeReKo corpus and analyzed using the method presented in Section 4.2 and demonstrated in Section 5.3, VCs #3-4 of this table were not found in this corpus analysis, but were included because they were found to be acceptable by native speaker consultants and can be identified in a more detailed search of the corpus.

[418] Other constructions were identified in the corpus that could potentially be added to this list but were excluded because they only differed from the listed VCs with respect to the realization of an argument that is not a core Frame Element. These included constructions with reflexive pronouns (e.g. *Er klaute sich ein Buch*. 'He stole himself a book') which express only the non-core Beneficiary FE, as well as those introducing source-like arguments in different PP types (e.g. *Er stiehlt Sachen am Tisch/auf einer Baustelle*), which are not clearly Source FEs but appear to be peripheral (non-core) Location FEs that situate the location of the stolen object or the location of the entire Theft event.

were to only posit one VC for such formally similar constructions, the German Theft verbs would be associated with only 11 VCs, which is even more strikingly fewer than Change verbs.[419] Conversely, as mentioned in Section 7.2 above, I conflated several FE distinctions posited by FrameNet (e.g. FrameNet posits both AGENT and CAUSE FEs for my single Cause_change FE); positing separate VCs for these FE distinctions would greatly increase the number of VCs for German change verbs and thus also the difference between the number of VCs across the classes.

VC #	VC Label and form	Example
#1	**I1**: C V	Sie verwandelt.
#2	**T2**: C V U	Sie verwandelt ihn.
#3	**T3a**: C V U in F	Sie verwandelt ihn in einen Frosch.
#4	**T3b**: C V U zu F	Sie verwandelt ihn zu einem Frosch.
#5	**T3c**: C V U dahing/so…	Sie verwandelt ihn so/dahingehend, dass er zum Frosch wird.
#6	**T3d**: C V Uneg an U	Sie ändert nichts an ihm.
#7	**T4aa**: C V U aus O in F	Sie verwandelt ihn aus einem Mann in einen Frosch.
#8	**T4ab**: C V U von O in F	Sie verwandelt ihn von einem Mann in einen Frosch.
#9	**T4ba**: C V U aus O zu F	Sie verwandelt ihn aus einem Mann zu einem Frosch.
#10	**T4bb**: C V U von O zu F	Sie verwandelt ihn von einem Mann zu einem Frosch.
#11	**R2**: U V sich	Er verwandelte sich.
#12	**R3a**: U V sich in F	Er verwandelte sich in einen Frosch.
#13	**R3b**: U V sich zu F	Er verwandelte sich zu einem Frosch.
#14	**R3c**: U V sich dahing/so,...	Er verwandelte sich so/dahingehend, dass er zum Frosch wird.
#15	**R3d**: Uneg V sich an U	Nichts ändert sich an ihm.
#16	**R4aa**: U V sich aus O in F	Er verwandelte sich aus einem Mann in einen Frosch.
#17	**R4ab**: U V sich von O in F	Er verwandelte sich von einem Mann in einen Frosch.
#18	**R4ba**: U V sich aus O zu F	Er verwandelte sich aus einem Mann zu einem Frosch.
#19	**R4bb**: U V sich von O zu F	Er verwandelte sich von einem Mann zu einem Frosch.

Table 7.12: German Change VCs (adapted from Table 6.9)

[419] The table below lists the Theft VCs when those differing only with respect to the fine-grained semantics of the prepositional object are listed as only a single VC. I use the label "O" (Original Location/Owner) to describe such FE types more generally.

#1	P _
#2	P _ in S
#3/4	P _ von O
#5	P _ G
#6/9/11	P _ G von O
#7	P _ G aus S
#8	P _ G in S
#10/12	P _ G bei O
#13	P _ V.dat G
#14	P _ V.dat G aus S
#15	P _ V.dat G von S

Another factor that demonstrates the narrow range of valency options for German Theft verbs, as compared to Change verbs, lies in the phrase types that can instantiate each of the FEs in a given VC. As discussed in Section 7.2.2.2 above, most FEs of English Change verbs allow several phrase type options (e.g. gerundial verb clauses, infinitival clauses, and *that* clauses, in addition to the default NP realization for the Cause_change FE), while the FEs of Theft verbs almost always appear as NPs (or NPs within PPs). This is also the case for German Change and Theft verbs. Therefore, if one were to posit separate VCs for each different phrase type realization, each of the Change VCs would be multiplied (sometimes several times), whereas few additional Theft VCs would be required. Thus, this comparison has demonstrated that German Theft VCs appear in a narrower range of VCs than German Change VCs, providing further evidence that the correlation between high descriptivity of a class and low constructional options is not limited to English but appears to hold across languages.

7.3.3.2. Are Theft VCs more diverse across languages than Change verbs?

I now compare the Theft VCs across German and English in order to determine the extent to which the VCs align across the languages and, conversely, to identify constructional gaps in which one language has a construction that does not exist (or is not used with Theft verbs) in the other language. Because the comparison of Change VCs in Section 6.4 showed virtually no "untranslatable" VCs, and given the difference in descriptivity between the classes and the discrepancies noted up to this point in this chapter, there is reason to expect that Theft verbs will exhibit greater cross-linguistic diversity in their VCs than that observed for Change verbs. For clarity in the comparison, Table 7.13 shows the short-hand notation and arbitrary numbers labeling the Theft VCs identified for each language.

	English VC			**German VC**
#1	P _		#1	P _
#2	P _ from S		#2	P _ in S
#3	P _ at S		#3	P _ von S
#4	P _ from V		#4	P _ von V
#5	P _ from S/V		#5	P _ G
#6	P _ G		#6	P _ G von S
#7	P _ G from S		#7	P _ G aus S
#8	P _ G at S		#8	P _ G in S
#9	P _ G off (of) S		#9	P _ G von V
#10	P _ G out of S		#10	P _ G bei V
#11	P _ G from V		#11	P _ G von S/V
#12	P _ G away from V		#12	P _ G bei S/V
#13	P _ G off (of) V		#13	P _ V.dat G
#14	P _ G from S/V		#14	P _ V.dat G aus S
#15	P _ S		#15	P _ V.dat G von S
#16	P _ S/V			
#17	P _ through G			

Table 7.13: Theft VCs in English and German

Looking only at VCs #1-14 for English and #1-12 for German, the two VC sets exhibit many similarities. They include both transitive [P _ G] and intransitive VCs ([P _]), which can each be combined with a prepositional phrase expressing a Source, Victim, or Source/Victim FE. While the simple intransitive (#1 in both languages) and simple transitive (#6 English, #5 German) exhibit no relevant differences,[420] VCs involving oblique phrases differ somewhat in the types of PPs they employ. The English *from* and German *von* can be used to express any of the three FEs (S, V, S/V), but the other prepositions differ slightly in their meanings and in their distribution across the FE types. In English, Source FEs can be introduced by the following prepositions: *from, at, off (of),* or *out (of)*; German Source FEs can be introduced by *von* ('from'), *in* ('in'), *aus* ('out (of)'), or *bei* ('at, by'). While some of these prepositions match up well across the languages (*from-von*; *at-bei*; *out (of)-aus*), the German equivalents of *off (of)* ('weg', 'ab', 'weg von') are typically not used as prepositions to introduce the Source FE, but instead may combine with some Theft verbs as a verb particle (see below).

English allows Victim and Source/Victim FE types to be expressed with the prepositions *from, away from,* or, with certain verbs, *off (of),* while German allows them to be expressed with

[420] In both languages, the transitive VCs realize the Perpetrator as (nominative) subject and the Goods as (accusative) direct object, while the intransitive VCs realize only the Perpetrator as (nominative) subject.

von ('from') or *bei* ('at, by'). While *from* and *von* are highly equivalent in most contexts across German and English, the other PP types do not match up. Specifically, German *bei* typically has a locational ('at', 'by') or comitative ('while', 'with') reading, none of its English counterparts can be used to introduce victims of Theft events. The English PPs *away from* (Ger. complex preposition 'weg von') and *off (of)* (Ger. verbal prefix 'ab') are not used as prepositions with Theft verbs; however, similar meanings may possibly be expressed through particle verbs such as *wegstehlen*[421] or *abklauen*.[422] While there appear to be slight mismatches across German and English VCs including oblique prepositional arguments, a precise comparison is not possible given the scope of this dissertation, as it would require a detailed analysis of the meanings of these prepositions and of the possible verb-prefix combinations for German Theft verbs.

Apart from the transitive and intransitive VCs with prepositional oblique arguments, there are two other significant differences in the VCs expressing Theft events across German and English. The first difference is seen in the German VCs #13-15, which express the Victim as a dative object and the Goods as direct accusative object, with the Source also optionally expressed in a *von* or *aus* PP (#14-15). The second difference involves the English VCs #15-16, which are transitive VCs that express the Source and Source/Victim FEs, respectively, as direct object, rather than the Goods FE, which is expected for most Theft VCs. These VC types are identified only in the data for *pilfer*[423] and are more closely associated with Robbery verbs such as *rob* and *mug*, as described in Sections 7.1 and 7.3.1. In German, the Victim or Source/Victim FEs may only be expressed as a direct object when the Theft verb appears with a *be-* prefix, which morphologically marks the applicative construction syntax. I am not aware that any German Theft verbs may occur with locational Source FEs as direct object, as in the English VC #15, so it appears that this VC type is not translatable across the two languages. Dux (fc.) offers a more

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421 *Eine Handtasche quasi «unter dem Hintern» der Besitzer* ***weggestohlen*** *hat ein Unbekannter in Bautzen.* ('A stranger in Bautzen **away-stole** a handback (from) virtually under the behind of its owner.') Accessed on Feb. 12, 2016 at: http://www.bild.de/regional/leipzig/handtasche-unter-dem-hintern-weggestohlen-22056694.bild.html

422 *Das ist sein Style oder der hat ihn von anderen Tänzern* ***abgeklaut***. ('That is his style or he has off-stole it from other dancers.'). Accessed through a Google search on Feb. 12, 2016 at: Jaan Valsiner, Peter C. M. Molenaar, Maria C.D.P. Lyra, Nandita Chaudhary (Eds.). *Dynamic Process Methodology in the Social and Developmental Sciences* (pg. 532).

423 English *pickpocket* also occurs in a VC realizing the Victim as direct object, which is more closely associated with the syntax of Robbery verbs. The following example is found in the COCA corpus: *Now, you pickpocketed her?* (COCA).

detailed comparison of these constructions across German and English, as well as the distribution of German Theft verbs across these constructions. Therefore, I merely note here that German includes an entire class of VCs ("dative victim VCs") that do not have equivalents in English, and that English has a set of VCs (with syntax associated with verbs such as *rob*) which do not have clear equivalents in German.

To conclude this comparison, recall that the comparison of Change VCs in Chapter 6 showed that basically every Change VC matched up across the two languages, with only minor differences in their frequency, distribution across verbs, and resulting from the systematic intransitive-reflexive distinction. In contrast, the Theft VCs differed more significantly across the languages. For one, the relatively comparable VCs with oblique Source, Victim, and Source/Victim FEs differed slightly with respect to the prepositions that could introduce each of the FEs. Two other significant differences were identified and discussed in detail by Dux (fc.): German Theft verbs appear in a variant of ditransitive/double-object construction, in which the Victim FE appears as a dative object, whereas similar English VCs only allow this argument to be interpreted as a Beneficiary who receives the stolen Goods. Finally, at least one English verb (*pilfer*) appeared in VCs that express the Source or Source/Victim FE as the direct object; these VC types are only permissible with German Theft verbs when they occur with the *be-* prefix in the applicative construction, and even then they typically only allow Victim or Source/Victim FEs, but not Source FEs, as direct (accusative) object. In conclusion, the analysis showed Theft VCs differ more drastically across German and English than Change VCs.

7.3.4. Summary of German-specific and contrastive comparison of Change and Theft

In this section, I investigated differences between Theft and Change verb meanings and valency constructions, both within German and from a contrastive German-English perspective. I hypothesized that Theft verbs would differ more drastically across the two languages because they are of a higher descriptivity level than Change verbs. In analyzing German Theft verb meanings, I first showed that they were much richer than those of German Change verbs, as they involve meaning components that are more numerous, more detailed, and more diverse in their distribution across individual verbs. I also showed that Theft verb meanings differ more drastically across German and English than those of Change verbs, with the result that several Theft verbs could not be directly translated across the two languages. I then investigated the VCs identified for German Theft verbs, first showing that they are less numerous and diverse than

those of German Change verbs, as was also found in the English class comparison in Section 7.2.2. I then compared the Theft VCs across German and English, relying on previous research demonstrating the cross-linguistic diversity of constructions expressing Theft events (Enghels and Wylin 2015, Dux fc.), to show that this verb class is cross-linguistically more diverse in its syntactic behavior than Change verbs, with several VCs lacking direct equivalents in the opposite language. These analyses further demonstrate the drastic differences between the Change and Theft verb classes, showing that they exhibit differences from a contrastive perspective, in addition to the language-specific differences identified in Section 7.2.

7.4. Conclusion

In this chapter, I compared the semantics and valency behavior of Theft verbs against that of Change verbs from both a language-specific and contrastive perspective. The motivation for this comparison came from research on verb descriptivity, specifically Snell-Hornby (1983) who showed that high-descriptivity verbs apply to a narrower range of contexts than low-descriptivity ones, and Boas (2008a), who showed that high-descriptivity verbs occur in a narrower range of valency constructions than low-descriptivity ones. While those studies focused on verbs of varying descriptivity levels within a single verb class (or semantic frame), this chapter aimed to establish similar findings across entire verb classes with different descriptivity levels. After demonstrating that Change verbs have a much lower descriptivity level than Theft verbs, relying on intuition and data from FrameNet and WordNet, I hypothesized that Theft verbs would exhibit the following aspects of behavior, when compared to Change verbs:

(a) Theft verbs are associated with richer and more numerous meaning components than Change verbs.

(b) Theft verbs have a narrower range of valency constructions than Change verbs.

(c) The meanings (and meaning components) of Theft verbs are more diverse across German and English.

(d) The valency constructions occurring with Theft verbs are more diverse across German and English.

In Section 7.2.1, I confirmed hypothesis (a), showing that Theft verbs have a wider range of meaning components than Change verbs and that the meaning components are also semantically richer and differ more greatly in their distribution across individual verbs. I also showed that the nature of meaning components differs across the two languages, with those of Change verbs typically characterizing the entire Change event as a whole and (some of) those of Theft verbs applying to specific FEs or circumstances of the Theft event. These different natures of meaning components led me to outline a typology of verb meaning components that can be applied in future analyses of fine-grained semantic differences among verbs in a given class.

The comparison of VCs of Theft and Change verbs in English in Section 7.2.2 confirmed hypothesis (b). I first showed that the VCs differ drastically across the classes, thus emphasizing the relevance of verb semantic classes for their argument realization behavior. I concluded that Change verbs exhibit a much more diverse range of options for argument realization than Theft verbs, which corroborated Boas's (2008a) verb-class-specific findings that more descriptive verbs appear in fewer constructions than low-descriptivity verbs and corroborated them on a broader scale by comparing distinct verb classes. Before arriving at that conclusion, I discussed methodological issues surrounding the identification and enumeration of VCs, specifically involving semantically related FE types (i.e. core sets),different phrase type realizations of a given FE and VC, and the relation between frequently and infrequently occurring VCs. I also showed that several phenomena, which are typically viewed as being purely syntactic, actually involve different semantic interpretations depending on the frame semantics of the verb they occur with.

In the comparison of Theft verb meanings across German and English in Section 7.3.2, I confirmed hypothesis (c), showing that Theft meanings are more diverse across German and English than Change meanings. Specifically, some meaning components were only found for one or the other language and the distribution of meaning components (even those identified for both languages) across individual verbs differed even more strikingly. I noted how these differences resulted in several verbs of each language lacking true translation equivalents. This stands in contrast to the findings for Change verbs, which showed that most of the verbs could easily be translated with one or more verbs from the other language.

Finally, Section 7.3.3 addressed hypothesis (d) by determining the equivalence of VCs found for German and English Theft verbs. Here, I corroborated earlier studies showing that the

syntax of Theft verbs differs drastically from language to language. I confirmed the hypothesis by showing that each of the languages had Theft VCs that did not translate across the two languages, specifically those involving "dative victims" in German, those realizing the Source or Victim FEs as direct object, and those introducing such VCs in prepositional phrases. Again, the contrastive findings for Theft verbs differed drastically from those for Change verbs, whose VCs all had close equivalents in the other language which differed primarily with respect to their frequency or distribution across the verbs.

Despite the drastic differences observed for Change and Theft verbs within and across languages, each of the classes exhibited both shared behavior that can be captured at the verb class level and idiosyncratic behavior that must be specified for individual verbs. In Section 7.2.3, I demonstrated how the valency frame/frame-based verb entry approach demonstrated for English Change verbs can be applied to Theft verbs as well. I emphasized that such an approach is necessary to capture generalizations at various levels of granularity (as argued for by Croft 2003, Boas 2003, 2008b, 2011a, Iwata 2008, Stefanowitsch 2011) and is independent of any specific class, but can be employed to capture both levels of generalizations for any verb class.

In sum, while Chapters 5 and 6 emphasized the differences in meaning and valency behavior among semantically related verbs, this chapter has emphasized that verbs of different classes exhibited more significant differences from each other than verbs within the same class. The analysis showed that many of the semantic and syntactic features that characterize Change verbs are simply not comparable to those of Theft verbs. Semantically, the two classes describe significantly different types of events involving different participant types and relations between them. Syntactically, the only construction that occurs with both verb classes and involves the same general semantic interpretation as the basic transitive construction, which occurs with virtually all transitive verbs in the lexicon (of Germanic languages). While these differences obviously relate to differences in the types of events or scenarios the two classes relate to, I suggested that some of the properties (e.g. number of meaning components, number of VCs, cross-linguistic diversity) may relate to the more general (non-verb-class-specific) notion of verb descriptivity. Of course, a comparison of only two verb classes is not sufficient to establish verb descriptivity as a predictor of the nature of verb meaning and valency, the present methods and findings enable future research on a wider range of verb classes and languages to determine the precise relation of verb descriptivity to verb meaning and form. The analysis also raised more

general issues that should be taken into account in future research on the syntax-semantics interface, particularly with respect to how verb meaning (component)s are categorized, how formally identical syntactic items/categories receive different interpretations when they occur with different verb classes, and the degree to which semantic frames determine the cross-linguistic similarity or diversity of verb meaning and syntax.

Chapter 8: Conclusion

In this dissertation, I investigated the nature and structure of verb classes and their ability to account for the relation between verb meaning and argument realization both within and across languages. The analysis involved a comparison of verb classes in several dimensions. Drawing primarily on verbs of Change (e.g. *alter, transform*) and Theft (e.g. *pilfer, embezzle*), I sought to account for both uniformity and idiosyncrasies in verb meaning and form, both within and across languages (German and English) and semantic domains. This study contributes to a significant body of research investigating the relation between meaning and (syntactic) form, specifically with respect to verbs and their arguments (Fillmore 1968, Levin 1993, Goldberg 1995, 2006, Croft 2012). In contrast to much existing research on argument realization which compares coarse-grained features across several verb classes, I approached the topic at a microscopic level and identified subtle differences among individual verbs of a given semantic class. This approach is motivated by recent findings in usage-based linguistics emphasizing that fine-grained bottom-up analyses are required before linguists are able to accurately account for more general or potentially universal principles of language. The results of the study contribute to broader linguistic theory by demonstrating how to account for both regularity and variation among verbs of a given class, how to compare verb classes across languages, and how the varying types and richness of verb classes' semantics influence various aspects of their behavior both within and across languages. In the remainder of the conclusion, I review the goals and findings of each chapter. I then return to the research questions presented in Chapter 1 and determine how they are answered by the present analysis. Finally, I address the limitations of the dissertation and point out avenues for future research.

8.1. SUMMARY OF DISSERTATION

After situating and motivating the study and outlining the specific research questions in the introductory chapter, I reviewed several existing approaches to verb classification and argument realization in Chapter 2. In Section 2.1, I introduced the main problems, goals, and assumptions of this field of study and its relation to other fields of linguistics. I then described in detail three concepts central to verb classification studies. In Section 2.2, I discussed how Levin (1993) employs argument structure alternations to classify English verbs, showing that while her classification has significantly advanced the field of verb class studies, many of her classes are

problematic as they include sets of verbs which (sometimes drastically) differ in their semantic and syntactic behavior. In Section 2.3, I presented early research that seeks to characterize semantic roles and predict their mapping to syntactic categories (Fillmore 1967, 1968, Dowty 1991, Van Valin and LaPolla 1997). Here, I showed that the original approach to semantic roles was flawed due to the assumption of a small (universal) list of semantic roles that can be directly mapped to grammatical functions, because it does not accurately account for the rich variety of role types nor for data in which a single verb and set of roles may be realized in multiple ways. Finally, in Section 2.4, I described event-structural approaches to argument realization which decompose verb meanings into primitive predicates that determine argument realization (Jackendoff 1990, Rappaport Hovav and Levin 1998, Croft 2012). While such approaches overcome several issues found with purely role-based approaches, they are unable to account for subtle differences in argument realization among semantically related verbs.

In Chapter 3, I then described how verb meaning and argument realization are treated in three prominent theories: Frame Semantics (Fillmore 1982, Fillmore and Baker 2010), Construction Grammar (Goldberg 1995, 2006), and Valency Grammar (Herbst et al. 2004, Faulhaber 2011, Herbst 2014). In Section 3.1, I presented Frame Semantics (Fillmore 1983, Fillmore and Baker 2010) and its implementation in FrameNet (Ruppenhofer et al. 2010), showing how its rich frame-semantic characterization of word (including verb) classes and case roles facilitates empirical investigations into the relation between verb meaning and syntactic form within and across languages and semantic domains. I also pointed out various shortcomings with the design of FrameNet, particularly noting that it does not account for fine-grained differences in verb meanings within a semantic frame nor does it provide enough syntactic information for individual verbs. In Section 3.2, I discussed the cognitively-oriented and usage-based approach of Construction Grammar in general, and how Goldberg (1995/2006) applies this approach to the study of verb meaning and syntax. Particularly relevant for the present analysis are Construction Grammar's assumption that argument structure patterns (and all aspects of language) are meaningful and its detailed investigations of such argument structure constructions and their interaction with verbs and verb classes. I then presented Valency Grammar (Helbig 1992, Welke 2011, Herbst 2014) and its implementation in *The Valency Dictionary of English* (Herbst et. al 2004), as its long-standing investigations into the valency properties of lexical items has emphasized the idiosyncratic nature of argument realization (Faulhaber 2011) and led to

fruitful collaborations with researchers in Construction Grammar and related usage-based linguistic theories (Herbst et al. 2014, Engelberg et al. 2015). Despite the differing goals and methods of these three approaches, they all arrive at the conclusion that an accurate account of verb classification and argument realization must draw on detailed item-specific investigations of natural language use (i.e. corpora) and posit generalizations at various levels of abstraction, as discussed in more detail in the following section.

In Chapter 4, I presented the basic methodology for assessing a verb's meaning and argument realization behavior, which is employed for each of the following chapters but demonstrated in most detail for the English Change verbs in Chapter 5. Specifically, I described how I use dictionary definitions to determine both the "general meaning" that is shared among all verbs of a class as well as "additional meaning components" that apply only to some verbs of the class. I then discussed how I determined the verb's argument realization behavior by documenting the "valency construction" of corpus examples including the verb, where valency construction is defined as a pairing of verb-class-specific semantic roles with their syntactic realization (typically consisting of its phrase type and grammatical function). After describing the primary method for analyzing verb meaning and valency, I then discussed the specific methodologies for each of the remaining chapters.

In Chapter 5, I assessed the semantics and valency behavior of English Change verbs, in order to determine the proper way to formulate verb classes and lexical entries that capture both shared and divergent behavior among semantically related verbs. After reviewing existing classifications of these verbs in Section 5.1, I then conducted detailed semantic (Section 5.2) and valency (Section 5.3) analyses of the verbs to assess their similarity. The results of the meaning and valency analyses for each class revealed that, while the general meaning and some valency constructions are shared among all verbs of the class, individual verbs differ (sometimes dramatically) in their additional meaning components and their precise distribution across valency constructions. In Sections 5.4 and 5.5, I demonstrated a novel approach to capturing both the shared and irregular behavior of verbs in verb classes. Specifically, I posited a "valency frame" with a semantic side specifying the general meaning shared by all verbs of the class and a

syntactic side listing all of the valency constructions identified for any verb in the class.[424] To capture verb-specific behavior, I formulated "frame-based verb entries" which list the valency frame of the verb (more precisely, one sense of the verb), thus associating it with other verbs in the class by assigning it the general meaning and full range of valency constructions. The other portions of the entry then account for how the verb differs from others in the class by listing the verb's additional meaning components (that further specify the general meaning) and its precise valency distribution (among the range of all valency constructions associated with the class), as well as any additional pragmatic, collocational, or other properties of the verb. At an intermediate level between the valency frame and frame-based verb entries, I identified "sub-classes" of verbs within a given class, consisting of two or more verbs of a class that exhibit a grammatically relevant meaning component: an additional meaning component that influences the valency behavior of verbs bearing it. Section 5.5 showed that this approach is effective in determining fine-grained aspects of the valency behavior of previously unanalyzed verbs.

In Chapter 6, I compared the findings for English Change verbs to semantically related verbs in German, specifically with respect to their meaning components, valency constructions, and the syntactic influence of potential grammatically relevant meaning components. In Section 6.1, I first reviewed contrastive and German-specific research on verb classification and argument realization. Here I showed that most existing contrastive research focuses on a single (argument structure) construction across numerous verb classes or on individual expressions with rich cultural and/or encyclopedic meanings. While few studies systematically compare the meanings and valency constructions of entire verb classes across languages, recent work in Construction Grammar and Frame Semantics (Croft 2001, Boas 2010a, 2010b) has provided language-independent methods and constructs to facilitate such comparisons.

After introducing the method and goals of the chapter in Section 6.2, the meaning components and valency behavior of five German Change verbs were established following the methodology described above. In Section 6.3, I compared the meanings of the Change verbs across German and English to determine whether the German verbs have the same general meaning as English Change verbs, as well as whether the two classes have the same additional meaning components and distribution of meaning components across individual verbs. This

[424] The valency frame closely corresponds to the semantic frame of FrameNet, but also adds a syntactic dimension by associating the verb class with a range of valency constructions.

comparison allowed me to establish the semantic equivalency of individual verbs across the languages. In Section 6.4, I then compared the valency constructions appearing with Change verbs across the two languages, employing Boas's (2010b) suggestions that constructions are most accurately compared across languages when they express the same frame semantics and involve the same number and types of (verb-class-specific) semantic roles ("Frame Elements," in the terminology of Frame Semantics). For each valency construction, I determined whether it is formally equivalent and/or semantically equivalent to valency constructions in the other language. The comparison revealed very few striking differences in Change verbs among the two languages: the meaning components were largely shared across languages resulting in few translation gaps, the valency constructions also had fairly direct equivalents across languages, and the grammatically relevant meaning components appeared to influence valency in similar ways for verbs of both languages.

In Chapter 7, I compared the Change verb class and the Theft verb class from both a language-specific and cross-linguistic perspective in order to determine whether the semantic domain of a verb class influences its structure and degree of uniformity. In Section 7.1, I introduced the Theft verbs and described how they differ from Change verbs in that they exhibit much higher verb descriptivity (i.e. semantic richness; Snell-Hornby 1983). The language-specific comparison of Change and Theft verbs in Section 7.2 revealed that Theft verbs have much richer meanings and more diverse meanings than Change verbs, but a much narrower range of options for the syntactic realization of arguments. Here, I also proposed a classification system to distinguish various types of meaning components and demonstrated that certain phenomena that are traditionally viewed as independent of verb meaning receive different interpretations when occurring with verbs of different classes. The cross-linguistic comparison of these classes in Section 7.3 showed that Theft verbs exhibit greater differences across German and English than Change verbs. For one, while most Change verbs have semantically equivalent verbs in the other language, many Theft verbs could not be directly translated as they were associated with (a combination of) meaning components not found with any verb of the other language. Syntactically, each of the valency constructions for Change verbs had a corresponding construction in the other language with highly similar formal and semantic properties, whereas several of the Theft valency constructions did not exist at all or did not occur with Theft verbs in the other language. In this analysis, I suggested that the drastic difference between Change and

Theft verbs relates to their varying levels of descriptivity (i.e. semantic weight; Snell-Hornby 1983), a hypothesis which must be tested on more verb classes in future work. I now turn to the major research questions of the dissertation and discuss how they are addressed by the analyses just described.

8.2. RESEARCH QUESTIONS

The first major research question of the dissertation is methodological in nature and asks what concepts, data, and methodological tools are necessary for an adequate and comprehensive account of the relation between verb meaning, argument realization, and verb classification.

> **Research Question 1:** What types of methods and theoretical constructs are most useful for defining verb classes and capturing the semantic and argument realization properties of individual verbs within such classes?

As made clear in Chapters 1-3, numerous frameworks have been developed to describe the relation between verb meaning and form, given the many dimensions of this relationship. As such, the most useful methods and constructs depend on what aspects of the verb-construction relationship are being analyzed. As the present study focused on the degree of uniformity in the meanings and valency distribution of verbs within fine-grained verb classes, it was necessary to draw on approaches that emphasize detailed, item-specific analyses based on rich semantic criteria. Furthermore, the cross-linguistic comparisons required a semantics-based characterization of verbs and constructions, given that syntactic structures may be incomparable across languages (Croft 2001). Furthermore, in order to capture both similarities and differences among verbs within and across verb classes, including differences in frequency distributions, frameworks from usage-based approaches were deemed most useful, as they capture various types of relations across linguistic items and appreciate the role of type and token frequency.

The review of traditional approaches to verb classification in Chapter 2 revealed that, while those approaches offer important insights and methods for capturing the relationship between verb meaning and valency, they were each unable to account for differences among verbs within verb classes. The discussion in Chapter 3, however, demonstrated that Frame Semantics, Construction Grammar, and Valency Grammar improve on the traditional approaches by appreciating the richness of verb meanings and the importance of bottom-up analyses. At the

same time, given the specific focus of these frameworks, each only addresses some aspects of verb meaning and valency. It was therefore necessary to combine insights from each of the three approaches. Specifically, Frame Semantics offers detailed and empirically grounded characterizations of word meaning and a semantic classification of the lexicon, but makes no explicit claims about how verb meaning related to argument realization. Construction Grammar investigates how grammatical constructions combine with verbs of specific semantic classes, but many studies in this field view constructions at a coarse-grained level and thus overlook subtle differences among specific verbs in a given semantic class. Valency Grammar, on the other hand, emphasizes the idiosyncratic nature of verb valency behavior and offers detailed verb-specific analyses that inform the coarser-grained constructional analyses. While Valency Grammar does not aim to identify verb classes, an integration with principles of Frame Semantics facilitates the identification of verb classes that capture similarities in both semantics and valency behavior among verb classes. As such, by applying various aspects of these three approaches to the analysis of (subtle differences in) the meanings and valency distribution of verbs within verb classes, my methodology showed how a combination of these frameworks capitalizes on the strengths and minimizes the weaknesses of each approach.

The second major research question surrounded the degree to which verbs of a given verb class (such as those formulated by FrameNet (Fillmore and Baker 2012) or Levin (1993)) are uniform with respect to their meanings and valency behavior, as well as how diversity within a given class can best be captured.

> **Research Question 2:** To what degree are verbs within a given class similar or different with respect to their meaning and argument realization, and how can we account for regularities and variation within verb classes?

The in-class analyses revealed that no sets of verbs were identical in both meaning and argument realization. While some sets of verbs, particularly in the Change classes, exhibited no notable semantic differences, they were not identical in their valency behavior. These findings emphasize that true synonymy does not exist (Quine 1951) and that verb valency is not (fully) predictable from verb meaning (Faulhaber 2011), thus calling into question the existence of verb classes altogether. At the same time, however, the comparison of Change and Theft verbs in Chapter 7 demonstrated that, while semantically related verbs may not be fully identical, they exhibit

significant overlap in meaning and in the set of valency constructions with which they may appear. These contradictory findings can be reconciled when one recognizes that verb classification depends greatly on the perspective and scope of a particular analysis. Consequently, the most accurate and comprehensive classification of the (English verbal) lexicon requires one to posit classes at numerous levels of granularity.

To address the other part of the second research question, surrounding how to capture the similarity of semantically related verbs (when compared against other classes) as well as their differences (when compared against one another), I argued that verb entries themselves must contain information of various granularity levels. In Section 5.4, I described my approach to such entries by defining the "valency frame" for English Change verbs and "frame-based verb entries" for each verb in the class. At a coarse-grained level, these frame-based verb entries include a specification of the verb's valency frame, which captures the shared meaning of all verbs in a class and specifies the full range of valency constructions that may appear with verbs in the class. To capture verb-specific information, the frame-based verb entries state the additional meaning components which further specify the general meaning as well as the specific range of valency constructions (associated with the valency frame) the verb may occur in. At an intermediate level of analysis, I proposed sub-classes, which capture low-level generalizations among sub-sets of verbs in a class and can thus be seen as finer-grained verb classes than those posited by Levin (1993) or FrameNet. This multi-level account neatly captures both the shared and unique semantic and syntactic behavior of verbs within a given class. It thereby reconciles two opposing views by both recognizing that verb meaning determines some aspects of syntactic behavior (Fillmore 1968, Levin 1993) and appreciating that every verb is unique and must be treated individually (Faulhaber 2011).[425]

The third major research question addressed the degree to which the meaning and valency behavior of a given verb class are similar across languages, specifically German and English.

[425] Furthermore, while the present analysis only applied this method to fairly specific verb classes, it can easily be expanded to a broader range of verbs and thereby capture regularities across larger portions of the lexicon. For instance, the Theft verbs analyzed here can be viewed as forming a sub-class within a larger class of Taking verbs, which can further be viewed as a sub-class of Receiving/Getting verbs.

> **Research Question 3:** Are verb classes specific to individual languages or can they be applied to multiple languages? Are the meanings and constructions associated with an English verb class comparable to translation equivalents in another language?

The review of contrastive verb class literature (Section 6.1) emphasized that verbs cannot be compared directly across languages, but require more nuanced comparisons relying on detailed verb meaning and constructional behavior. The comparisons in Chapters 6 and 7 built on Boas's (2010b) suggestions for an integration of Frame Semantics and Construction Grammar in contrastive analysis by comparing the verb meanings, valency constructions, and grammatically relevant meaning components of entire verb classes across languages. This methodology can be refined and reproduced for studies of other verb classes and other language groups. The results of the cross-linguistic analyses also suggest that the degree of cross-linguistic similarity depends on the semantic nature of the classes compared. Specifically, the contrastive comparison of Change verbs revealed significantly fewer differences than Theft verbs in their meanings and their valency constructions. As such, future cross-linguistic studies must take into account the semantic nature of the compared verbs and constructions, as the findings of such analyses may apply only to verbs of a particular semantic domain but not the entire lexicon.

From an applied perspective, my dissertation identified mismatches in the meaning and syntax of verbs and constructions, which are essential for language learning, translation, and intercultural communication. The comparison also reveals potential reasons for specific translation problems, which may be purely idiosyncratic, related to differences in cultural knowledge, or determined by systematic structural properties of individual languages.

The final research question, addressed in Chapter 7, addressed the comparability of verb meaning and valency behavior for verbs of different semantic domains from both a language-specific and contrastive perspective.

> **Research Question 4:** To what extent do verb classes of different semantic domains differ with respect to their semantic and syntactic properties? Do different semantic domains exhibit different degrees of cross-linguistic variation?

Besides the obvious need to conduct analyses on multiple verb classes before making claims about the general structure and nature of verb classes, this research question had other motivations as well. A major motivation for this research question is that very few existing

studies explicitly compare verbs or verb classes of different semantic domains. Such a comparison may encourage future analyses to better appreciate the semantic differences among verbs, as they may have unexpected syntactic implications. Furthermore, the comparison of German and English Change verbs in Chapter 6 demonstrated that cross-linguistic comparisons are highly fruitful when they are restricted verbs of a specific semantic domain, rather than comparing large sub-sets of the languages' lexicons.

The comparison of Theft verbs against Change verbs in Chapter 7 demonstrates that the semantic domain of a verb class greatly influences many aspects of their semantic and syntactic behavior, both within and across languages. While comparisons with other classes are necessary before arriving at conclusive results, the findings suggest that the descriptivity level (i.e. semantic weight; Snell-Hornby 1983) of a verb class determines the number and nature of its meaning components and valency constructions, as well as the degree to which these differ cross-linguistically. The comparison also revealed unexpected differences in the types of meaning components differentiating individual verbs of diverse semantic classes, and it demonstrated that certain phenomena that are traditionally viewed as independent of verb meaning receive different interpretations when occurring with verbs of different classes. More generally, this cross-class comparison will hopefully guide future research by encouraging scholars to appreciate the semantic class of the lexical items they analyze.

In summary, the major contribution of my dissertation is the bottom-up, corpus-based analysis of fine-grained verb classes. As discussed in Chapters 2 and 3, many approaches to the syntax-semantics interface assume highly general principles, be they event structure templates or principles for fusing verbs and independently existing constructions, and attempt to accommodate new data into these rigid theoretical constructs. At the same time, researchers in both projectionist and constructional frameworks have emphasized the need for more detailed verb-specific analyses of argument realization.[426] My dissertation addresses these needs by developing a methodology for such analyses and providing crucial data on argument realization within and across verb classes that must be taken into account in future investigations of verb classes and argument realization.

[426] See Levin and Rappaport Hovav (2005: Ch. 7) for such claims within projectionist frameworks, and the work of Boas (2003, 2006) and Croft (2003, 2012: Ch. 9), among others, for such claims in constructional frameworks.

Perhaps the most important insight of my analysis is that verbs with nearly identical meanings exhibit significant variation in their distribution across syntactic contexts (i.e. valency constructions). For instance, among the five English Change verbs classified together in both Levin (1993) and FrameNet (Fillmore and Baker 2010), no two verbs occurred in the same range of valency constructions with similar frequencies and, more strikingly, no valency construction was found to occur with all verbs of the class in the data set. These data are a challenge not only for projectionist approaches (Jackendoff 1990, Rappaport Hovav and Levin 1998), which assume a minimal set of (typically 5-10) basic event structure templates that predict argument realization. Specifically, given this small set of templates, one would assume that the fine-grained semantic class of Change verbs must be associated with the same template. If this is the case, then event structure templates must be reformulated if they are to be entirely predictive of grammatical behavior, given the grammatical diversity among Change verbs identified here. The data are equally problematic for constructional approaches such as that of Goldberg (1995, 2006), whose principles state that verbs may be used within a given construction if the verb's participant roles are semantically compatible with the constructional slots of the construction. Given the semantic similarity of Change verbs (and thus their participant roles), one would expect that these verbs would be equally felicitous in the same range of constructions. Again, this conflicts with the data discussed here, necessitating a reformulation of the principles for verb-construction fusion. If the abstract principles, rules, and generalizations proposed in any of these frameworks are intended to adequately account for the full range of linguistic data, then the data provided in this dissertation – showing that semantically related verbs differ in their grammatical behavior – must also be taken into account.

In addition to the importance of this verb class data for future characterizations of the syntax-semantics interface, this dissertation also advances more lexicographic work on verb classification by bringing together the strengths of the two most prominent English verb classifications: FrameNet (Fillmore and Baker 2010 and Levin (1993). FrameNet's emphasis on a verb's frame semantics as criterial for classification leads to well-defined, fine-grained verb classes. However, as a lexicographic resource based on Frame Semantics, FrameNet does not associated verb classes with any syntactic (i.e. argument realization) properties directly, but only offers simple descriptions of individual lexical units' valency behavior based on a limited set of annotated corpus examples. In contrast, Levin's (1993) employs purely syntactic criteria for

classification, specifically a (group of) verb's behavior in a hand-selected set of alternation pairs. Although Levin's approach identifies certain aspects of argument realization behavior, its top-down method (i.e. pre-determining specific alternations as criteria for a verb class) precludes the identification of the full range of constructions (or alternation variants) available to a given class (and each of its members individually), not to mention the semantic heterogeneity within classes resulting from her syntax-based approach. The classes investigated here (defined based on shared frame semantics) were shown to be associated with a fairly distinct set of valency constructions,[427] including those not identified by Levin (1993) or FrameNet. My analysis also gave structure to the set of constructions associated with a verb class by capturing features shared by individual constructions and by addressing the relative type and token frequencies with which each occurred. My investigation thus allows for a better picture of the argument realization behavior of verb classes at different levels of abstraction and enables future verb classification research and resources to directly associate verb classes with constructions.[428]

8.3. LIMITATIONS AND OUTLOOK

In conclusion, I discuss the limitations of the present study and avenues for future research, including those building directly on the present analysis, those applying the present results to other verb classes and languages, and those employing this type of research to practical applications. While this dissertation offered a detailed treatment of the valency behavior of two verb classes in German and English, its scope, data, and methodology leave many questions unanswered. For one, I only analyzed a handful of verbs for each of the classes here, which are associated with several more verbs, such as *convert*, *develop*, and *morph* for Change and *filch*, *rustle*, and *misappropriate* for Theft. Future work must therefore investigate all potential members of these classes to gain a fuller picture of the structure and uniformity of verb classes.

A further limitation of this dissertation involves the lack of depth in the semantic analysis. The identification of verb meanings relied primarily on dictionary definitions, which are often inaccurate or incomplete (Fillmore and Atkins 2000). Indeed, there is reason to believe that

[427] Each class was associated with around eight to 20 valency constructions (depending on how constructions are defined; see Section 7.2.2) with a higher number found with Change than Theft verbs.

[428] As discussed in detail above, my approach overcomes a further issue with the existing classifications, namely that they do not adequately account for verb-specific differences among members of a given class. The formalization of frame-based verb entries (see Section 5.4) captures both the shared and verb-specific behavior of verb classes. This information, too, can and should be integrated into lexicographic resources.

the verbs may exhibit subtle and elusive semantic differences which are not captured in dictionary definitions nor adequately identified in this work. Such semantic distinctions relate both to verb meanings and to (features of) valency constructions. For instance, while the dictionaries noted no differences in the types of Undergo_change arguments that may occur with *alter* and *modify*, a detailed corpus analysis may well reveal that one verb or the other is more likely to be used with specific types of arguments. Further, the choice of a *to* or *into* PP to introduce the Final_state with a Change verb is most likely be determined by semantic factors (*turn into/*to a frog*; *turn to/?into stone*). Additionally, the semantic analysis relied on fine-grained semantic roles compared to those in traditional role-based approaches (see Sections 2.3 and 3.1), but this set of roles was much more coarse-grained than those defined in FrameNet,[429] suggesting that a more nuanced analysis of role types may give a better picture of the semantics of Change verbs. Indeed, more detailed investigations are necessary to identify semantic differences among verbs or constructions that did not surface under the present methodology.

The valency analysis could also be improved in various ways. While the amount of data analyzed here is greater than that found in many studies of verb classes and constructions, it must be scaled up in future work to gain a more complete picture of the actual valency distribution of verbs and verb classes. Of course, it is likely impossible to gain a fully "complete" picture of a verb's (or verb class's) precise grammatical behavior, which can only be achieved by analyzing all instances in which each verb has been used (and also accounting for diachronic change in valency behavior of a given verb and the coining of new verbs). In a related fashion, my corpus sample was limited to active, finite clauses and investigated only the realization of core arguments, but did not investigate the verbs' distribution in other clause types (e.g. passive, infinitive clauses) and with other linguistic elements such as adverbs or tense-aspect-modality markers. However, given recent advances in computing and corpus linguistics, such as collostructional analysis (Stefanowitsch and Gries 2003, Gries and Stefanowitsch 2004), the insights of this dissertation can be applied to much larger amounts of data to arrive at highly accurate characterizations of verb valency and other grammatical properties.

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[429] For example, as discussed in detail in Chapter 5.1, FrameNet posits a much richer set of Frame Elements for the frames containing the Change verbs analyzed here, such as Agent and Cause for my Cause_change, and Entity and Attribute for my Undergo_change role. The FrameNet roles were not used due to methodological issues addressed in that section, but a more rigorous semantic analysis may reveal that these fine-grained distinctions influence verb valency behavior.

The analyses in the preceding chapters also revealed interesting data that could not be treated in detail given the scope of the dissertation. For example, I viewed the verb-construction relation primarily from the perspective of the verb and its meaning, as I described how frequently each verb appears in each valency construction, but it is equally important to take the opposite view to determine which constructions are most frequent with which verbs. Further, by limiting my scope to only analyze the core Frame Elements (i.e. obligatory arguments), I did not address the combination and interpretation of more "peripheral" (i.e. adjunct) phrases with the verbs in question. For example, many Change examples include *with* PPs that describe an indirect cause of the event (*change with time*) or other phrases describing the direction or result of the change (*change for the better*). Analyzing these types of phrases may reveal further distinctions among the verbs and identify whether certain "adjuncts" may be interpreted differently depending on the frame semantics of the verb they modify. Finally, the various meaning component types (Section 7.2.1) and frame-sensitive syntactic features (Section 7.2.2) identified in the comparison of Change and Theft verbs must be applied to other verb classes to better understand their nature.

The methods and analyses of my dissertation must also be applied to a much wider range of verb classes. For one, while I was able to associate two verb classes with the range of constructions they occur with, an important goal for future work is to relate other verbs to their constructional potentials. In doing so, it may be possible to build a constructional inventory into FrameNet that shows which types of valency constructions verbs of each frame may occur with, thereby contributing to the development of a constructional inventory of English (a.k.a. the Constructicon, Fillmore 2008, Fillmore et al. 2012). The comparison of verb classes in Chapter 7 also suggested that verb descriptivity influences the syntactic and semantic uniformity of verb classes within and across languages and must therefore be applied to other classes of different descriptivity levels. And of course, all of these analyses must be carried out on more typologically diverse languages to establish the potential universality of verb classes.

Finally, the results of my dissertation can also be used to improve and develop various lexicographic, computational, and pedagogical applications. For one, the lexicographic goals of FrameNet will benefit from my identification of valency frames and frame-based verb entries, as they will enrich the verb-specific and syntactic information available to its users. These are also important for computational applications, particularly natural language processing, as my results provide rich syntactic and semantic information that can be used to interpret large texts, and

machine translation, as the cross-linguistic comparisons identify important mismatches in both word meaning and constructional behavior. This work is also highly relevant for language learning and translation, as it establishes which constructions a given verb is most likely to occur in and which words and constructions are the most accurate translation equivalents. As discussed in Section 6.1, research such as that in this dissertation is already being applied to (German-English) vocabulary learning in the German Frame-based Online Lexicon (Boas and Dux 2011, Boas et al. fc.), which organizes vocabulary according to semantic frames and provides rich word-specific and constructional information.

Appendix A: Full dictionary definitions for meaning analysis

Appendix A1: Full dictionary definitions for English Change verbs

This appendix provides the full dictionary definitions for English Change verbs from three dictionaries: *Collins-Times English Dictionary and Thesaurus*, 2nd Edition (CT), the *American Heritage Dictionary of the English Languages*, 5th Edition (AH), and the online version of the *Merriam-Webster Dictionary* (MW; http://www.merriam-webster.com; accessed on 9 June 2014)

The definitions included here only pertain to verbal uses of these words and not nominal or adjectival uses. I have also excluded any idiomatic phrases with these verbs (e.g. *turn a trick*), unless they were included with the normal verb senses. Finally, I have removed any information pertaining to the pronunciations or etymologies of the verbs.

The definitions in this appendix serve as the basis for the semantic analysis of English Change verbs in Section 5 2.

TRANSFORM

MW : to change (something) completely and usually in a good way **Full Definition of TRANSFORM** *transitive verb* **1a :** to change in composition or structure **b :** to change the outward form or appearance of **c :** to change in character or condition **:** convert **2:** to subject to mathematical transformation **3:** to cause (a cell) to undergo genetic transformation *intransitive verb***:** to become transformed **:** change
AH *tr.* 1. To change markedly the appearance or form of: "*A thick, fibrous fog had transformed the trees into ghosts and the streetlights into soft, haloed moons*" (David Michael Kaplan). 2. To change the nature, function, or condition of; convert: *A stream engine transforms heat in to mechanical energy*. See Synonyms at **convert**. 3. *Mathematics* To subject to a transformation. 4. *Electricity* To subject to the action of a transformer. 5. *Genetics* To subject (a cell) to transformation. - *intr.* To undergo a transformation.
CT *vb* 1 to alter or be altered in form, function, etc. 2 (*tr*) to convert (one form of energy) to another form. 3 (*tr*) *Maths.* to change the form of (an equation, etc.) by a mathematical transformation. 4 (*tr*) to change (an alternating current or voltage) using a transformer.

ALTER

MW : to change (something) : to make a change to (a piece of clothing) so that it will fit better : to remove the sex organs of (an animal) so that the animal is unable to reproduce *transitive verb* **1:** to make different without changing into something else **2:** castrate, spay *intransitive verb***:** to become different
AH *tr*. 1. To change or make different; modify: *altered my will*. 2. To adjust (a garment) for a better fit. 3. To castrate or spay (an animal, such as a cat or dog) *intr*. To change or become different.
CT *vb* 1 to make or become different in some respect; change. 2 (*tr*) *Inf., chiefly US*. a euphemistic word for **castrate** or **spay**

MODIFY

MW : to change some parts of (something) while not changing other parts grammar : to limit or describe the meaning of (a word or group of words) **Full Definition of MODIFY** *transitive verb* **1:** to make less extreme **:** moderate **2 a :** to limit or restrict the meaning of especially in a grammatical construction **b :** to change (a vowel) by umlaut **3 a :** to make minor changes in **b :** to make basic or fundamental changes in often to give a new orientation to or to serve a new end <the wing of a bird is an arm *modified* for flying> *intransitive verb* **:** to undergo change
AH *tr*. 1. To change in form or character; alter. 2. To make less extreme, severe, or strong: *refused to modify her stand on the issue*. 3. *Grammar* To qualify or limit the meaning of. For example, *summer* modifies *day* in the phrase *a summer day*. 4. *Linguistics* To change (a vowel) by umlaut. *intr*. To be or become modified; change.
CT *vb* **modifies, modifying, modified.** (*mainly tr*) 1 to change the structure, character, intent, etc., of. 2 to make less extreme or uncompromising 3 *Grammar*. (of a word or phrase) to bear the relation of modifier to (another word or phrase). 4 *Linguistics*. to change (a vowel) by umlaut. 5 (*intr*) to be or become modified.

CHANGE

MW

: to become different
: to make (someone or something) different
: to become something else
Full Definition of CHANGE
transitive verb
1
a : to make different in some particular : alter <never bothered to change the will>
b : to make radically different : transform <can't change human nature>
c : to give a different position, course, or direction to
2
a : to replace with another <let's change the subject>
b : to make a shift from one to another : switch <always changes sides in an argument>
c : to exchange for an equivalent sum of money (as in smaller denominations or in a foreign currency) <change a 20-dollar bill>
d : to undergo a modification of <foliage changing color>
e : to put fresh clothes or covering on <change a bed>
intransitive verb
1 : to become different <her mood changes every hour>
2 of the moon : to pass from one phase to another
3: to shift one's means of conveyance : transfer <on the bus trip he had to change twice>
4: of the voice : to shift to lower register : break
5: to undergo transformation, transition, or substitution <winter changed to spring>
6: to put on different clothes <need a few minutes to change for dinner>
7: exchange, switch <neither liked his seat so they changed with each other>
— chang·er noun
— change hands
: to pass from the possession of one owner to that of another <money changes hands many times>

AH

tr.
1a. To cause to be different: *change the spelling of a word.*
b. To give a completely different form or appearance to; transform: *changed the yard into a garden*.
2. To give and receive reciprocally; interchange: *to change places*.
3. To exchange for or replace with another, usually of the same kind or category: *change one's name; a light that changes colors.*
4a. To lay aside, abandon, or leave for another; switch: *change methods; change sides*.
b. To transfer from (one conveyance) to another: *change planes*.
5. To give or receive the equivalent of (money) in lower denominations or in foreign currency.
6. To put a fresh covering on: *change a bed; change the baby*.
-
intr.
1. To become different or undergo alteration: *He changed as he matured*.
2. To undergo transformation or transition: *The music changed to a slow waltz*.
3. To go from one phase to another, as the moon or the seasons.
4. To make an exchange: *If you prefer this seat, I'll change with you*.
5. To transfer from one conveyance to another: *She changed in Chicago on her way to the coast.*
6. To put on clothing: *We changed for dinner*.

CHANGE (continued)

CT
vb 1 to make or become different; alter
2 (*tr*) to replace with or exchange for another: *to change one's name*.
3 (sometimes foll. by *to* or *into*) to transform or convert or be transformed or converted.
4 to give and receive (something) in return: *to change places*
5 (*tr*) to give or receive (money) in exchange for the equivalent sum in a smaller denomination or different currency.
6 (*tr*0 to remove or replace the converings of: *to change a baby*.
7 (when *intr*, may be foll. by *into* or *out of*) to put on other clothes.
8 to operate (the gear level of a motor vehicle): *to change gear*.
9 to alight from (one bus, train, etc.) and board another.

TURN

CT
vb 1 to move around an axis: *to turn a knob*.
2 (sometimes foll. by *round*) to change or cause to change positions by moving through an arc of circle: *he turned the chair to face the light.*
3 to change or cause to change in course, direction, etc.
4 to go or pass to the other side of (a corner, etc.).
5 to assume or cause to assume a rounded, curved, or folded form: *the road turns here*.
6 to reverse or cause to re-verse position.
7 (*tr*) to perform or do by a rotating movement: *to turn a somersault.*
8 (*tr*) to shape or cut a thread in (a workpiece) by rotating it on a lathe against a cutting tool.
9 (when *intr*, foll. by *into* or *to*) to change or convert or be changed or converted.
10 (foll. by *into*) to change or cause to change in nature, character, etc.: *the frog turned into a prince*.
11 (*copula*) to change so as to become: *he turned nasty.*
12 to cause (foliage, etc.) to change colour or (of foliage, etc.) to change colour.
13 to cause (milk, etc.) to become rancid or sour or (of milk, etc.) to be-come rancid or sour.
14 to change or cause to change in subject, trend, etc.: *the conversation turned to fishing*.
15 to direct or apply or be directed or applied: *he turned his attention to the problem*.
16 (*intr*; usually foll. by *to*) to appeal or apply (to) for help, advice, etc.
17 to reach, pass, or progress beyond in age, time, etc.: *she has just turned twenty*.
18 (*tr*) to cause or allow to go: to *turn an animal loose*.
19 to affect or be affected with nausea.
20 to affect or be affected with giddiness: *my head is turning*.
21 (*tr*) to affect the mental or emotional stability of (esp. in turn (someone's) head).
22 (*tr*) to release from a container.
23 (*tr*) to render into another language.
24 (usually foll. by *against* or *from*) to transfer or reverse (one's loyalties, affections, etc.).
25 (*tr*) to cause (an enemy agent) to become a double agent working for one's own side.
26 (*tr*) to bring (soil) from lower layers to the surface.
27 to blunt (an edge) or (of an edge) to become blunted.
28 (*tr*) to give a graceful form to: *to turn a compliment*.
29 (tr*)* to reverse (a cuff, collar, etc.).
30 (*intr*) US. to be merchandised as specified: *shirts are turning well this week.*
31 *Cricket*. to spin (the ball) or (of the ball) to spin.
32 turn a trick. *Sl*.. (of a prostitute) to gain a customer
33 turn one's hand to. to undertake (something practical).

TURN (continued)

MW
: to move around a central point
: to cause your body or a part of your body to face a different direction
: to cause (something or a side of something) to face an opposite or different direction

Full Definition of TURN
transitive verb
1
a : to cause to move around an axis or a center **:** make rotate or revolve <*turn* a wheel> <*turn* a crank>
b (1) **:** to cause to move around so as to effect a desired end (as of locking, opening, or shutting) <*turned* the knob till the door opened> (2) **:** to affect or alter the functioning of (as a mechanical device) or the level of (as sound) by such movement <*turn* the oven to 400°> <*turn* the music to full volume>
c : to execute or perform by rotating or revolving <*turn*handsprings>
d : to twist out of line or shape **:** wrench <had *turned* his ankle>
2
a (1) **:** to cause to change position by moving through an arc of a circle <*turned* her chair to the fire> (2) **:** to cause to move around a center so as to show another side of <*turn*the page> (3) **:** to cause (as a scale) to move so as to register weight
b : to revolve mentally **:** think over **:** ponder
3
a : to reverse the sides or surfaces of **:** invert <*turn*pancakes> <*turn* the shirt inside out>: as (1) **:** to dig or plow so as to bring the lower soil to the surface <*turn* the compost weekly> (2) **:** to make (as a garment) over by reversing the material and resewing <*turn* a collar> (3) **:** to invert feet up and face down (as a character, rule, or slug) in setting type
b : to reverse or upset the order or disposition of<everything was *turned* topsy-turvy>
c : to disturb or upset the mental balance of **:** derange,unsettle <a mind *turned* by grief>
d : to set in another especially contrary direction
4
a : to bend or change the course of **:** divert <a battle that*turned* the tide of history>
b : to cause to retreat <used fire hoses to *turn* the mob>
c : to alter the drift, tendency, or expected result of
d : to bend a course around or about **:** round <*turned* the corner at full speed>
5
a (1) **:** to direct or point (as the face) in a specified way or direction (2) **:** to present by a change in direction or position<*turning* his back to his guests>
b : to bring to bear (as by aiming, pointing, or focusing) **:** train <*turned* the light into the dark doorway> <*turned* a questioning eye toward her>
c : to direct (as the attention or mind) toward or away from something
d : to direct the employment of **:** apply, devote <*turned* his skills to the service of humankind>
e (1) **:** to cause to rebound or recoil <*turns* their argument against them> (2) **:** to make antagonistic **:** prejudice <*turn*a child against its mother>
f (1) **:** to cause to go in a particular direction <*turned* our steps homeward> (2) **:** drive, send <*turn* cows to pasture><*turning* hunters off his land> (3) **:** to convey or direct out of an inverted receptacle <*turn* the mixture into a baking dish>
6
a (1) **:** to make acid or sour (2) **:** to change the color of (as foliage)
b (1) **:** convert, transform <*turn* defeat into victory> (2) **:** translate, paraphrase

TURN (continued)

c : to cause to become of a specified nature or appearance<*turned* him into a frog> <embarrassment *turned* her face red>
d : to exchange for something else <*turn* coins into paper money>
e : to cause to defect to another side
7a : to shape especially in a rounded form by applying a cutting tool while revolving in a lathe
b : to give a rounded form to by any means <*turn* the heel of a sock>
c : to shape or mold artistically, gracefully, or neatly <a well*turned* phrase>
8: to make a fold, bend, or curve in:
a : to form by bending <*turn* a lead pipe>
b : to cause (the edge of a blade) to bend back or over **:** blunt, dull
9a : to keep (as money or goods) moving; *specifically* **:** to dispose of (a stock) to make room for another
b : to gain in the course of business <*turning* a quick profit>
c : to make use of <*turned* her education to advantage>
d : to carry to completion **:** pull off <*turned* a double play><*turn* a deal>
10: to engage in (an act of prostitution) <*turn* tricks>
intransitive verb **1a :** to move around on an axis or through an arc of a circle **:** rotate
b : to become giddy or dizzy **:** spin <heights always made his head *turn*>
c (1) **:** to have as a decisive factor **:** hinge <the argument*turns* on a point of logic> <the outcome of the game *turned*on an interception> (2) **:** to have a center (as of interest) in something specified <the discussion *turned* on the overall worth of the project> (3) **:** to become focused on something specified <the conversation *turned* to baseball>
2a : to direct one's course
b (1) **:** to reverse a course or direction <the tide has*turned*> (2)**:** to have a reactive usually adverse effect
c : to take a different course or direction <*turned* toward home> <the main road *turns* sharply to the right>
3a : to change position (as of one's head) so as to face another way <everyone *turned* to stare>
b : to face toward or away from someone or something<flowers *turn* toward the light>
c : to change one's attitude or reverse one's course of action to one of opposition or hostility <felt the world had*turned* against him>
d : to make a sudden violent assault especially without evident cause <dogs *turning* on their owners>
4a : to direct one's attention to or away from someone or something
b (1) **:** to change one's religion (2) **:** to go over to another side or party **:** defect
c : to have recourse **:** refer, resort <*turned* to a friend for help> <*turned* to his notes for the exact figures>
d : to direct one's efforts or activity **:** devote or apply oneself <*turned* to the study of the law> <*turned* to a life of crime>
5 a : to become changed, altered, or transformed <the weather *turned*>: as (1) *archaic* **:** to become different (2) **:** to change color <the leaves have *turned*> (3) **:** to become sour, rancid, or tainted <the milk had *turned*> (4) **:** to be variable or inconstant (5) **:** to become mentally unbalanced**:** become deranged
b (1) **:** to pass from one state to another **:** change <water had *turned* to ice> (2) **:** become, grow <his hair had *turned*gray> <the weather *turned* bad> <just *turned* twenty> (3) **:** to become someone or something specified by change from another state **:** change into <*turn* pro> <doctors *turned*authors> (4)**:** to change by the passage of time <days*turned* into weeks>
6: to become curved or bent (as from pressure); *especially* **:** to become blunted by bending <the edge of the knife had*turned*>
7: to operate a lathe
8*of merchandise* **:** to be stocked and disposed of **:** change hands

TURN (continued)

AH

tin (tarn) v turned. turning, turns

tr.

1a. To cause to move around an axis or center; cause to rotate or revolve: *A motor turns the wheels*.
b To cause to move around in order to achieve a result, such as opening, closing, tightening, or loosening: *turn the key*; *turn a screw*.
2. To alter or control the functioning of (a mechanical device, for example) by the use of a rotating or similar movement: *turned the iron to a hotter setting*.
3. To perform or accomplish by rotating or revolving: *turn a somersault*.
4a. To change the position of so that the underside becomes the upper side: *turn the steak*; *turn a page*.
b. To spade or plow (soil) to bring the undersoil to the surface.
c. To reverse and resew the material of (a collar, for example).
5. To revolve in the mind; meditate on; ponder: *turned the question in her mind*.
6a. To give a rounded form to (wood, for example) by rotating against a cutting tool.
b. To give a rounded shape to (clay, for example) by rotating and shaping with the hands or tools.
c. to give a rounded form to: *turn a heel in knitting a sock*.
d. To give distinctive, artistic, or graceful form to: *They know precisely how to turn a dramatic line or phrase*. *that is guaranteed to make the evening news*" (William Safire)
7a. To change the position of by traversing an arc of a circle; pivot. *turned his chair toward the speaker* .
b. To present in a specified direction by rotating or pivoting: *turn one face to the wall*. c. To cause (a scale) to move up or down so as to register weight: *Even a feather will turn a delicate scale*.
8a. To fold, bend, or twist (something).
b. To change the position or disposition of by folding, bending, or twisting: *Turn the design right side up on your jacket buttons. Turn the hat inside out*.
c. To make a bend or curve in: *strong enough to turn a bar of steel*.
d. To blunt or dull (the edge of a cutting instrument).
e. To injure by twisting: *turn an ankle*.
f. To upset or make nauseated: *That story turns my stomach*.
9. To change the direction or course of; *turn the car to the left*.
10a. To divert or deflect: *turn a stampede*.
b. To reverse the course of; cause to retreat: "*Then turn your forces from this paltry siege / And stir them up against a mightier task*." (Shakespeare).
11. To make a course around or about: *turn a corner*.
12. To reach and pass (a specified age): *My niece has turned two*.
13. To change the purpose, intention, or content of by persuasion or influence: *Her speech turned my thinking*.
14. To change the order or disposition of; unsettle: "*Sudden prosperity had turned [*his*] head*" (Thomas Macaulay).
15a. To aim or focus: *turn one's gaze to the sky; turned the camera on the speaker*.
b. To devote or apply (oneself, for example) to something: *She turned herself to law*.
16. To cause to act or go against; make antagonistic*: The scandal turned public opinion against the candidate*.
17. To cause to go in a specific direction; direct: *They turned their steps toward home*.
18. To send, drive, or let go: *turn the bully out of the bar: turned the dog loose*.
19. To pour, let fall, or otherwise release contents from or into a receptacle: *Turn the dough onto a floured board*.
20a. To cause to take on a specified character, nature, identity. or appearance; change or transform. Used with *to* or *into*: *water that had been turned to ice; turn a rundown house into a show place*.
b. To affect or change the color of: *Autumn turns the green leaves golden*.

TURN (continued)

c. To make sour; ferment: *Lack of refrigeration turned the milk*.
21. To exchange; convert. Used with *to* or *into*: *turns her singing talent into extra money*.
22. To keep in circulation; sell and restock: *We turned a great deal of merchandise during the holidays*.
23a. To make use of: *turned the situation to our advantage*.
b. To get by buying and selling: *turn a fair profit*.
24. To perform successfully; complete: *turn a double play*.
25. *Slang* To perform (an act of prostitution): *turning tricks.*
- *intr.*
1. To move around an axis or center; rotate or revolve.
2. To have a sensation of revolving or whirling, especially as a result of dizziness or giddiness: *My head is turning*.
3. To change position from side to side or back and forth: *I tossed and turned all night*.
4. To progress through pages so as to arrive at a given place: *Please turn to page 31*.
5a. To operate a lathe.
b. To be formed on a lathe: *a softwood that turns easily*.
6. To direct one's way or course: *The truck turned into the gas station. Turn off the highway at the next exit.*
7. To change or reverse one's way, course, or direction: *Too tired to go farther, we turned toward home*.
8. To change one's actions or attitudes adversely; become hostile or antagonistic: *The peasants turned against the cruel king*.
9. To attack suddenly and violently with no apparent motive: *The lion turned on the animal trainer*.
10. To channel one's attention, interest, or thought toward or away from something: "*In the spring a young man's fancy lightly turns to thoughts of love"* (Tennyson).
11. To devote or apply oneself to something, as to a field of study: *Unsuccessful in math, the student turned to biology*.
12. To convert to a religion.
13. To switch one's loyalty from one side or party to another.
14a. To have recourse to a person or thing for help, support, or information: *You can always turn to me for advice*.
b. To start to use (something) as a solution to a problem or relief of distress: *When things got really bad, he turned to drugs.*
15. To depend on something for success or failure; hinge: *"The election would turn not on ideology but on competence"* (George F. Will).
16a. To change so as to be; become: *His hair turned gray. I am a lawyer turned novelist*.
b. To change; become transformed. Used with *to* or *into*: *The sky turned to pink at dawn. The night turned into day*.
c. To change color: *The leaves have turned*.
d. To become sour: *The milk will turn if you don't refrigerate it*.
17. To be stocked and sold: *This merchandise will turn easily.*
18. To become dull or blunt by bending back. Used of the edge of a cutting instrument.
n

Appendix A2: Full dictionary definitions of German Change verbs

ÄNDERN

Duden 1a) [*durch Hinzufügen oder Streichen, durch Veränderung von Details] abändern, modifizieren*: einen Mantel, einen Text ä. ; das Flugzeug ändert seinen Kurs um 30 Grad ; daran ist nichts zu ä. (*damit muss man sich abfinden*) b) *wecheln, durch etw. anderes ersetzen, umformen, wandeln:* seine Meinung, seine Ansicht, den Ton ä. ; alte Menschen kann man nicht mehr ä. *(von ihren Gewohnheiten abbringen)* 2) (ä + sich) *anders werden, sich verändern*: das Wetter, die Lage ändert sich; du hast dich sehr geändert; <schweiz. auch ohne "sich":> wie rasch die Dinge ändern.
Langenscheidt **I** v/t <h> 1. change, alter, vary, *teilweise*: modify, *bes. jur. pol.* amend**; s-n Sinn** ~ change one's mind; **s-n Standpunkt** ~ shift one's ground; **das ändert (natürlich) die Sache** that puts a new complexion on the matter; **es ändert nichts an der Tatsache, dass** it does not alter the fact that; **das Testament ~** alter one's will; **ich kann es nicht ~** I can't help it; **das ist nicht zu ~** that cannot be helped, there's nothing to be done (about it). 2. (*Kleider etc.*) alter; **et. ~ an** (*dat*) make alterations to. **II** v/reflex **sich ~** 3. change, alter; **sich zum Vorteil (Nachteil) ~** change for the better (worse); **daran hat sich bis heute nichts geandert** that is still the same today; **die Zeiten ~ sich** times are changing 4. *Wetter*: change, break, *Wind*: change, shift; **das Wetter ändert sich** there will be a change in the weather. 5. *econ. Preise etc.*: vary, fluctuate.
Wahrig <V.t.; hat> 1. *anders machen, eine andere Form, ein anderes Aussehen geben;* ich will mir das **Kleid** ~ (lassen); seine **Meinung** , seine Pläne ~; die **Richtung** ~; das ändert nichts an der Tatsache, dass… *trotzdem bleibt die Tatsache bestehen, dass…*; das ist nicht **zu ~** *damit muss man sich abfinden* 2 <V. refl.> sich ~ *anders werden*; das **Wetter** ändert sich; die **Zeiten** ~ sich; das **lässt** sich nicht ~; es hat sich seitdem **nichts** geändert; er hat sich schon **sehr** geändert
DWDS **ändern** – Verb **etw., jmdn. verändern, umgestalten** *ein Kleid, etw. am Kleid ändern (lassen)* (ein Kleid, etw. am Kleid umändern (lassen))

ABÄNDERN

Duden 1. *ein wenig, in Teilen ändern*: das Testament, den Antrag; Beschluss, das Programm a. 2. (Biol.) *(durch Mutation od. Umwelt) in den Artmerkmalen variieren, sich wandeln*: die Farben der Blüten ändern stark ab.
Langenscheidt 1. alter, change *s. th* (partially), modify, (*berichtigen*) rectify, correct, amend. 2. *jur.* (Urteil) commute, *in zweiter Instanz*: reverse. 3. *parl*. (*Gesetzesentwurf, Verfassung*) amend, (*Gesetz*) revise
Wahrig <V.t.; hat> *anders machen, umändern, umbilden; verbessern*
DWDS **abändern** – verb **1 etw. teilweise verändern, ein wenig umgestalten**: *einen Plan, ein Programm, eine Vorlage, Bestimmung, einen Vertrag, ein Urteil, die Verfassung, einen (Gesetzes)vorschlag abändern* **2 etw. durch Änderung beseitigen**: *einen Übelstand abändern*

VERÄNDERN

Duden 1.) (*in Wesen od. in der Erscheinung) anders machen, ändern* (1a), *umgestalten*: sie will die Welt v.; dieses Erlebnis hat ihn, sein Leben [von Grund auf] verändert; der Bart verändert ihn stark *(gibt ihm ein anderes Aussehen).* 2.) <v. + sich> *(im Wesen od. in der Ersscheinung) anders werden, sich ändern*: seine Miene veränderte sich schlagartig; bei uns hat sich kaum etwas verändert; sich zu seinem Vorteil, Nachteil v.; wir müssen der veränderten Lage Rechnung tragen; du hast dich aber verändert!; krankhaft verändertes Gewebe. 3.) <v. + sich> *seine berufliche Stellung wechseln*: er will sich [beruflich] v.
Langenscheidt **I** v/t <*no* **ge-, h**> **1.** *allg*. change. *bes. in Einzeiheiten, in Größe, Aussehen etc*: alter. *leicht*: modify. *weitS.* (*umformen*) transform: **sie wollen die Welt ~** they want to change the world: **das Gesicht der Stadt ~** alter the appearance of the city; **et. ~ an** (*dat*) change (*od*. alter) s.th. on. **II** v/reflex **sich ~ 2.** change, alter; **sich sehr zu s-m Vorteil (***od.* **zu s-n Gunsten) ~** change for the better; **sich zu s-m Nachteil (***od.* **zu s-n Ungunsten) ~** change for the worse: **bei uns hat sich vieles verändert** there have been many changes here. things have changed quite a lot. **3.** *colloq. beruflich*: change one's place of work (*od.* job).
Wahrig 1 <V.t.> *anders machen, umgestalten, verwandeln, umarbeiten;* im jugendlichen Überschwang will er am liebsten die ganze Welt ~; an einer Sache etwas ~; mit veränderter Stimme sprechen; seitdem ist er ganz vt 2 <V. refl.> sich ~ *anders werden;* <umg.> *Stellung, Beruf od. Wohnung wechseln;* du hast dich in den letzten Jahren gar nicht verändert; er hat sich zu seinen Gunsten, seinem Nachteil, seinem Vorteil verändert; ich möchte, will mich ~ <umg.>
DWDS **etw. in eine andere, von der bisherigen verschiedene Form, Beschaffenheit, Zusammensetzung, Ordnung bringen, etw. umgestalten, umwandeln** *die Rohstoffe werden im Arbeitsprozess verändert* *s. verändern* anders werden, s. umwandeln; *während meiner Abwesenheit hat sich der Ort kaum verändert* **2** umgangssprachlich *s. verändern* eine andere Arbeitsanstellung annehmen; *sie sagte, sie wolle sich verändern*

VERWANDELN

Duden 1.a) (*in Wesen od. in der Erscheinung) sehr stark, völlig verändern, anders werden lassen*: das Erlebnis verwandelte sie; sie ist völlig verwandelt, wie verwandelt; die Tapete hat den Raum verwandelt b) *zu jmd., etw. anderem werden lassen*: ein Zauber hatte den Prinzen in einen Frosch verwandelt c) <v. + sich> *zu jmd., etw. anderem werden*: das kleine Mädchen hat sich inzwischen **in** eine junge Dame verwandelt; während der Regenzeit verwandeln sich die Bäche zu reißenden Strömen. 2. *umwandeln* (a); *umgestalten*: Energie in Bewegung, Wasser in Dampf v.; er hat die Niederlage in einen Sieg verwandelt. 3. (Ballspiele) (*etw.[eine Chance]) zu einem Erfolg, Sieg, Tor nutzen*: einen Eckball direct v.; <auch ohne Akk.-Obj.:> der Spieler verwandelte zum 2 : 0.
Langenscheidt **I** *v/t* <*no* **ge-, h**> **1.** (*verändern*) change, transform, alter, metamorphose: **das Erlebnis hat ihn völlig verwandelt** this experience changed him completely; **sie ist wie verwandelt** she has completely changed **2.** (*umwandeln*) (**in** *acc* into) change, turn, convert, transform, transmut, *bes. humor.* transmogrify; **Energie in Bewegung ~** convert (*od*. transform) energy into motion ; **die Hexe hat den Prinzen in e-n Frosch verwandelt** the witch turned (*od*. metamorphosed) the prince into a frog; **et. in Staub (e-n Trümmerhaufen) ~** reduce s.th. to dust (a heap of ruins) **3.** *Fußball*: **e-n Strafstoß ~** convert a penalty kick. **II** *v/reflex* **sich ~ 4.** change, alter. **5. sich ~ in** (*acc*) change (*od*. turn) into, be converted (*od*. transformed) into, turn (*od*. metamorphose) (o.s.) into
Wahrig <V.t.; hat> *ändern, umgestalten, umformen*; die Szene, den Schauplatz ~ <Theat.>; sich in etwas ~ *die Gestalt von etwas annehmen*; Flüssigkeit in Dampf ~; die Hexe verwandelte die Prinzessin in ein Kätzchen <im Märchen> *verzauberte*; Zeus verwandelte sich in einen Schwan <grch. Myth.>; das Haus wurde durch den Bombenangriff in einen Trümmerhaufen verwandelt; sie war durch die Freude ganz verwandelt; er ist seit seiner Kur wie verwandelt
DWDS **verwandeln** – Verb *etw., jmdn. verwandeln* einer Sache, jmdm. eine andere Gestalt, ein anderes Aussehen geben, etw., jmdn. (völlig) ändern *der Frühling wird bald wieder die Landschaft verwandeln* Theater *sich verwandeln* *das Bühnenbild verwandelt sich* (wird umgebaut) *etw., jmdn. in etw., jmdn. verwandeln* *der Regen hat die ausgetrockneten Wiesen in grünes Weideland verwandelt* *sich in etw. verwandeln* *die leichte Brise verwandelte sich schnell in einen Sturm*

WANDELN

Duden
1. <w. + sich; hat>
a) *sich [grundlegend] verändern; eine andere Form, Gestalt o.Ä. bekommen; in seinem Wesen, Verhalten, o.Ä. anders werden*: du hast dich, dein Leben hat sich gewandelt; die Verhältnisse haben sich seitdem sehr gewandelt; die Zeit, das Bewusstsein der Menschen, die Mode hat sich gewandelt; Meinungen, Anschauungen, Ideale wandeln sich im Laufe der Zeit; die Bedeutung des Wortes hat sich im Laufe der Sprachgeschichte gewandelt; den gewandelten Bedürfnissen gerecht werden;
b) *zu etw. anderem werden; sich verwandeln*: seine Angst hatte sich in Zuversicht gewandelt
2. <hat>
a) *anders werden lassen, verändern*: die Erlebnisse haben sie gewandelt; sie ist ein gewandelter Mensch;
b) *zu etw. anderem werden lassen, verwandeln*: das Chaos in Ordnung w.;
c) (Rechtsspr.) *(einen Kauf- od. Werkvertrag als Käufer od. Besteller) durch einseitige Erklärung rückgängig machen:* w. oder mindern
3. <ist> *langsam, mit gemessenen Schritten, meist ohne einem Ziel zuzusteuern, gehen, sich fortbewegen*: in einem Park w.; auf und ab w.; ***ein wandelner, eine wandelnde …** (ugs. scherzh.; *eine Verkörperung eines, einer …:* er ist ein wandelnder Vorwurf).
4. <hat> (bibl.) *in einer bestimmten Weise leben, seinen Lebenswandel führen*: jene, die nicht nach dem Fleisch wandeln, sondern nach dem Geist; wir haben in der Gnade Gottes gewandelt.

Langenscheidt
v/t u. **sich ~** *v/reflex <h>*
change.

Wahrig
1 <V.t.; hat> = *verwandeln, verändern*; alles wandelt sich *nicht ist beständig*; seine Ansichten haben sich (grundlegend) gewandelt
2 <V. i.; ist> *langsam, geruhsam gehen, lustwandeln*; auf und ab ~; im Park, unter Bäumen ~; Wandelndes Blatt *Gespenstheuschrecke Ostindiens, die mit ihrem grünen, flachen Körper u. breiten Beinen einem Eichenblatt ähnlich sieht; Phyllium siccifolium; er ist die ~de Güte* <fig.> *er ist sehr, außerordentlich gütig*; er sieht aus wie eine ~de Leiche <umg.> *er sieht erschreckend blass aus*; sie ist ein ~des Lexikon <umg> *sie hat ein umfangreiches Wissen*

DWDS
wandeln – Verb
Homographen wandeln[1] | wandeln[2]
sich wandeln sich im Wesen ändern, verändern, wesentlich anders werden, in einen neuen, anderen Zustand übergehen
die Mode, der Geschmack, die Formen, jmds. Auffassungen, Ansichten wandeln sich
gehoben *jmdn., etw. wandeln* jmdn., etw. im Wesen ändern, verändern, bewirken, dass jmd., etw. anders wird
die Jahre im Ausland haben ihn sehr gewandelt

Appendix A3: Full dictionary definitions of English Theft verbs

STEAL

CT

1. to take (something) from someone, etc., without permission or unlawfully, esp. in a secret manner
2. to obtain surreptitiously
3. to appropriate (ideas, etc.) without acknowledgment, as in plagiarism
4. to move or convey stealthily
5. to pass unnoticed
6. to win or gain by strategy or luck, as in various sports

AH

tr. 1. To take (the property of another) without right or permission
2. To present or use (someone else's words or ideas) as one's own
3. To get or take secretly or artfully
4. To give or enjoy (a kiss) that is unexpected or unnoticed
5. To draw attention unexpectedly in (an entertainment), especially by being the outstanding performer
6. *Baseball* [...]

intr. 1. To steal another's property
2. To move, happen, or elapse stealthily or unobtrusively
3. *Baseball* [...]

MW

: to take (something that does not belong to you) in a way that is wrong or illegal
: to take (something that you are not supposed to have) without asking for permission
: to wrongly take and use (another person's idea, words, etc.)

[1]steal

verb \ˈstēl\
: to take (something that does not belong to you) in a way that is wrong or illegal
: to take (something that you are not supposed to have) without asking for permission
: to wrongly take and use (another person's idea, words, etc.)

Full Definition of *STEAL*

intransitive verb
1**:** to take the property of another wrongfully and especially as a habitual or regular practice
2**:** to come or go secretly, unobtrusively, gradually, or unexpectedly
3**:** to steal or attempt to steal a base

transitive verb
1 *a* **:** to take or appropriate without right or leave and with intent to keep or make use of wrongfully <*stole* a car>
b **:** to take away by force or unjust means <they've *stolen* our liberty>
c **:** to take surreptitiously or without permission <*steal* a kiss>
d **:** to appropriate to oneself or beyond one's proper share **:** make oneself the focus of <*steal* the show>
2 *a* **:** to move, convey, or introduce secretly **:** smuggle
b **:** to accomplish in a concealed or unobserved manner <*steal* a visit>
3 *a* **:** to seize, gain, or win by trickery, skill, or daring <a basketball player adept at *stealing* the ball> <*stole* the election>
b of a base runner **:** to reach (a base) safely solely by running and usually catching the opposing team off guard

EMBEZZLE

CT To convert (money or property entrusted to one) fraudulently to one's own use
AH To take (money one has been entrusted with) for personal use
MW : to steal money that you have been trusted with *transitive verb***:** to appropriate (as property entrusted to one's care) fraudulently to one's own use <*embezzled* thousands of dollars>

PILFER

CT To steal (minor items), esp. in small quantities
AH *tr*. To steal (a small amount or item) *intr*. To steal or filch
MW : to steal things that are not very valuable or to steal a small amount of something **intransitive verb**: steal; especially : to steal stealthily in small amounts and often again and again **transitive verb**: steal; especially : to steal in small quantities

SHOPLIFT

CT *only *shoplifter* (n): a customer who steals goods from a shop
AH To steal merchandise from a store
MW : to steal things from a shop or store **intransitive verb**: to steal displayed goods from a store **transitive verb**: to steal (displayed goods) from a store

SNATCH

CT 1. to seize or grasp (something) suddenly or peremptorily 2. to seize or attempt to seize suddenly 3. to take hurriedly 4. to remove suddenly 5. to gain, win, or rescue, esp. narrowly
AH 1a. To grasp or seize hastily, eagerly, or suddenly 1b. To steal, especially quickly or with a sudden movement 1c. *informal* To kidnap (someone) 2. *Sports* [...weightlifting...] 3.*informal* a. To obtain or achieve quickly or unexpectantly b. To get (a small amount of sleep) *intr*. To make grasping or seizing motions
MW : to take (something) quickly or eagerly : to take (something or someone) suddenly from a person or place often by using force **intransitive verb** **:** to attempt to seize something suddenly **transitive verb** **:** to take or grasp abruptly or hastily <*snatch* up a pen> <*snatched* the first opportunity>; *also* **:** to seize or take suddenly without permission, ceremony, or right <*snatched* a kiss>

Appendix A4: Full dictionary definitions of German Change verbs

STEHLEN

Duden 1. fremdes Eigentum, etw., was einem nicht gehört, heimlich, unbemerkt an sich nehmen, in seinen Besitz bringen 2. […sneak…]
Wahrig widerrechtlich wegnehmen, entwenden [... examples/idioms...] […be lazy…] […sneak away…] […sneak into…]
Langenscheidt I v/t allg. steal (bes. Kleinere Sachen) a. pilfer, purloin, (Kinder etc.) a. kidnap (e-e Idee etc.) a. plagiarize, lift bes. Am. (Pferde, Vieh) rustle […figurative…] II v/i steal, thieve, bes. jur. commit larceny (od. theft) III […sneak…] IV [… Nominal Use…]
DWDS etw. jmdm. heimlich und widerrechtlich wegnehmen, entwenden bildlich: jmdm. die Ruhe, den Schlaf stehlen (ihn darum bringen) sich irgendwohin stehlen sich heimlich irgendwohin begeben, schleichen

ENTWENDEN

Duden unter Ausnutzung einer Gelegenheit unbemerkt wegnehmen u. [mühelos] an sich bringen; stehlen
Wahrig heimlich, wiederrechtlich wegnehmen, stehlen
Langenscheidt 1. steal (j-m et. s. th. from so.) misappropriate, purloin, make away with 2. (*unterschlagen*) embezzle
DWDS gehoben: jmdm. etw. wegnehmen, stehlen

KLAUEN

Duden [kleinere Dinge] stehlen
Wahrig stehlen, rauben
Langenscheidt *colloq.* pinch, swipe, lift, filch, *fig.* (Ideen etc.) steal, borrow, crib
DWDS salopp: etw. stehlen

MOPSEN

Duden 1. […be bored…] 2. (kleinere Dinge von meist geringem Wert) heimlich an sich nehmen, sich unbemerkt aneignen
Wahrig stehlen (geringfügige Dinge)
Langenscheidt I *v/t.* 1. (*stehlen*) swipe, pinch […]
DWDS salopp: etw., das geringen Wert hat, wegnehmen, entwenden, stehlen

STIBITZEN

Duden (Studentenspr.) auf listige Weise entwenden, an sich bringen
Wahrig stehlen, sich mit List aneignen
Langenscheidt *colloq.* pinch, swipe *Am. a.* snitch
DWDS umgangssprachlich, scherzhaft: etw. (Geringfügiges) auf listige Weise wegnehmen, entwenden

UNTERSCHLAGEN

Duden 1. (bes. Rechtsspr.) Gelder, Werte, o.Ä., die jmdm. anvertraut sind, vorsätzlich nicht für den vom rechtgemäßigen Eigentümer gewollten Zweck verwenden, sondern für sich behalten, verwenden 2. [… mitteilen ...]
Wahrig unrechtgemäß zurückhalten, veruntreuen (Geld, Brief) verheimlichen (Neuigkeit, Nachricht) [… überspringen ...]
Langenscheidt 1. (*Geld*) embezzle 2. (*Brief*) intercept 3.-5. […suppress…]
DWDS I die Beine beim Sitzen unterschlagen [...] II […] 1 sich eine anvertraute, fremde Sache aneignen, etw. veruntreuen [...] 2 umgangssprachlich, übertragen etw. absichtlich nicht erwähnen [...]

Appendix B: Meaning analysis of English and German Theft verbs

Appendix B1: Semantics of English Theft verbs

As demonstrated for Change verbs in Chapters 5 and 6, I describe the meanings of English Theft verbs according to their definitions in the *Collins-Times English Dictionary and Thesaurus*, 2nd Edition (CT), the *American Heritage Dictionary of the English Languages*, 5th Edition (AH), and the online version of *the Merriam-Webster Dictionary* (MW; http://www.merriam-webster.com; accessed on 24 February 2015). I begin with the analysis of the most general verb, *steal*, and proceed to the other verbs that further constrain the Theft semantics of by specifying the type or value of the Goods, the type of Source, and/or the manner in which the theft is carried out.

Steal

I begin with the meaning analysis of *steal*, whose definitions are provided in Table B1.1.

CT	AH	MW (Accessed Feb 24, 2015)
1. to take (something) from someone, etc., without permission or unlawfully, esp. in a secret manner 2. to obtain surreptitiously 3. to appropriate (ideas, etc.) without acknowledgment, as in plagiarism […]	*tr.* 1. To take (the property of another) without right or permission 2. To present or use (someone else's words or ideas) as one's own 3. To get or take secretly or artfully […] *intr.* 1. To steal another's property […]	: to take (something that does not belong to you) in a way that is wrong or illegal : to take (something that you are not supposed to have) without asking for permission : to wrongly take and use (another person's idea, words, etc.) **Full Definition of *STEAL*** intransitive verb 1 **:** to take the property of another wrongfully and especially as a habitual or regular practice […] *transitive verb* 1 *a* **:** to take or appropriate without right or leave and with intent to keep or make use of wrongfully <*stole* a car> *b* **:** to take away by force or unjust means <they've *stolen* our liberty> *[…]* 3 *a* **:** to seize, gain, or win by trickery, skill, or daring <a basketball player adept at *stealing* the ball> <*stole* the election>
-without permission -unlawfully -in a secret manner/ surreptitiously -appropriate without acknowledgment (plagiarize)	-without right or permission -secretly or artfully -present as one's own (plagiarize)	-something that does not belong to you -wrong or illegal -without right or leave -with intent to keep or make use of wrongfully -by force or unjust means -surreptitiously or without permission -by trickery, skill, or daring

Table B1.1: Relevant definitions for *steal*

The definitions provide evidence that *steal* is the most semantically general of the English Theft verbs. Most definitions employ the verb *take* or *get/obtain* and specify that the agent takes something from another person, that the taking is illegal or wrong, and that the agent does not ask for permission. The types of entities that can be stolen are also very diverse: most definitions simply use the word *something* or *property*, and the example sentences include a diverse array of stolen entities. The examples in MW, for instance, contain words such as *car, liberty, ball,* and *election*. Each definition also includes a sense for the theft or illegal use of words and ideas, referring to acts of plagiarism, which *steal* can also refer to. These characterizations of *steal* show that it is not restricted to any specific type or value range of goods. *Steal* is also general with respect to the manner in which the theft act is carried out. Evidence for this is the fact that the definitions employ a wide range of manner adverbials in the definitions, including *secretly/surreptitiously, artfully, by trickery, by skill, by force,* and *by unjust means*. Furthermore, the definitions do not include any specification of the type of source or victim, thus suggesting that *steal* can apply to stealing from a wide range of people or places. In sum, the highly general nature of the definitions for *steal* suggest that it has no (or at least very few) restrictions on the types of theft events it can denote.

Further support for classifying *steal* as a highly general Theft verb arises when its definitions are compared to the other Theft verbs. Specifically, the definitions (in at least one dictionary) for each of the other verbs employ the word *steal*, suggesting that these verbs refer to some type of stealing. The other verbs' definitions also include specific adverbials that further specify how the general stealing act is carried out, as described in the remainder of this section.

With respect to peripheral senses, *steal* is used in certain senses that are closely related to that of the Theft frame, including the stealing of words (i.e. plagiarism) or ideas, stealing glances or kisses, and performing better than other performers (e.g. *steal the show*). Of these sub-senses, only the first, *plagiarize* sense is treated as an actual Theft verb (i.e. its syntax is documented in the following section), as it involves the same participants of stealing events, namely a Perpetrator (the one who steals words), Goods (the stolen words), Source (the original book/text of the stolen words), and Victim (the original author). The other senses (steal kiss, steal show) are highly idiomatic, do not entail illegal taking, and typically do not realize Source or Victim arguments. *Steal* also has two other senses that are not related to Theft and thus not treated in the

syntactic analysis, namely that of self-motion (*steal across the room*) and the baseball strategy of advancing bases (*stealing second base*).[430]

Having established that *steal* is a general Theft verb and specified the senses which will be included and excluded in the analysis, I now turn to the definitions of the other Theft verbs under analysis.

Embezzle

The relevant definitions for *embezzle* are provided in Table B1.3.

Collins Times	American Heritage	Merriam-Webster (24 February 2015)
To convert (money or property entrusted to one) fraudulently to one's own use	To take (money one has been entrusted with) for personal use	: to steal money that you have been trusted with transitive verb **:** to appropriate (as property entrusted to one's care) fraudulently to one's own use <*embezzled* thousands of dollars>
-money/property (Goods) -Goods entrusted to Perp -fraudulently -for one's own use	-money -entrusted -for personal use	-money -entrusted to Perpetrator -fraudulently -one's own use

Table B1.2: Relevant definitions for *embezzle*

The definitions for *embezzle* suggest that it is a Theft verb, as the MW definition uses the base verb *steal*, while that of AH uses the base verb *take*. The wrongfulness of the taking, a core characteristic of Theft verbs, is found in the CT and MW definitions, which mention the adverb *fraudulently* to specify the illegality of this taking event.

However, unlike *steal*, *embezzle* further specifies the basic semantics of *steal* in a variety of ways. With respect to the goods, all three of the dictionaries specify that the stolen Goods are money (CT, AH, MW). While two dictionaries also mention that the stolen goods may be property (CT, MW), native speaker intuitions suggest that only certain types of non-monetary property, such as documents or information, but not other types, specifically concrete goods such as wallets or cars, may be *embezzled*. This component is thus a FE-related, polar meaning component which specifies that the Goods are abstract and financial.

430 Note that other sports-related senses of stealing, such as stealing the ball from another player, or stealing points or victories from another team, are included in the analysis.

There is also a more detailed adverbial meaning component identified in the definitions. Specifically, *embezzle* refers to Theft situations in which the Goods have been entrusted to the Perpetrator (CT, AH, MW), most likely by the Victim. Furthermore, each of the dictionaries also mentions a meaning component that pertains to the purpose of the theft, specifically that the Goods are stolen for the personal/own use of the Perpetrator.

In sum, *embezzle* is a Theft verb which specifies that the Goods are most frequently money but possibly some other abstract type of assets, that the Goods are entrusted to the Perpetrator, and that the Perpetrator steals the Goods and uses them for their own personal use.

Pilfer

The relevant definitions for *pilfer* are provided in Table B1.3.

Collins Times	American Heritage	Merriam-Webster (24 February 2015)
To steal (minor items), esp. in small quantities	*tr.* To steal (a small amount or item) *intr*. To steal or filch	: to steal things that are not very valuable or to steal a small amount of something **intransitive verb** : steal; especially : to steal stealthily in small amounts and often again and again **transitive verb** : steal; especially : to steal in small quantities
-minor items -small quantities	-small amount -small item	-not very valuable -small amount -stealthily -again and again

Table B1.3: Relevant definitions for *pilfer*

The definitions for *pilfer* also indicate that *pilfer* is a type of Theft verb, as all dictionaries employ the base verb *steal*. The definitions all also further specify the general Theft event, showing that *pilfer*, like *embezzle*, is not a general Theft verb. Specifically, the dictionaries specify that the Goods of *pilfer* are typically small items (CT, AH), items in small quantities (CT, MW), and/or items of small value (MW). The MW definitions also mention manner meaning components for *pilfer*, specifically that it is done "stealthily," and, for intransitive uses, that it is done "often again and again."

The analysis of definitions for *pilfer* has shown that it is a non-general Change verb, as it has a FE-related binary, scalar meaning component specifying that the Goods that are small, in small amounts, or of low value. It also has two optional adverbial meaning components, one

stating that the Perpetrator acts stealthily, and one, which only applies to intransitive uses, that the pilfering is done repeatedly (i.e. again and again). No additional meaning components or special sub-senses were identified for *pilfer*.

Shoplift

The relevant definitions for *shoplift* are provided in Table B1.4. Note that CT only has an entry for the noun *shoplifter*, which nonetheless helps to understand the concept of shoplifting and its corresponding verb, *shoplift*.

Collins Times	American Heritage	Merriam-Webster (24 February 2015)
*only *shoplifter* (n) a customer who steals goods from a shop	To steal merchandise from a store	: to steal things from a shop or store **intransitive verb** : to steal displayed goods from a store **transitive verb** : to steal (displayed goods) from a store
	-merchandise (Goods) -store (Source)	-displayed goods (Goods) -from a store (Source)

Table B1.4: Relevant definitions for *shoplift*

We may classify *embezzle* as a Theft verb, because each of the definitions include the word *steal* with further modifications. Namely, the dictionaries specify that the SOURCE of the Theft is a store (AH, MW) or shop (MW). They also state that the GOODS are merchandise (AH) or displayed goods (MW), thus implying that the Goods are concrete and not abstract. The CT definition of the noun *shoplifter* also specifies that the PERPETRATOR is a customer. These individual meaning components combined provide a very specific construal of the more general Theft event, as they specify three of the four potential FEs of the frame. Since the SOURCE is specified to be a store or shop, it is likely that animate VICTIM FEs are not compatible with this verb.

To summarize, *shoplift* is associated with a highly rich event-related adverbial meaning component which states that it applies to theft events in which (someone pretending to be) a customer takes concrete goods on display from a store, shop, or other business. As such, *shoplift* is similar to *embezzle* in that it refers to a very specific type of stealing event.

Snatch

The relevant definitions for *snatch* are provided in Table B1.5 below. *Snatch* is slightly different from the other verbs in that the three dictionaries characterize most of its senses as senses of taking, grabbing, or seizing, rather than stealing per se. In fact, only AH includes the

verb *steal* in the definition of *snatch*, but MW also lists the phrase 'without permission […] or right.' However, in many cases the taking or seizing that is involved with snatching results in an act of theft. Nevertheless, it is difficult to characterize *snatch* as a pure Theft verb, as its Theft interpretation often depends on specific linguistic or extra-linguistic contextual information.[431]

Collins Times	American Heritage	Merriam-Webster (24 February 2015)
1. to seize or grasp (something) suddenly or peremptorily 2. to seize or attempt to seize suddenly 3. to take hurriedly 4. to remove suddenly 5. to gain, win, or rescue, esp. narrowly	1a. To grasp or seize hastily, eagerly, or suddenly 1b. To steal, especially quickly or with a sudden movement 1c. *informal* To kidnap (someone) 2. *Sports* [...weightlifting...] 3.*informal* a. To obtain or achieve quickly or unexpectantly b. To get (a small amount of sleep) *intr.* To make grasping or seizing motions	: to take (something) quickly or eagerly : to take (something or someone) suddenly from a person or place often by using force **intransitive verb** **:** to attempt to seize something suddenly **transitive verb** **:** to take or grasp abruptly or hastily <*snatch* up a pen> <*snatched* the first opportunity>; *also* **:** to seize or take suddenly without permission, ceremony, or right <*snatched* a kiss>
-take hurriedly	-esp. quickly or with a sudden movement	-take quickly or eagerly -take suddenly -often by using force -without permission […]

Table B1.5: Relevant definitions for *snatch*

In defining how *snatch* further specifies the more generic meaning of 'take' or 'seize', dictionaries list several adverbs associated with speed or quickness, such as *suddenly* (AH, CT, MW), *eagerly* (AH, MW), *hurriedly* (CT), or *with a sudden movement* (AH), among others. Further, the MW definition specifies that it is often done *by using force*, which is also a component of the verb *seize* found in all three dictionaries. Given these meaning components, it appears that *snatch* is primarily a verb of taking or grasping, but can also be used to describe acts of theft, particularly those involving suddenness or a use of force.

[431] In the syntactic analysis, it is not always easy to distinguish whether *snatch* is used to describe a theft or a simple act of taking. I have relied primarily on intuition to distinguish these two interpretations and tried to exclude any examples which were not clearly some act of taking something which does not belong to the agent.

Appendix B2: Semantics of German Theft verbs

As with the Change verbs, I describe the meanings of German Theft verbs based on their definitions in four dictionaries: *Duden Deutsches Universalwörterbuch* (7th edition; D), *Wahrig Deutsches Wörterbuch* (W), the online *Digitales Wörterbuch der Deutschen Sprache* (DW), and the bilingual *Langenscheidts Grosswörterbuch Deutsch-Englisch* (1st Edition; L). I have extracted all of the relevant (i.e. Theft sense) definitions of each German Theft verb and summarize here the meaning components which set individual verbs apart from one another. I begin with the most general Theft verbs *stehlen* and *klauen* and then proceed to verbs with richer semantics.

Stehlen

The relevant dictionary definitions for *stehlen* are provided in Table B2.1.

Duden	Wahrig	Langenscheidt	DWDS
1. fremdes Eigentum, etw., was einem nicht gehört, heimlich, unbemerkt an sich nehmen, in seinen Besitz bringen 2. […sneak…]	widerrechtlich wegnehmen, entwenden [... examples/idioms...] […be lazy…] […sneak away…] […sneak into…]	I *v/t* *allg.* steal (*bes. Kleinere Sachen*) *a.* pilfer, purloin, (*Kinder etc.*) *a.* kidnap (*e-e Idee etc.*) *a.* plagiarize, lift *bes. Am.* (*Pferde, Vieh*) rustle […figurative…] II *v/i* steal, thieve, *bes. jur.* commit larceny (*od.* theft) III […sneak…] IV [… Nominal Use…]	--etw. jmdm. heimlich und widerrechtlich wegnehmen, entwenden --bildlich: jmdm. die Ruhe, den Schlaf stehlen (ihn darum bringen) --[…sneak…]

Table B2.1: Relevant definitions for *stehlen*

Stehlen appears to be the most semantically general of the German Change verbs, as at least one dictionary entry for all of the other Theft verbs (except *unterschlagen*) includes the word *stehlen* in its definition. All of the German definitions for *stehlen* mention two major meaning components. The first states that the agent takes something (*an sich nehmen* 'take to oneself' in D, *wegnehmen* 'take away' in W and DW). The second component states that this taking is wrongful or illegal as the goods do not belong to to the agent (*wiederrechtlich* 'illegally' in D, *etw, was einem nicht gehört* 'something that doesn't belong to one' in W and DW).

The only other meaning component that further specifies the 'wrongful taking' base/core meaning is that the theft is carried out secretively (*heimlich*; D and DW) or that it is not noticed (*unbemerkt*; D). However, based on the corpus data and native speaker consultations, this 'secretive' meaning component is not essential to *stehlen* and is thus only an optional meaning component.

L, W, and DW each mention various idiomatic and figurative uses, such as stealing one's time or stealing sleep. These types of uses are included in the corpus analysis. Also, as with its English cognate *steal*, German *stehlen* also has a non-Theft sense referring to moving without being noticed, or 'sneaking,' which is not included in the corpus analysis, as it evokes the `Self_motion` frame rather than `Theft`.

With respect to transitivity, only the bilingual L dictionary mentions that *stehlen* has an intransitive use, which corresponds to (habitual) *thieve*. The other dictionaries do not clearly specify whether *stehlen* is possible with intransitive uses.

In summary, *stehlen* is a general Theft verb with the base/core meaning of wrongful or illegal taking. It has an optional event-related adverbial meaning component that the theft is secretive or goes unnoticed. *Stehlen* can be used figuratively with abstract GOODS such as time or sleep. It is likely that *stehlen* can be used both transitively and intransitively, based on the definition in L. I now proceed to another fairly general German Theft verb, *klauen*, and then discuss verbs of higher descriptivity.

Klauen

The relevant definitions for *klauen* are provided in Table B2.2.

Duden	Wahrig	Langenscheidt	DWDS
[kleinere Dinge] stehlen	stehlen, rauben	*colloq.* pinch, swipe, lift, filch, *fig.* (Ideen etc.) steal, borrow, crib	salopp: etw. stehlen
-smaller things	-none		-informal

Table B2.2: Relevant definitions for *klauen*

The definitions clearly show that *klauen* is a Theft verb, as all of the dictionaries use the base verb *stehlen/steal* to define it. The dictionaries also suggest that *klauen* is semantically general among German Theft verbs. Specifically, W, DW, and L each add no specification to the base

verb *steal/stehlen*. Neither do any of the dictionaries specify exactly what types of stolen entities may appear with *klauen*.

Only D includes the modifying object *kleinere Dinge* ('smaller things'), suggesting that *klauen* is preferred with smaller or low-value Goods. This meaning component is also suggested by the translation equivalents in the first definition in L (*pinch, swipe, lift, filch*), each of which are associated with the non-serious theft of low-value GOODS. However, corpus data and native speaker consultations suggest that this is only an optional meaning component, as *klauen* can be used for the theft of larger objects, such as vehicles.

With respect to pragmatic properties, L and DW mention that *klauen* is colloquial or informal, which appears to be the main feature that separates it from the more standard verb *stehlen*. L also mentions that *klauen* can be used figuratively for the theft of abstract entities such as ideas.

In summary, *klauen* is also a highly general Theft verb. It has an optional FE-based, scalar meaning component stating that it occurs with GOODS that are small, but this meaning component is only a weak association at best. It appears that *klauen* differs from *stehlen* only pragmatically in that it is informal rather than standard.

Mopsen

The relevant definitions for *mopsen* are provided in Table B2.3.

Duden	Wahrig	Langenscheidt	DWDS
1. […be bored…] 2. (kleinere Dinge von meist geringem Wert) heimlich an sich nehmen, sich unbemerkt aneignen	stehlen (geringfügige Dinge)	I *v/t.* 1. (*stehlen*) swipe, pinch […]	salopp: etw., das geringen Wert hat, wegnehmen, entwenden, stehlen
-smaller things -small value -secretively/unnoticed	-minor things		-informal -low value

Table B2.3: Relevant definitions for *mopsen*

The dictionaries again clearly show that *mopsen* is a Theft verb, as each of the definitions reference the more general verb *stehlen*.

The definitions also identify additional meaning components for *mopsen*. Specifically, the GOODS associated with *mopsen* are small (*kleinere*; D) and of little value (*geringen Wert*; DW) or significance (*geringfügige*; W). These two specifications of the GOODS FE are also

suggested in the equivalents provided by L (*swipe, pinch*), which are both associated with small or low-value GOODS.

A further event-related meaning component is mentioned only in D, which specifies that the theft is secretive (*heimlich*) or goes unnoticed (*unbemerkt*). However, as no other dictionaries mention this component, I classify it as only an optional component.

Mopsen, like *klauen*, is also associated with informal registers, as stated directly in DW (*salopp*, 'slang') and suggested by the equivalents in L, both of which are informal verbs. With respect to transitivity, it appears that *mopsen* is only appears in transitive uses, as this is the only use listed in L, while the other dictionaries are ambiguous with respect to transitivity. No special sub-senses or other meaning components are mentioned in the definitions.

In sum, *mopsen* is an informal German Theft verb with various scalar meaning component that apply to the GOODS FE, specifying that it be small, insignificant, and of low value. It also has an optional event-related adverbial meaning component that the theft is secretive or unnoticed. As such, *mopsen* is of higher descriptivity than the more general verbs *stehlen* and *klauen* discussed above.

Stibitzen

The relevant definitions for *stibitzen* are provided in Table B2.4

Duden	Wahrig	Langenscheidt	DWDS
(Studentenspr.) auf listige Weise entwenden, an sich bringen	stehlen, sich mit List aneignen	*colloq.* pinch, swipe *Am. a.* snitch	umgangssprachlich, scherzhaft: etw. (Geringfügiges) auf listige Weise wegnehmen, entwenden
-auf listige Weise	-mit List		-geringfügig -listig -scherzhaft (umgs.)

Table B2.4: Relevant definitions for *stibitzen*

The definitions show that *stibitzen* is also a Theft verb, as they each reference other Theft verbs such as *stehlen* (W), *entwenden* (D, DW; see below), or English equivalents (L).

Each of the German language dictionaries also specify additional meaning components and/or pragmatic features that set it apart from the more general Theft verbs. The first such component, mentioned in D, W, and DW, suggests that *stibitzen* applies to theft scenarios in which the PERPETRATOR uses sneakiness or cunning (*List, listig* 'cunning(ly)').

The second component suggests that the GOODS are insignificant or of low value. This is specified in DW with the word *Geringfügiges* ('insignificant') and suggested in the equivalents provided by L (*pinch, swipe, snitch*), which are typically also associated with low-value GOODS. It is likely that this meaning component is optional, as DW includes this specification in parentheses, and D and W do not mention it at all.

Pragmatically, *stibitzen* is informal or comical, as specified by the words *colloquial* (L), *umgangssprachlich* ('colloquial'; DW), *Studentensprache* ('student language'; D), and *sherzhaft* ('jokingly'; DW). None of the dictionaries mention whether *stibitzen* can be used intransitively as well as transitively.

To summarize, *stibitzen* is an informal or humorous Theft verb. It has an event-related adverbial meaning component that the theft is undertaken with cunning or trickery, as well as an optional FE-related scalar meaning component specifying that the GOODS are insignificant or of little value. As such, *stibitzen* is quite similar to *mopsen*, as both are informal and associated with low-value GOODS.

Unterschlagen

The relevant definitions for *unterschlagen* are provided in Table B2.5.

Duden	Wahrig	Langenscheidt	DWDS
1. (bes. Rechtsspr.) Gelder, Werte, o.Ä., die jmdm. anvertraut sind, vorsätzlich nicht für den vom rechtge-mäßigen Eigentümer gewollten Zweck verwenden, sondern für sich behalten, verwenden 2. [… mitteilen ...]	unrechtgemäß zurückhalten, veruntreuen (Geld, Brief) […verheimlichen …] [… überspringen ...]	1. (*Geld*) embezzle 2. (*Brief*) intercept 3.-5. […suppress…]	I [… fold over …] II […] 1 sich eine anvertraute, fremde Sache aneignen, etw. veruntreuen [...] 2 […withhold…]
-Gelder, Werte -entrusted to Perpetrator -use for self -use not for intended purpose	-Geld, Brief -hold back	-Geld, Brief	-trust

Table B2.5: Relevant definitions for *unterschlagen*

Unlike the German Theft verbs discussed thus far, *unterschlagen* is not clearly categorized as a Theft verb, as it specifies a very specific type of illegal taking, similar to Engish *embezzle*, and has numerous other uses that relate more or less closely to the Theft semantics. However, various phrases in the definitions show that it does refer to wrongful/illegal taking. Specifically, D

mentions the phrase *Gelder[...] für sich behalten* ('keep money for one's self), DW mentions the phrase *sich eine […] fremde Sache aneignen* ('to appropriate a foreign/another's thing to one's self). Furthermore, L lists English *embezzle* as a translation equivalent, and both W and DW reference the related verb *veruntreuen*, which is listed as equivalent to English *embezzle* and *misappropriate* in online bilingual dictionaries. As such, we may include *unterschlagen* in the analysis of German Theft verbs.

Various additional meaning components are mentioned in the definitions. For one, the GOODS associated with *unterschlagen* include money (*Geld*; D, W, L) and letters (*Brief*; W, L). A further meaning component specifies that the GOODS are typically entrusted (*anvertraut*) to the PERPETRATOR (D, DW), and that the PERPETRATOR uses the GOODS for his/her own rather than their intended purpose (D). With respect to pragmatics, D mentions that this verb is especially common in legal language. Native speaker consultations also suggest that *unterschlagen* is highly formal and not typically used in colloquial registers. The dictionaries do not mention any information with respect to transitivity.

Interestingly, *unterschlagen* has another (more frequent) sense of withholding or not mentioning information in a wrongful or (slightly) illegal manner. This sense may be related to the Theft sense, as both involve some type of corporate, white-collar crime. In some cases, it is difficult to distinguish which sense is in play, particularly when the GOODS are some concrete object with writing or similar information that could either be stolen or not mentioned, such as a letter. Such uses are excluded from the corpus analysis.

The analysis shows that *unterschlagen* is a peripheral member of the Theft verb class. It is associated with a highly specific event-related meaning component specifying that it refers the illegal taking of money or similar entities that have been entrusted to the PERPETRATOR, who uses the GOODS for his/her own use. It is a highly formal and/or legalistic term that is not frequent in colloquial registers. *Unterschlagen* thus differs from each of the other German Theft verbs analyzed, but is semantically closely related to English *embezzle*. It is thus very interesting to investigate if it behaves the same as its English counterpart with respect to valency behavior.

Entwenden

The relevant definitions for *entwenden* are provided in Table B2.6 below. The definitions show that *entwenden* is clearly a Theft verb, as each of the dictionaries include the more general verb *stehlen* or *steal*.

Duden	Wahrig	Langenscheidt	DWDS (Feb 2015)
unter Ausnutzung einer Gelegenheit unbemerkt wegnehmen u. [mühelos] an sich bringen; stehlen	heimlich, wiederrechtlich wegnehmen, stehlen	1. steal (j-m et. s.th. from so.) misappropriate, purloin, make away with 2. (*unterschlagen*) embezzle	gehoben: jmdm. etw. wegnehmen, stehlen
-take adv. of opportunity -unnoticed -easily	-secretively		-high register

Table B2.6: Relevant definitions for *entwenden*

There are four other meaning components mentioned in the definitions, each of which is only mentioned in one of the dictionaries. The first component states that the PERPETRATOR takes advantage of an opportunity to steal something (*unter Ausnutzung einer Gelegenheit*; D). This component likely relates to another meaning components specified in D, namely that the theft is effortless (*mühelos*). The other two meaning components are also likely related and state that the theft is unnoticed (*unbemerkt*; D) and secretive (*heimlich*; W). There is no specification as to the exact type of GOODS, but the bilingual L dictionary associates *entwenden* with German *unterschlagen* and English *embezzle* and *misappropriate*, suggesting that it is applicable to abstract financial GOODS (in addition to more general GOODS types).

Pragmatically, DW mentions that *entwenden* is in the formal (*gehoben*) register. With respect to its valency behavior, no mention is made of the verb's transitivity. However, both L and DW include the abbreviations for *jemandem etwas* (someone [dative] something), suggesting that the VICTIM is frequently realized in the dative case.

In summary, *entwenden* is a (slightly) formal Theft verb that is associated with an event-related adverbial meaning component specifying that the PERPETRATOR takes advantage of an opportunity to steal something, and thus takes little effort to steal the thing. Related to this, the theft is often secretive and goes unnoticed. There is no specification of the exact type of GOODS associated with *entwenden*, but it appears to apply to a wide range of GOODS types. Two dictionaries also mention a specific construction in which the PERPETRATOR is realized in the dative case, suggesting that this construction may be relatively frequent with *entwenden*.

Appendix C: Peripheral Frame Elements

A number of examples in the English Change corpus analysis exhibited valency constructions which include what I term "peripheral FEs": additional arguments that are not in the set of refined core FEs, but nonetheless closely pertain to the Change event described in the sentence.[432] Such arguments refer to the general direction of the change (e.g. *for the better*), the degree of the change (e.g. *beyond recognition*),[433] a related entity which changes in correlation with the core U argument (e.g. *according to X*), an external or indirect cause of the change (e.g. *with the arrival of X*), an entity that embodies the change (e.g. *in his work, he changes something*), or the result of the change (e.g. *so drastically that …*).[434] While I do not account for the characterization and distribution of these peripheral FEs in the main analysis, this appendix informally summarizes the types of peripheral FEs identified in the data and their distribution across each of the analyzed English Change verbs.

The data types are organized according to their general function, and provided examples of each type below. The first five types seem to be closer to "core" than the final three Means, Manner, Beneficiary categories.

Types of Peripheral FEs

DIRECTION

This type of FE seems to only be realized as *for the better* and *for the worse* (the latter, however, did not occur in the main corpus). That is, it does not seem to be flexible with other types of

[432] While these FE types roughly correspond to the *non-Core FE*s of FrameNet (Ruppenhofer et al. 2010). However, the FrameNet FE types apply to participants/arguments that are not central to the semantic frame, and are further subcategorized as either *Peripheral FE*s that provide setting information (e.g. time, place, manner) or as *Extra-thematic FE*s that situate the event in terms of other events (e.g. iteration: *twice*, or containing event: *while driving*. In contrast, the "Peripheral FEs" discussed here are more central to the frame than the FrameNet non-Core FEs, yet not so central to the frame as Core FEs as they are not required to be overtly realized nor interpreted through null-instantiation.

[433] The current analysis does not investigate in detail adverbs that specify the change in more detail, such as *suddenly, completely*. While investigating such adverbs would surely improve the semantic characterization of the verbs, they are highly diverse and frequent, so a complete account of them must be left for future work due to reasons of space.

[434] Note that clausal, purposive F arguments headed by *so (that)* or *to* are included among the set of common valency constructions due to their frequency with *modify* and occurrence with other Change verbs. The peripheral FE valency constructions described here are much less frequent and more formally diverse than the purposive clausal F arguments included in the set of common constructions for English Change verbs.

adjectives (e.g. *for the larger, for the redder*). This Peripheral FE appears to specify the direction of the change in terms of subjective judgment (positive/negative). It differs from normal "adjuncts", however, because it specifies the outcome of the change and does not seem to appear with other verb classes (**steal for the better, *brighten for the better, *speak for the better*).

(C.1) So it would change every aspect of our lives **mainly for the better**[435]

(C.2) the situation at the inlet's entrance can alter dramatically **for the better**

GUIDE of change/COROLLARY change

In Examples (C.3)-(C.7), the change described by the basic VC occurs in parallel with a change in a related entity, which is expressed in different types of prepositional phrases. These FEs also seem to be relatively "core" (i.e. essential for the Change frame), as they somehow bring about (but do not actively cause) the change and they do not appear with some other verb classes (??*She stole/spoke/ran with time*) or have different interpretations when they do (*She *stole/*spoke/brightened according to its speed*).

(C.3) the 2009 Audi A4 modifies the steering ratio **in response to the car's speed**.

(C.4) the Doppler effect (which alters a signal's frequency **according to its motion**)

(C.5) Chameleons alter their color **according to light intensity, state of health, temperature and mood**

(C.6) Our tastes, abilities, and needs all alter **with time.**

(C.7) classification and survivability may not be constant or may change **as the war progresses or subsides**

INDIRECT CAUSE

These types of arguments seem to only occur with intransitive VC types. They refer to a non-agentive cause, typically a state of affairs, which brings about the change and are generally realized in an oblique phrase, typically with a *with* PP. These seem to be core FEs, since they are part of the cause of the change event, and they have different interpretations (e.g. comitative, instrument) with other verb classes.

(C.8) But the mood changed abruptly today **with the team's bankruptcy filing**.

[435] All examples in this Appendix are from the main dataset from the COCA corpus, as described in Chapters 4 and 5.

(C.9) But **with the end of the draft and the cold war**, that has changed

(C.10) the genetic content of the populations -- shown inside the heavy dotted lines -- alters **under the pressure of mutation, or environmental change, or random shifting**

EMBODIMENT of change

Some arguments expressed in *in* PPs that refer to entities that exemplify the change expressed in the main VC (C.11) or they refer to some property or attribute of the changed entity that has specifically undergone the change (C.12). They seem to be specific to this verb class, as they typically have a Location/Place interpretation with other verb classes.

(C.11) **In heroic sculptures and magnificent facades,** this Brazilian artist transformed the colonial baroque into a vibrant new art form

(C.12) the fundamental nature of the prison had altered so significantly **in its transportation to East Africa** that many of the assumed norms at

RESULT/PURPOSE

These examples contain FEs that describe the result state of the change or the purpose that the resulting state serves. They are typically realized in CPs headed by *so that* or *to*. While these argument types seem to be quite general, in that many verbs may appear with clauses that describe the purpose or result, it seems as though they may be more frequent with Change verbs, since the resulting state of a change is an integral part of the Change frame. Also, it appears that certain verbs (e.g. *modify*) are much more frequent than others with these phrase types. They also do not co-occur with prepositional or resultative Final_state arguments, which are core, so it seems that they fulfill this same function.

Note that the bolded argument in (C.17) is not a simple *so that* CP (which was included as a specific VC type in the main analysis), but has the adverb (*so significantly that*), so this may have more of a Degree interpretation instead of, or in addition to, the Result interpretation. Also, the second to last example has the phrase *beyond recognition*, which also specifies the Degree of the change.

(C.13) they are ready to reform government and help transform our economy **so that our people are more prosperous, our nation is more secure**

(C.14) special cells, known to biologists as adult mesenchymal stem cells, have grown and transformed themselves within the pigs' hearts **to form new, healthy tissue**

(C.15) humans have modified the world **for improved living conditions**

(C.16) leading men thought nothing of altering his screenplays **beyond recognition to suit their infantile needs and desires**

(C.17) the fundamental nature of the prison had altered **so significantly in its transportation to East Africa that many of the assumed norms at** […]

Non-core FEs

I also identified the following three types of arguments in the data that are more likely to be identified as "adjuncts/non-core FEs" than "arguments/core FEs," because they seem to have the same function and formal realization when they appear with other verb types and do not directly characterize the change event described by the main VC (and Change verb).[436] As such, these are not included in the following discussion of individual English Change verbs' occurrence with peripheral FEs. The names of the categories are fairly straightforward.

MEANS

(C.18) meteorologist Carl-Gustaf Rossby transformed weather forecasting **by identifying the "grandest atmospheric movements**,

(C.19) King Hussein changed the dynastic succession **by naming Abdullah, then only 37, his heir**.

(C.20) **by changing the dose or the times that you're taking estrogen**, you can modify that

(C.21) Assimilators grasp knowledge through abstract conceptualization and transform it **through reflective observation**.

BENEFICIARY

(C.22) But that could change **for Robertson**

MANNER

(C.23) books, films/videos and interactive media that could transform K-12 curricula **in the same way that the materials emerging from black women's studies […]**

[436] These FE types correspond more closely to the *non-Core FE*s of FrameNet (Ruppenhofer 2010) than do the Peripheral FEs discussed above.

Distribution of Peripheral FEs with English Change verbs in corpus analysis

Alter

Alter occurs with a relatively high number of peripheral FE arguments that specify the change event further than the core FEs, with a total of seven such arguments or 9% of all *alter* examples. Three such FEs specify another entity which the core U argument changes in correlation with. Of these, two occur with simple transitive VCs and express the correlated entity in the expression *according to*.[437] The other correlated entity is realized in a *with* PP and further specifies a simple intransitive VC.[438] One peripheral FE specifies an indirect cause of the change in a simple intransitive VC with the expression *under the pressure of*.[439] Two other peripheral FEs specify the degree of the change: one in a simple transitive VC with the expression *beyond recognition*,[440] and the other in a simple intransitive VC with a *so ADV that* construction.[441] Finally, one simple intransitive VC includes a peripheral FE that specifies the direction of the change with the expression *for the better*.[442]

With respect to peripheral FEs, *alter* occurs with the highest relative frequency of examples including peripheral FEs out of all five English change verbs analyzed: 9% of the analyzed *alter* examples include non-core FEs that nonetheless specify details of the change event. These peripheral FEs further specify the direction of the change, entities that embody the change, entities that change in correlation with the change in U, and the degree of the change, and they are formally very diverse as well. At present, it is not clear why *alter* should appear so frequently with peripheral FEs, but it may be due to the fact that *alter* does not include any additional meaning components apart from the scalar component specifying that it refers to subtle, non-categorical changes. These peripheral FEs can thus provide more detail to the type of change expressed by *alter*.

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437 *Chameleons alter their color according to light intensity, state of health, […]. ; […] the Doppler effect (which alters a signal's frequency according to its motion) […]*

438 *Our tastes, abilities, and needs all alter with time.*

439 *[…] the genetic content of the populations […] alters under the pressure of mutation, or environmental change, or random shifting […]*

440 *[…] leading men thought nothing of altering his screenplays beyond recognition […]*

441 *[…] the fundamental nature of the prison had altered so significantly in its transportation to East Africa that many of the assumed norms at the heart of Foucault's writings become utterly alien.*

442 *[…] the situation at the inlet's entrance can alter dramatically for the better.*

Change

Seven instances of peripheral FEs were identified in the *change* corpus data, a figure of slightly over 5% of all *change* examples. Four such peripheral FEs describe an indirect cause of the change in a *with* PP, each of which is found in simple intransitive VCs.[443] Two examples including arguments that describe the direction of the change are included in simple transitive VCs, one of which is the phrase *for the better*,[444] while the other is the phrase *back and forth*.[445] Finally, one simple intransitive VC features a peripheral FE expressing a correlated change in a clause headed by *as*.[446] Similar to *alter*, *change* also has a relatively high number of examples (> 5%) that feature peripheral FEs, expressing the direction of the change, an indirect cause of the change, or an entity that changes in correlation with the core U argument. As was speculated for *alter*, the relative frequency of such peripheral FEs may result from the general semantics of *change*, which involves no additional meaning components apart from the base/core Change semantics.

Transform

Only one peripheral FE was identified in the corpus data for *transform*. This FE was found in a transitive VC with F realized in an *into* PP, and it expresses in an *in* PP an entity separate from the C and U arguments which embodies the change expressed by the common VC.[447] This is the only occurrence of this particular peripheral FE type in the entire analyzed corpus.

This data differs from the previously discussed verbs which occurred more frequently with peripheral FEs: 5% of *change* examples and 9% of *alter* examples. I noted above that the relatively high frequency of peripheral FEs for those two verbs may result from their general semantics: because they involve very few additional meaning components specifying the type of change, they may easily add additional FEs that provide more detail to the change expressed in the common VC. The low frequency of peripheral FEs with *transform* appears to support this view, as *transform* is associated with up to three additional meaning components and thus refers to a much more specific type of change, which need not be further specified by additional

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443 *But the mood changed abruptly today with the team's bankruptcy filing.*
444 *So it would change every aspect of our lives mainly for the better...*
445 *Robert Henry is not the only one whose story has changed back and forth over the years.*
446 *[...] classification and survivability may [...] change as the war progresses or subsides.*
447 *In heroic sculptures and magnificent facades, this Brazilian artist transformed the colonial baroque into a vibrant new art form.*

phrases. These observations, of course, are merely speculative and must be tested more rigorously in future work, specifically by investigating peripheral FEs across several frames to determine whether there is an inverse correlation between the number of peripheral FEs that appear with a verb and the number of meaning components associated with that verb.

Turn

No analyzed examples of *turn* include peripheral FEs that specify further details about the direction, degree, indirect cause, or other features of the change expressed in the common (or verb-limited) VC. In the preceding analyses, I suggested that such FEs appear more frequently with verbs with few additional meaning components, but no specific additional meaning components were identified in the dictionary analysis of *turn*. The lack of peripheral FEs in this case may possibly be due to the fact that *turn* requires the F argument and thus always specifies to some degree the type of change that takes place.

Modify

Like *alter* and *change*, *modify* appears with peripheral FEs that further specify the change described in the common VC. The data include four examples with such FEs, a figure of slightly over 4%. Two examples added to the simple transitive VC an argument referring to an indirect cause of the change, expressed with the phrase *in response to NP*.[448] One example expresses the degree/result of the change by adding the phrase *to ... degree that ...* to a simple transitive VC.[449] Finally, one transitive VC example expresses the purpose of the change in a *for* PP governing a NP.[450] Although only four (technically defined) peripheral FEs were found in the data for *modify*, the 17 examples with purposive F clauses can also be viewed as peripheral FEs, as they specify details of the change event described in the main clause. Including such arguments, a total of 22% of *modify* examples included phrases that further specify the change beyond the core (i.e. subject, object, oblique) FEs.

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448 *[…] the 2009 Audi A4 modifies the steering ratio in response to the car's speed.* See Appendix XX for other example.

449 *Every species worldwide had modified its feeding habits to such a degree that it could live on carrion […]*

450 *Humans have modified the world for improved living conditions […]*

Appendix D: Detailed Valency Distribution and VC Phrase Types

Section D.1. Distribution of English Change verbs with VCs, including PT-changing VCs

The table below lists the distribution of each English Change verb with the VCs identified in Chapter 5. While the main analysis did not focus on subtle phrase type differences among individual VC types, the table shows all the various phrase type configurations for each VC, as well as how they occurred across each English verb.

The first column lists the formal label of the VC, as specified in Chapter 5. The second column provides the short-hand label of the VC without any phrase type specification in bold.

Below the bold labels are series of phrase type labels that show the phrase type of each (core) argument. The phrase type labels are separated by commas, with the first phrase type label corresponding to the first argument (FE) label in the bold VC label above it. (E.g., the first cell under [C _ U] reads *NP, NP* and thus states that the C is realized as a (subject) NP and the U is realized as an (object) NP. The first phrase type set corresponds to the "default" realization of the VC, as described in Section 5.3. If no non-default phrase types were identified in the corpus analysis, then none are specified.

The third through fifth columns specify how frequently each VC (and phrase type combination) occurs with each verb in the corpus analysis. The main VC rows are in bold and show both the relative frequency (percentage) of that verb in the VC as well as the precise number of examples exemplifying the VC (in parentheses). The different phrase type combinations (not in bold) only specify the number and not the percentage.

	TRANSITIVE	change	alter	modify	turn	transfm
T2	**C _ U**	**55% (74)**	**90% (71)**	**82% (78)**		**48% (52)**
	NP, NP	(72)		(76)		(45)
	NP, Rflxv					(6)
	Ving, NP	(2)	(2)			
	fortoCP, NP		(1)			
	NP, whCP	(1)	(1)	(2)		(1)
T3a	**C _ U into F**	**x**			**45% (50)**	**35% (38)**
	NP, NP, NP					(36)
	NP, Rflxv, NP					(2)
T3b	**C _ U to F**	**1% (1)**			**2% (3)**	
	NP, NP, NP	(1)			(2)	
	NP, NP, NPs-repeated				(1)	
T3c	**C _ U F.purposeCP**		**2% (2)**	**17% (17)**		**1% (1)**
	NP, NP, toCP		(1)	(14)		(1)
	NP, NP, sothatCP		(1)	(3)		
T4a	**C _ U from O into F**				**1% (1)**	**5% (5)**
	NP, NP, NP, NP				(1)	(3)
	NP, Rflxv, NP, NP					(2)
T4b	**C _ U from O to F**	**1% (1)**				**4% (4)**
	NP, NP, NP, NP					(1)
	NP, NP, Adj, Adj	(1)				(2)
	NP, NP, Adj, NP					(1)
	INTRANSITIVE	change	alter	modify	turn	transfm
I1	**U _**	**42% (56)**	**8% (6)**			**3% (3)**
	NP	(56)	(6)			
I2a	**U _ into F**	**1% (1)**			**23% (32)**	**5% (5)**
	NP, NP	(1)			(30)	
	NP, whCP				(1)	
	NP, NUM				(1)	
I2b	**U _ to F**				**5% (7)**	
	NP, NP				(6)	
	NP, SENT				(1)	
I3b	**U _ from O to F**				**3% (4)**	**1% (1)**
	NP, NP, NP				(1)	
	NP, ADJ, ADJ				(2)	
	NP, ADJ, NP				(1)	
	RESULTATIVE					
RT3	**C _ U F**				**3% (4)**	
	NP, NP, ADJ					
RI3	**U _ F**				**23% (31)**	
	NP, ADJ				(30)	
	NP, NP				(31)	

Table D1: VCs and phrase type combinations and their distribution among Change verbs

Section D.2: Distribution of English Change verbs with common VCs, PT-changing VCs, Peripheral FEs, and special senses

The following tables summarize the precise distribution of the analyzed English Change verbs with more detailed characterizations of valency constructions. Specifically, they list the distribution among:

-the "common VCs" that were used in the main analysis in Chapter 5

-"PT-changing VCs" which realize (an) argument(s) of a common VC in a different phrase type than the default phrase type specified for the common VC

-"Peripheral FE VCs" that, in addition to the basic VC, include arguments that were not identified as "core FEs" of the Change frame, but nonetheless differ from traditional "adjuncts" as they closely pertain to the Change frame semantics and behave differently with other verb classes (see Appendix D)

-"Special senses" – the dictionary entries for some verbs specified that the verb occurs with a specific type of argument and has a special, scene-specific sense in such collocations

Each table describes the distribution of each examined English Change verb across these VC types. Actual VCs are placed in square brackets and employ the short-hand notation described in Section 5.3. The number in parentheses following each VC type refer to the number of sentences instantiating the VC type. For the PT-changing VCs and Peripheral FE VCs, the general category of the VC type is written in italics, and the specific sub-types of the category are indented and listed below the category specification. For PT-changing VCs, the specific type shows the type of common VC the non-default phrase type occurs in. For Peripheral FE VCs, the specific type shows how the peripheral FE is syntactically realized, with "X" representing the peripheral FE.

The number of total examples analyzed is listed at the top of each table. The number of examples demonstrating the specific VC types are listed in parentheses after the VC type label.

Alter – 79 total examples	
Common [C _ U] – (71) [C _ U F.CP] – (2) [C _ U toF.CP] – (1) [C _ U so (that) F.CP] – (1) [U _] – (6)	**Peripheral FE – (7)** *Correlate* (3) [C _ U *according to* X] (2) [U _ *with* X] (1) *Cause* (1) [U _ *under pressure of* X] (1) *Degree* (2) [C _ U *beyond recognition*] (1) [U _ *so significantly that* X] (1) *Direction* (1) [U _ *for the better*] (1)
PT-changing – (4) *C as V.ing* – 2 [C.Ving _ U] – (2) *C as for-to* – (1) [C.for-to _ U] – (1) *U as wh.CP* – (1) [C _ U.whCP] – (1)	**Special sense** *Alter clothing* – (1) [C _ U] – (1)

Table D2: Full distribution of *alter*

Change – 134 total	
Common [C _ U] – (74) [C _ U from O.adj to F.adj] – (2) [C _ U to F] – (1) [U _] – (56) [U _ into F] – (1)	**Peripheral FE – (7)** *Direction* – (2) [C _ U *for the better*] – (1) [C _ U *back and forth*] – (1) *Cause* – (4) [U _ *with* X] – (4) *Correlate* – (1) [U _ *as* X.CP] – (1)
PT-changing – (3) *C as VP.ing* – (2) [C.VPing _ U] – (2) *U as wh.CP* – (1) [C _ U.whCP] – (1)	**Special sense – (10)** *Mind* – (9) [C _ *mind*] – (8) [*mind* _] – (1) *Clothes* – (1) [C _ *clothes*] – (1)

Table D3: Full distribution of *change*

Modify – 95 total	
Common [C _ U] – (78) [C _ U F.CP] – (17) [C _ U toF.CP] – (14) [C _ U so (that) F.CP] – (3)	**Peripheral FE – (4)** *Cause* – (2) [C _ U *in response to* X] – (2) *Degree* – (1) [C _ U *to degree that* X] – (1) *Purpose* – (1) [C _ U *for* X] – (1)
PT-changing – (2) *U as wh.CP* – (2) [C _ U.whCP] – (2)	**Special sense – (1)** *Grammar* – (1) [C _ U] – (1)

Table D4: Full distribution of *modify*

Transform – 109	
Common [C _ U] – (52) [C _ U from O into F] – (5) [C _ U from O to F] – (1) [C _ U from O.adj to F.adj] – (2) [C _ U from O.adj to F.NP] – (1) [C _ U into F] – (38) [C _ U F.CP] – (1) [C _ U toF.CP] – (1) [U _] – (3) [U _ from O to F] – (1) [U _ into F] – (5)	**Peripheral FE –** (1) *Embody* – (1) [C _ U into F *in* X] – (1)
PT-changing *U as reflexive object* – (11) [C _ U.self] – (6) [C _ U.self from O into F] – (2) [C _ U.self into F] – (2) [C _ U.self to F.CP] – (1) *U as wh.CP* – (1) [C _ U.whCP] – (1)	**Special sense – n/a**

Table D5: Full distribution of *transform*

Turn – 132	
Common [C _ U from O into F] – (1) [C _ U into F] – (50) [C _ U to F] – (3) [U _ from O to F] – (1) [U _ from O.adj to F.adj] – (2) [U _ from O.adj to F.NP] – (1) [U _ into F] – (32) [U _ to F] – (7) **[**C _ U F.adj] – (4) [U _ F.adj] – (30) [U _ F.NP] – (1)	**PT-changing** *F as to.CP* – (1) [U _ to F.CP] – (1) *F as into.whCP* – 2 [U _ into F.whCP] – (2) *F as into.NUM* [U _ into F.number] – (1) *Multiple prepositional F* [C _ U to F to F to F] – (1)
Peripheral FE – n/a	**Special sense – n/a**

Table D6: Full distribution of *turn*

Metamorphose – 206	
Common [C _ U] – (2) [C _ U into F] – (3) [U _] – (28) [U _ into F] – (145) [U _ to F] – (7) [U _ to F.adj] – (1) [U _ from O to F] – (8) [U _ from O.adj to F.adj] – (2) **Previously unidentified** [U _ as F – (1) [U _ through F – (1) [U _ from O to F.CP – (1) [U _ from O into F – (6) [U _ F.toCP – (1)	**Peripheral FE** *Degree* – (1) U _ so significantly that – (1)
PT-changing *U as reflexive object* – (1) [C _ U.self into F] – (1) *U as _ing, F as _ing, Multiple F* – (1) [U _ from O._ing to F._ing to F._ing] – (1) *Multiple F* – (1) [U _ from O to F to F to F] - (1) *F as CP* – (1) [U _ into F.CP] – (1)	**Special sense – n/a**

Table D7: Full distribution of *metamorphose*

Appendix E: German Change valency frame and FBVEs

This appendix demonstrates the valency frame/FBVE approach to classifying German Change verbs, as discussed in detail for English Change verbs in Section 5.4.

E.1. Semantics of German Change valency frame

With respect to semantics, the German Change verbs exhibit few differences from their English counterparts. They each describe situations in which some entity (Undergo_change) undergoes a change from one state (Original_state) to another (Final_state), and they may express an entity that brings about the change (Cause_change). As this semantic characterization captures all the relevant similarities across German Change verbs, I define the semantics of the German Change valency frame the same way as for the English frame, as in Figure E.1:

Semantics of the German Change valency frame
These verbs describe situations in which an entity (U) undergoes a change from one state (O) to another state (F). The change may be brought about by some agent or cause (C).
Core (R)FEs
C = Cause_change = agent or cause which brings about the change
U = Undergo_change = entity which undergoes the change
O = Original_state = state of the entity before the change
F = Final_state = state of the entity after the change

Figure E.1: Semantics of the German Change valency frame

Many further features identified for English Change verbs also apply to German Change verbs. For one, like English Change verbs, German Change verbs differ from the broader set of "change-of-state" verbs (e.g. *break, grow*) in that they do not specify the exact type of change which is undergone. Also, several of the additional meaning components that set individual verbs apart from one another occur across the two languages. The most significant such component is the distinction between subtle Change verbs (*abändern, ändern, verändern*) and drastic Change verbs (*verwandeln, wandeln*). Another component identified in both languages is that of 'changing for a purpose, especially to improve', which applies both to English *modify* and German *abändern*. Also, German Change verbs exhibit special sub-senses of the Change semantics in specific contexts (e.g. *verändern* as 'to change jobs') as well as polysemy, i.e. other non-Change senses (e.g. *wandeln* as 'to move/walk'). However, none of the German Change verbs exhibit such senses to the same extent as English *change* or the extremely polysemous *turn*.

Despite the overwhelming parallels in the semantics of the German and English Change frames, some minor differences should be noted. While I characterized English *change* and *turn* as "general" change verbs, restricted neither to subtle nor drastic changes, none of the German Change verbs exhibited this generality. Instead, all verbs could be classified as subtle or drastic change verbs. Another difference is the semantics behavior of the verb *abändern*, which differs from the other subtle change verbs *ändern* and *verändern*, in that it applies only to a very narrow set of change types, especially those referring to amendments of texts. As such, while English *alter* and *modify* can be deemed translation equivalents of German *ändern* and *verändern*, they are not clear equivalents of *abändern*, as they may refer to a much wider range of (subtle) change scenarios.

E.2. Syntax of German Change frame

Table E.1 presents the constructional range of German Change verbs – the set of valency constructions attested with (any of the) German Change verbs.

VC	Pattern	Example
I1	C _	Sie verwandelt.
T2	C _ U	Sie verwandelt ihn.
T3a	C _ U in F	Sie verwandelt ihn in einen Frosch.
T3b	C _ U zu F	Sie verwandelt ihn zu einem Frosch.
T3c	C _ U dahing/so…	Sie verwandelt ihn so/dahingehend, dass er zum Frosch wird.
T3d	C _ NEG an U	Sie ändert nichts an ihm.
T4aa	C _ U aus O in F	Sie verwandelt ihn aus einem Mann in einen Frosch.
T4ab	C _ U _on O in F	Sie verwandelt ihn von einem Mann in einen Frosch.
T4ba	C _ U aus O zu F	Sie verwandelt ihn aus einem Mann zu einem Frosch.
T4bb	C _ U _on O zu F	Sie verwandelt ihn von einem Mann zu einem Frosch.
R2	U _ sich	Er verwandelte sich.
R3a	U _ sich in F	Er verwandelte sich in einen Frosch.
R3b	U _ sich zu F	Er verwandelte sich zu einem Frosch.
R3c	U _ sich dahing/so,...	Er verwandelte sich so/dahingehend, dass er zum Frosch wird.
R3d	NEG _ sich an U	Nichts ändert sich an ihm.
R4aa	U _ sich aus O in F	Er verwandelte sich aus einem Mann in einen Frosch.
R4ab	U _ sich _on O in F	Er verwandelte sich von einem Mann in einen Frosch.
R4ba	U _ sich aus O zu F	Er verwandelte sich aus einem Mann zu einem Frosch.
R4bb	U _ sich _on O zu F	Er verwandelte sich von einem Mann zu einem Frosch.

Table E.1: Constructional range of German Change valency frame: list view

The first column lists the VC label. The second column lists the informal notation of the VC, listing only the FE abbreviations, their relative order (with nominative subjects preceding

and accusative objects following the placeholder "_" for the verb), and any relevant prepositions. The right-most column provides a simple, invented example of the VCs. As discussed in Section 6.2, the VCs in the constructional range of the German Change valency frame can be organized according to various features. These features, their values, and the VCs that fall into each category are provided in Table E.2.

Feature	**Category**	**VCs**
Transitivity	Transitive	T2, T3a-d, T4aa-bb
	Reflexive	R2, R3a-d, R4aa-bb
	Intransitive	I1
State realization	No states	I1, T2, R2
	Only F	T3a-d, R3a-d
	Both O and F	T4aa-bb, R4aa-bb
F realization	*in* PP	T3a, T4aa, T4ab, R3a, R4aa, R4ab
	zu PP	T3b, T4ba, T4bb, R3b, R4ba, R4bb
	so/dahingehend, dass	T3c, R3c
O realization	*aus* PP	T4aa, T4ba, R4aa, R4ba
	von PP	T4ab, T4bb, R4ab, R4bb
Special	*NEG an U*	T3d, R3d

Table E.2: Classes of German Change valency constructions

With respect to transitivity, VCs may be transitive, reflexive, or (very rarely) intransitive. With respect to the number of states realized, VCs may realize no states, only the Final_state, or both the Original_state and the Final_state. VCs that realize the final state may do so using an *in* PP, a *zu* PP, or as a subordinate *dass* clause introduced with the adverb *so* or *dahingehend*, describing the result of the change. VCs which also realize the O argument may do so with either an *aus* PP or a *von* PP. Finally, Table E.2 contains one final category which groups together the transitive and reflexive variants of the [NEG an U] pattern discussed in Section 6.2.

Again, a more appropriate manner of presenting the VCs in the German Change constructional range is in terms of an inheritance network, which specifies how more complex VCs specifying more aspects of the change scenario build up from simpler, more abstract VCs. Such a network is provided in Figure E.2.

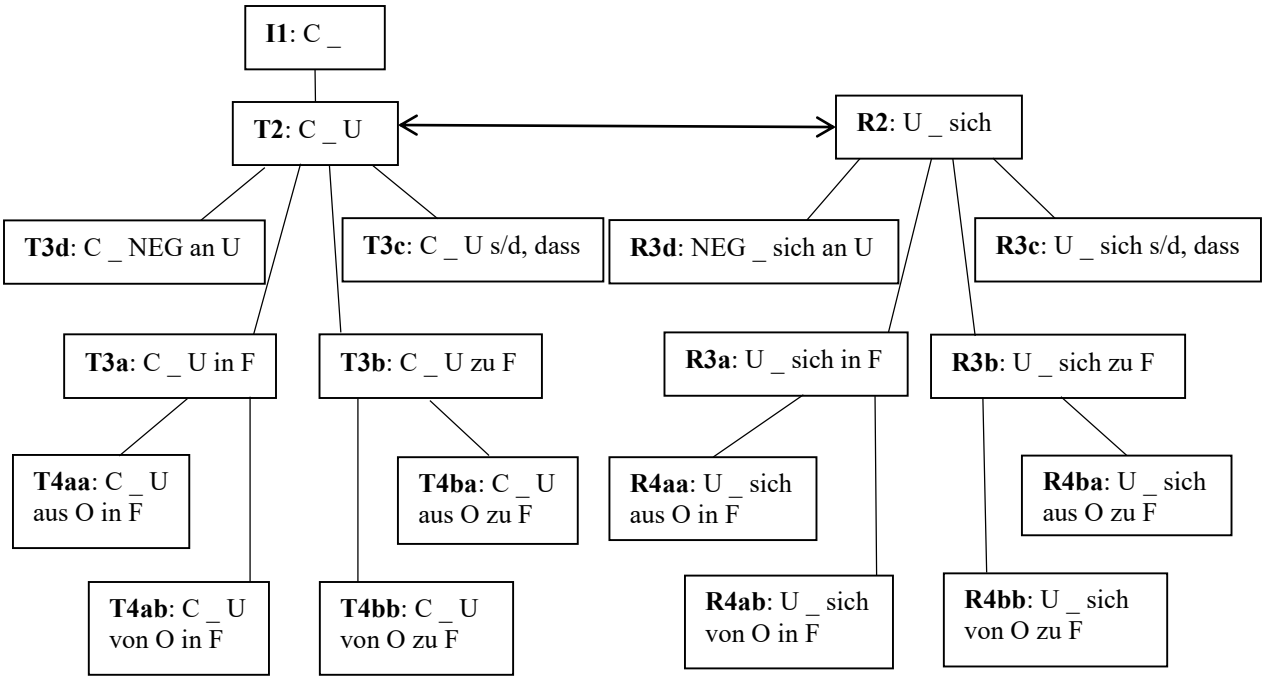

Figure E.2: Constructional range of German Change valency frame: network view

The structure of this constructional network is as follows. At the very top left is the simple intransitive VC (I1) that is highly infrequent and somewhat questionable (but nonetheless included in the anlaysis). This pattern simply consists of the Cause_change subject followed by the verb. The simple transitive VC (T2; [C _ U]) is directly below the I1 VC and connected by a line signifying that the lower VC inherits the higher VC. More specifically, T2 inherits the intransitive I1 and adds to it a direct (accusative) object which expresses the Undergo_change argument. At a parallel level is the simple reflexive VC (R2; [U _ sich]), which is the simplest construction of its type and thus does not inherit from another construction. The arrowed line connecting the two VCs at this level, T2 and R2, represents the causative-inchoative link that captures the correspondence between caused scenarios expressed with transitive constructions and (uncaused) inchoative scenarios expressed with reflexive constructions.

At the level below the T2 and R2 VCs are eight VC types which include three arguments. For most of these, the additional third argument is the Final_state, which can be expressed in three different ways: in an *in* PP, in a *zu* PP, or as a subordinate *dass* clause introduced by *so* or *dahingehend*. As each of these F realization types occur in both transitive and reflexive variants, two nodes are required for each realization type, one each from the simple transitive and simple

reflexive VC nodes. Again, the lines connecting these VCs to the higher-level ones represent inheritance. For example, the R3a node ([U _ sich in F]) inherits the basic transitivity information from the higher R2 VC ([U _ sich]) and further elaborates it with an *in* PP expressing the Final_state. Also at this intermediate level are the [NEG an U] patterns (T3d, R3d) that were attested only with the verb *ändern*. These not only add to the simpler, higher-level VCs an *an* PP expressing the Undergo_change argument, but they also specify that the (accusative) object of the transitive VC and the subject of the reflexive VC is some negative element (e.g. *nichts, kein Wort*). At the lowest level are VC types that realize both the Original_state and the Final_state. Each of these adds to the higher-level VC a PP headed by either *aus* or *von* expressing the Original_state of the change. These inherit only from the VCs with prepositional F (not from the clausal F or the [NEG an U] constructions). However, given that (a) the O may be expressed as an *aus* or *von* PP, (b) it may occur with VCs expressing F in *in* and *zu* PPs, and (c) it may appear in both transitive and reflexive variants, a total of eight such VCs are required at this level.

That eight different VC nodes are required to represent O arguments that come in only two types (*aus* PP, *von* PP) underscores the degree of redundancy in the above network. Indeed, apart from the single intransitive node above the simple transitive T2 VC, the networks below the transitive and reflexive VCs are nearly identical, with the only difference being their transitivity type (transitive vs. reflexive). In order to decrease this redundancy and more clearly represent the major features that distinguish individual VCs, the non-redundant network in Figure E.3 shows only those portions of the VCs that are added to the inherited, higher-level VCs.

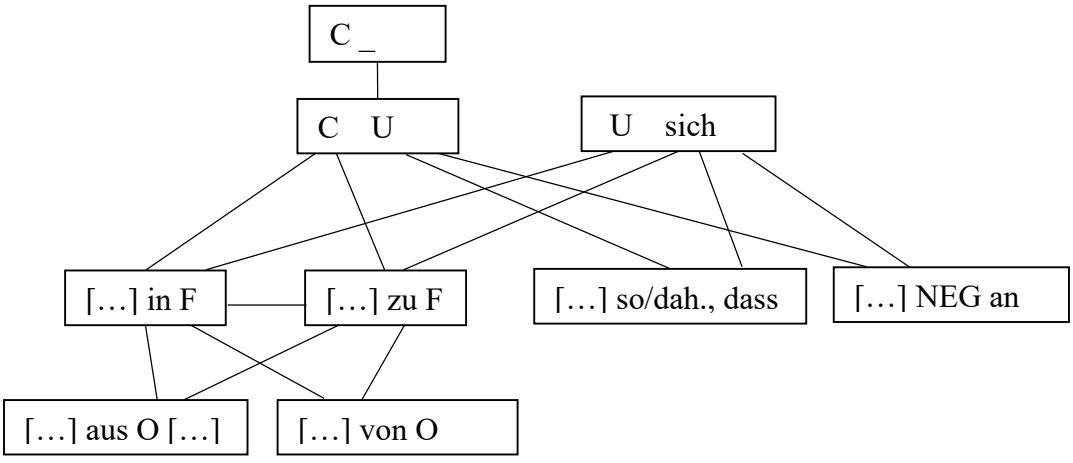

Figure E.3: Constructional range of German Change valency frame: non-redundant network view

The top portion of Figure E.3 is identical to that of the redundant network in Figure E.2 above, listing the simple intransitive, transitive, and reflexive patterns. At the level below this, however, only four nodes are required to represent the three different realizations of F and the [NEG an U] construction found with *ändern*. Two lines go up from each of these nodes, one linking to the simple transitive and one to the simple reflexive patterns, in order to signify that such construction types appear in both transitive and reflexive variants. The […] markers in these VC nodes stands for the inherited content of the higher-level constructions. For instance, in the left-most of the four VC nodes, reading "[…] in F", the […] may be replaced either with the simple transitive VC to yield [C _ U into F] or with the simple reflexive VC to yield [U _ sich into F]. Finally, at the lowest level are the two realizations of the O argument (as *aus* PP or *von* PP), which include unspecified portions ([…]) both before and after the specified portions, which are filled in with the high-level simple transitive/reflexive VC and the F realization, respectively. These lowest nodes include inheritance links to both the *in* F and *zu* F mid-level nodes, as they may appear in any of these combinations.

E.3. Frame-based verb entries for German Change verbs

While the preceding discussion focused on the characterization of German Change verbs as a class, emphasizing their shared aspects of meaning and the full set of VCs available to them, I now present frame-based verb entries for each of the verbs analyzed, which specify idiosyncratic behavior that may differ from verb to verb within the class. Again, this appendix parallels that of 5.4: I present the FBVE for each verb, which specifies its valency frame (in this case Change), meaning components (in addition to the general Change frame semantics defined above), valency behavior (including exact corpus frequency in each VC and general trends stated in prose), and any additional information (e.g. pragmatics, scene-specific uses).

Abändern

The FBVE for *abändern* is given in Table E.3 below. The second row of Table E.3 states that *abändern* is a member of the (German) Change valency frame and is thus associated with the meaning defined above in Figure F1 and may potentially appear in the VCs defined in Table E.1. The third row shows that it is not associated with any sub-class (see following sub-section). The fourth row specifies additional semantic components that set *abändern* apart from other Change verbs, namely its restriction to minor changes, especially to texts. The next row specifies the valency behavior of *abändern*, including the frequency with which it appears in its attested VCs

in the corpus analysis, as well as a prose summary of its behavior. Here, I note that *abändern* is only used in transitive VCs and almost always occurs in VCs without prepositional state arguments.

Verb	*Abändern*
Frame	CHANGE
Sub-class	none
Additional Meaning	-Refers to subtle, non-categorical changes -Refers to changes in texts, laws, policies, etc.
Additional Syntax	Appears in: T2 (86%), T3b (5%), T3c (9%) → Only appears in transitive VCs → Almost exclusively (> 90%) in VCs without prepositional F
Other	a) Slightly formal

Table E.3: Frame-based verb entry for *abändern*

The exact valency behavior of *abändern* with respect to the constructional range of the German Change valency frame is also summarized in Table E.4.

	abändern
I1: C V	
T2: C V U	86%
T3a: C V U in F	
T3b: C V U zu F	5%
T4aa: C V U aus O in F	
T4ab: C V U von O in F	
(T4ba: C V U aus O zu F)	
(T4bb: C V U von O zu F)	
T3c: C V U dahing/so…	9%
T3d: C V Uneg an U	

	abändern
R2: U V sich	
R3a: U V sich in F	
R3b: U V sich zu F	
R4aa: U V sich aus O in F	
R4ab: U V sich von O in F	
(R4ba: U V sich aus O zu F)	
R4bb: U V sich von O zu F	
R3c: U V sich dahing/so,...	
R3d: Uneg V sich an U	

Table E.4: Valency distribution of *abändern*

The valency distribution of *abändern* may also be represented graphically with the inheritance network view of the constructional range, as in Figure E.4. The arrows signify that the verb in the bottom box is attested in the VCs to which the arrow points, with different arrow colors/styles representing the frequency with which the verb was found in the given VC. For instance, the thick arrow going from *abändern* to the T2 box signifies that *abändern* is highly frequent (over 60%) in that VC. [451]

[451] In the following presentations of verbal valency distributions in the constructional range networks, the types of lines signify the following:
Bold = over 60%
Solid = 20-60%

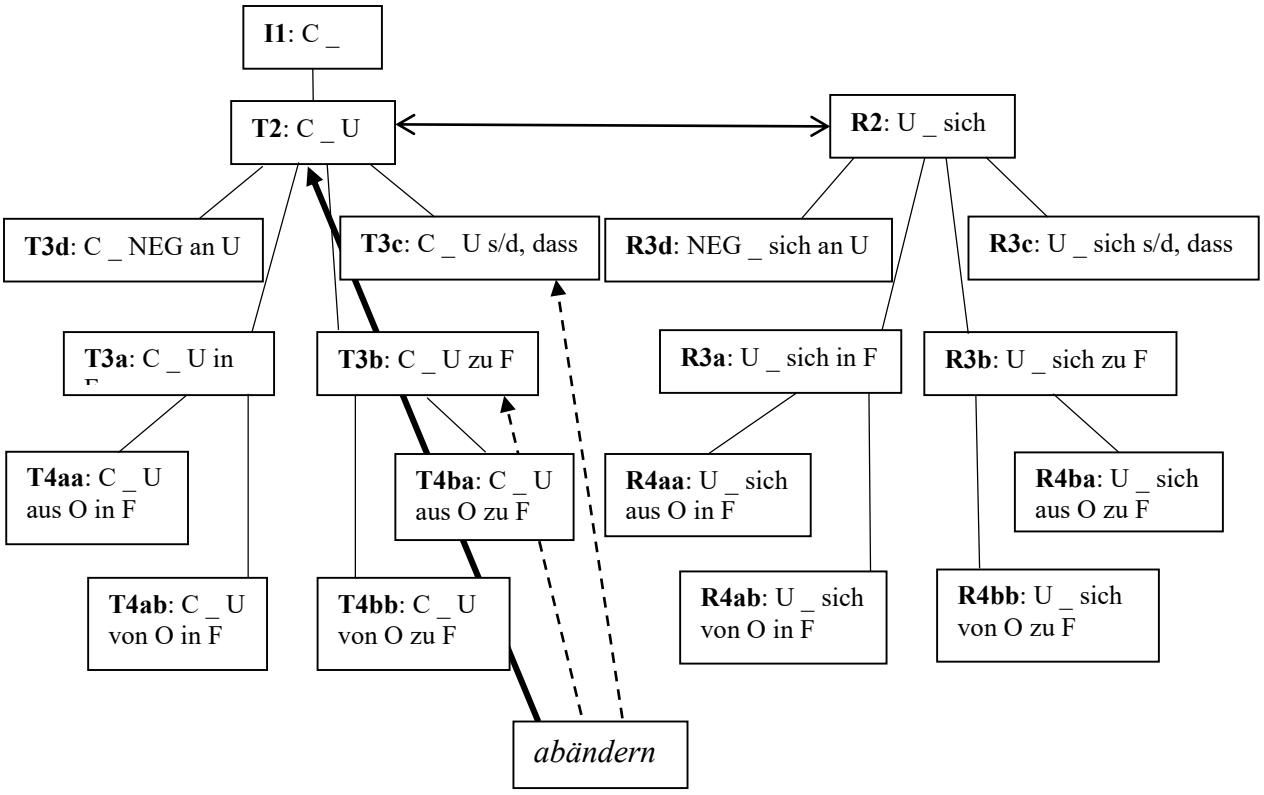

Figure E.4: Valency distribution of *abändern*

Ändern

The FBVE for *ändern* is provided in Table E.5.

Verb	*Ändern*
Frame	CHANGE
Sub-class	none
Meaning	-Refers to subtle, non-categorical changes
Valency	Appears in: T2 (43%), R2 (35%), T3d (14%), R3d (6%), T4ab (1%), R3c (1%) → Almost exclusively (> 90%) in VCs without prepositional F → Only German Change verb to appear in [NEG an U] VCs
Other	n/a

Table E.5: Frame-based verb entry for *ändern*

Again, the second row specifies that *ändern* is associated with the semantics and constructional range of the (German) Change valency frame, defined in the previous sub-section. The next row

---

Dashed = 5-20%
Dot-dashed = less than 5%

states that *ändern* is not associated with a sub-class. The third line specifies the "minor change" meaning component identified for *ändern*. The syntax portion of the entry specifies its exact valency distribution in the corpus and summarizes this, noting that it is almost always occurs in VCs without prepositional state arguments and that it is the only verb in the class to appear in the [NEG an U] VCs described in Section 6.2 above. No other notable behavior is needed in the FBVE for *ändern*. Again, the precise valency distribution of *ändern* is given in Table E.6 and Figure E.5.

	ändern
I1: C V	
T2: C V U	43%
T3a: C V U in F	
T3b: C V U zu F	
T4aa: C V U aus O in F	
T4ab: C V U von O in F	1%
(T4ba: C V U aus O zu F)	
(T4bb: C V U von O zu F)	
T3c: C V U dahing/so…	
T3d: C V Uneg an U	14%

	ändern
R2: U V sich	35%
R3a: U V sich in F	
R3b: U V sich zu F	
R4aa: U V sich aus O in F	
R4ab: U V sich von O in F	
(R4ba: U V sich aus O zu F)	
R4bb: U V sich von O zu F	
R3c: U V sich dahing/so,...	1%
R3d: Uneg V sich an U	6%

Table E.6: Valency distribution of *ändern*

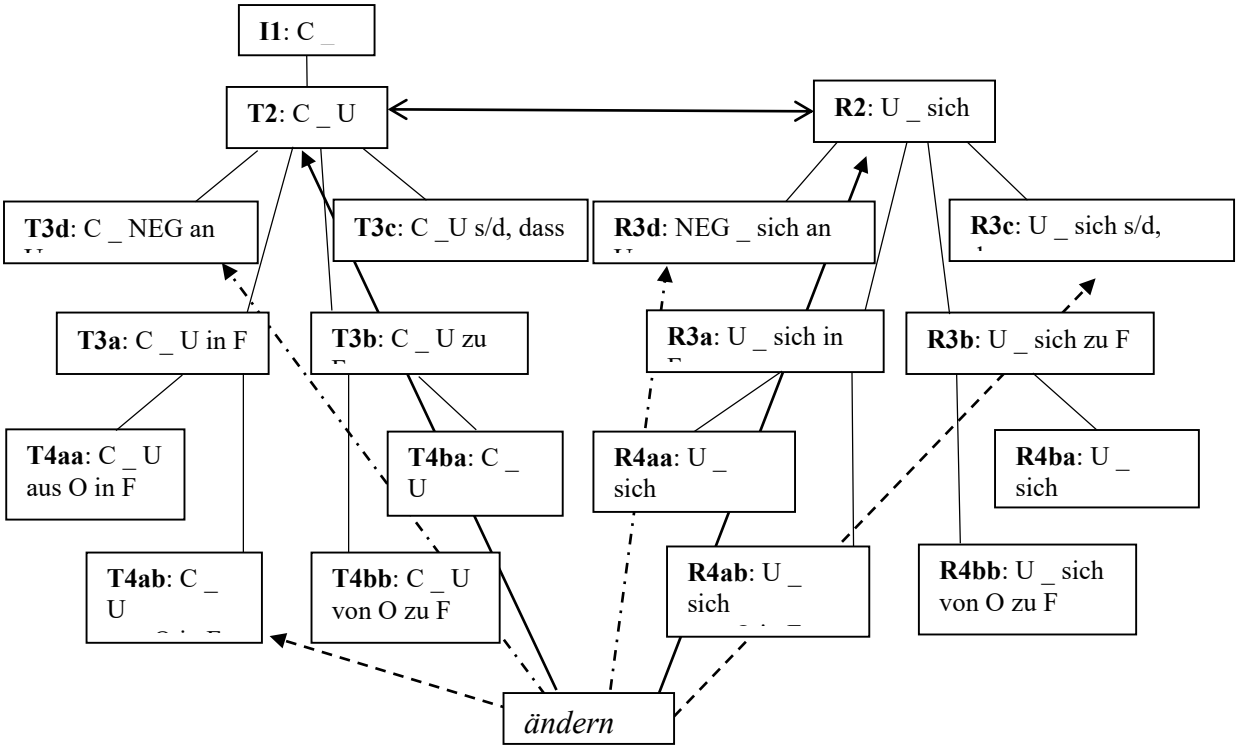

Figure E.5: Valency distribution of *ändern*

Verändern

Table E.7 shows the FBVE for *verändern*.

Verb	*Verändern*
Frame	CHANGE
Sub-class	none
Meaning	-Refers to subtle, non-categorical changes
Valency	Appears in: T2 (53%), R2 (45%), R3c (1%) → Exclusively (100%) in VCs without prepositional F (T3a-b, T4aa-bb)
Other	n/a

Table E.7: Frame-based verb entry for *verändern*

Again, the second and third rows specify that *verändern* is a member of the Change valency frame and is not associated with a sub-class. The meaning portion states that *verändern* refers to minor rather than categorical changes, and the valency portion specifies the verbs valency distribution and notes that it does not appear in VCs with prepositional state arguments. The "other" portion does not include any additional information. The valency distribution of *verändern* is provided in Table E.8 and Figure E.6.

	verändern
I1: C V	
T2: C V U	53%
T3a: C V U in F	
T3b: C V U zu F	
T4aa: C V U aus O in F	
T4ab: C V U von O in F	
(T4ba: C V U aus O zu F)	
(T4bb: C V U von O zu F)	
T3c: C V U dahing/so…	
T3d: C V Uneg an U	

	verändern
R2: U V sich	45%
R3a: U V sich in F	
R3b: U V sich zu F	
R4aa: U V sich aus O in F	
R4ab: U V sich von O in F	
(R4ba: U V sich aus O zu F)	
R4bb: U V sich von O zu F	
R3c: U V sich dahing/so,...	1%
R3d: Uneg V sich an U	

Table E.8: Valency distribution of *verändern*

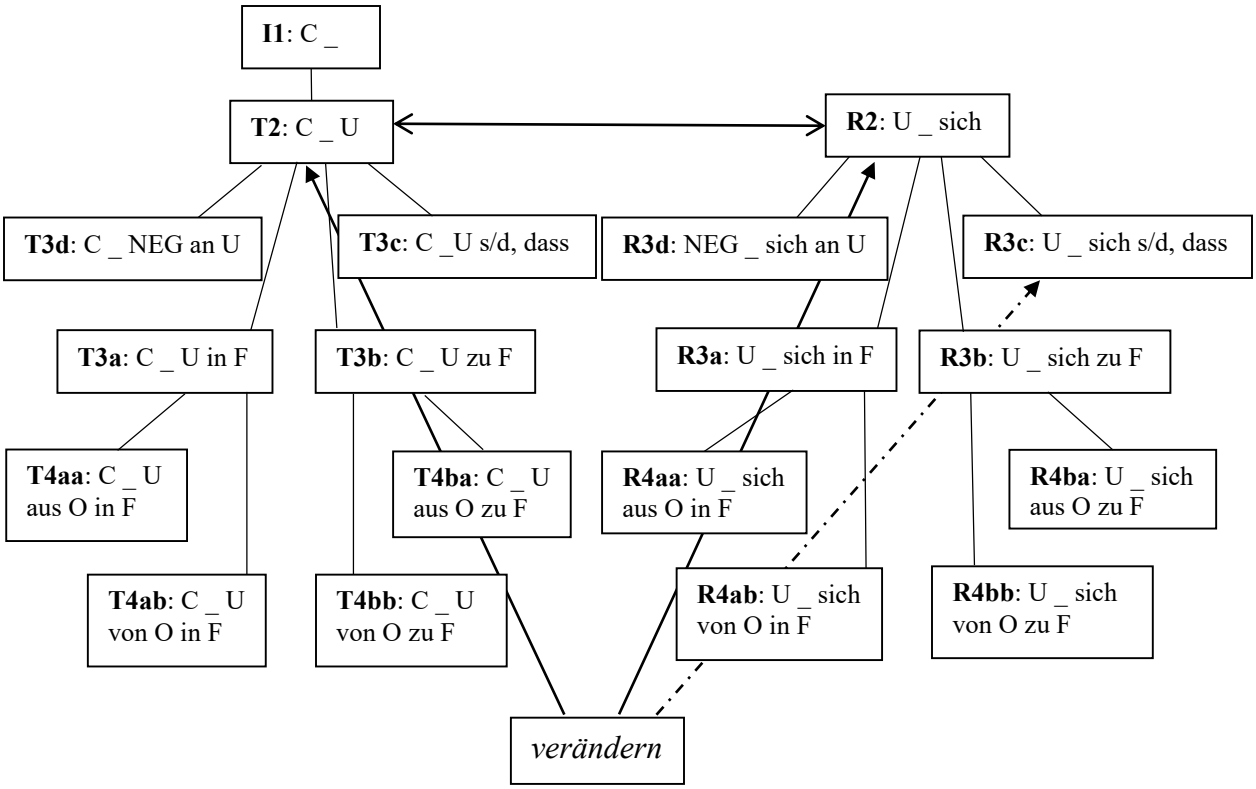

Figure E.6: Valency distribution of *verändern*

Verwandeln

Table E.9 shows the FBVE for *verwandeln*

Verb	*Verwandeln*
Frame	CHANGE
Sub-class	none
Meaning	-Refers to drastic changes
Valency	Appears in: R3a (41%), T3a (32%), T2 (9%), R2 (9%), T3b (3%), R3b (2%), I1 (2%), T4aa (1%), R4aa (1%), R4ab (1%) → More frequent (80%) in VCs with prepositional F than in those without → Strong preference to realize F using *in* PP rather than *zu* PP
Other	n/a

Table E.9: Frame-based verb entry for *verwandeln*

The top rows of the FBVE are identical to those for the preceding verbs. The "Meaning" portion states that *verwandeln* refers to drastic changes. The "Valency" portion lists the verb's valency

distribution and summarizes this, saying that *verwandeln* is frequent in VCs with prepositional state arguments and that it prefers to realize the Final_state argument in an *in* PP. No other information is included. The valency distribution of *verwandeln* is given in Table E.10 and Figure E.7.

	verwandeln
I1: C V	2%
T2: C V U	9%
T3a: C V U in F	32%
T3b: C V U zu F	3%
T4aa: C V U aus O in F	1%
T4ab: C V U von O in F	
(T4ba: C V U aus O zu F)	
(T4bb: C V U von O zu F)	
T3c: C V U dahing/so…	
T3d: C V Uneg an U	

	verwandeln
R2: U V sich	9%
R3a: U V sich in F	41%
R3b: U V sich zu F	3%
R4aa: U V sich aus O in F	1%
R4ab: U V sich von O in F	1%
(R4ba: U V sich aus O zu F)	
R4bb: U V sich von O zu F	
R3c: U V sich dahing/so,...	
R3d: Uneg V sich an U	

Table E.10: Valency distribution of *verwandeln*

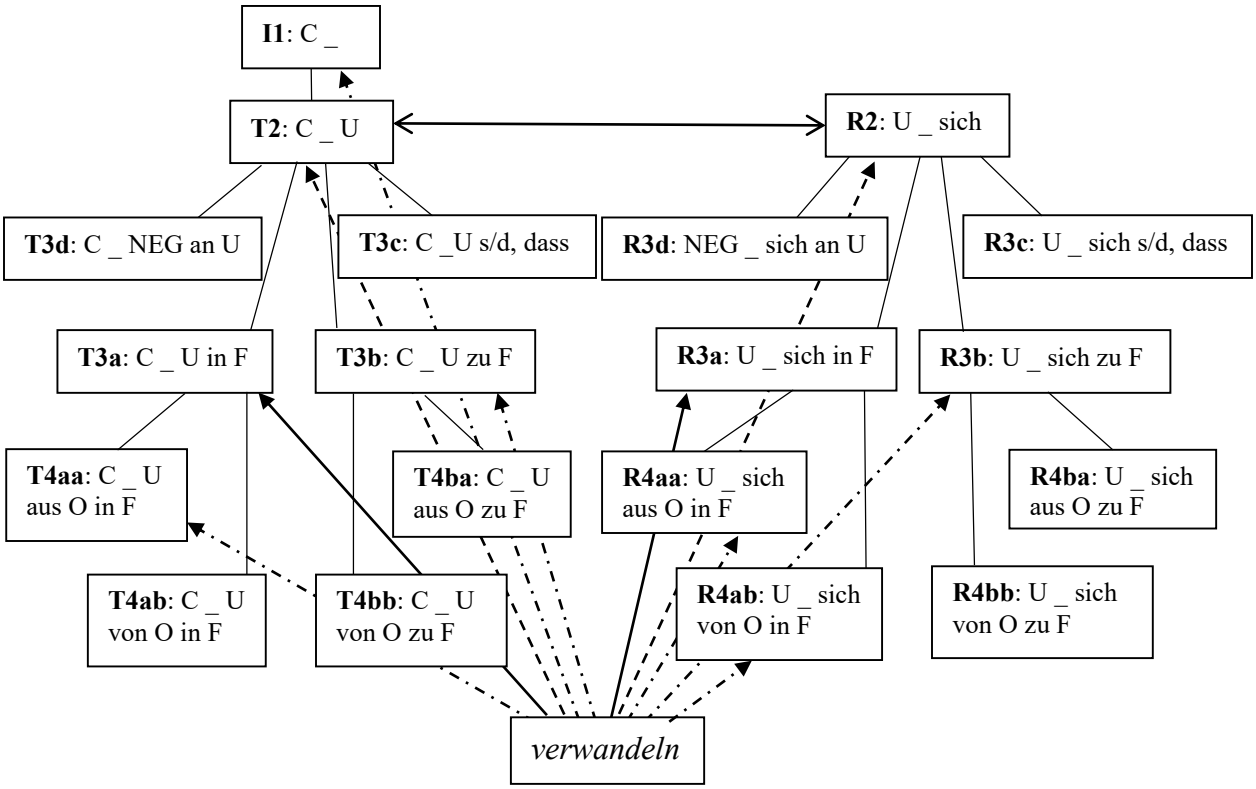

Figure E.7: Valency distribution of *verwandeln*

Wandeln

Table E.11 shows the FBVE for *wandeln*.

Verb	*Wandeln*
Frame	CHANGE
Sub-class	none
Meaning	-Refers to drastic changes
Valency	Appears in: R2 (66%), R3b (13%), R4bb (8%), T2 (7%), T3b (2%), R3a (2%), R3c (1%), R4aa (1%) → Almost exclusively (> 90%) in reflexive VCs → More frequent (75%) in VCs with prepositional F than in those without → Preference to realize F using *zu* PP rather than *in* PP → Relatively frequent (9%) among Change verbs in VCs realizing O arguments
Other	n/a

Table E.11: Frame-based verb entry for *wandeln*

The first three sections of the FBVE are identical to that for *verwandeln*, specifying that *wandeln* is a Change verb, is not associated with a sub-class, and refers to drastic changes. The valency section summarizes the exact valency distribution by stating that *wandeln* is almost exclusively used in reflexive patterns, that it is more frequent without a prepositional F than with one, that the preposition for F is normally *zu*, and that it is relatively frequent with O arguments than other German Change verbs. The "other" category contains no additional information. Again, the exact valency distribution of *wandeln* is provided in Table E.12 and Figure E.8.

	wandeln
I1: C V	
T2: C V U	7%
T3a: C V U in F	
T3b: C V U zu F	2%
T4aa: C V U aus O in F	
T4ab: C V U von O in F	
(T4ba: C V U aus O zu F)	
(T4bb: C V U von O zu F)	
T3c: C V U dahing/so…	
T3d: C V Uneg an U	

	wandeln
	66%
R2: U V sich	2%
R3a: U V sich in F	13%
R3b: U V sich zu F	1%
R4aa: U V sich aus O in F	
R4ab: U V sich von O in F	
(R4ba: U V sich aus O zu F)	8%
R4bb: U V sich von O zu F	1%
R3c: U V sich dahing/so,...	
R3d: Uneg V sich an U	

Table E.10: Valency distribution of *verwandeln*

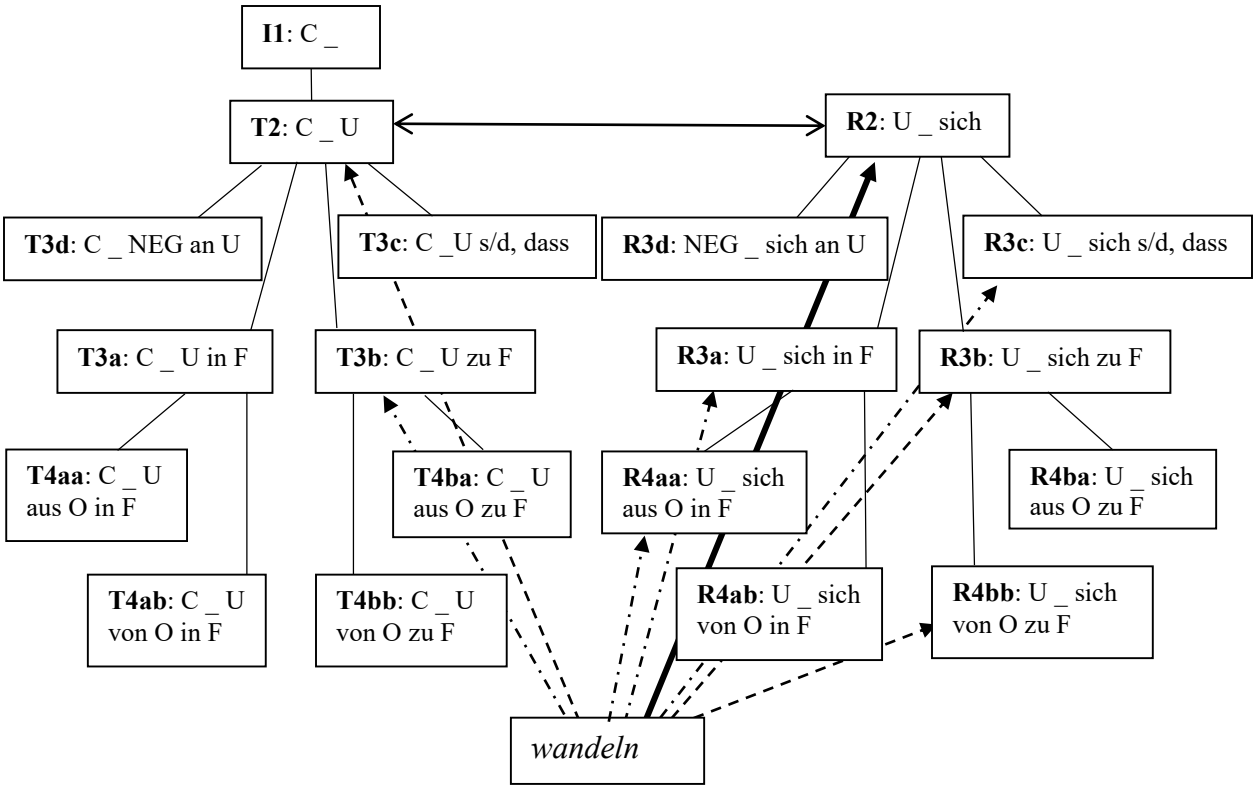

Figure E.8: Valency distribution of *wandeln*

For a detailed discussion of the advantages, implications, and applications of the valency frame and FBVE approach to verb classes and verbal lexical entries, see Sections 4.3 and 5.4.

Glossary

This document provides brief definitions of the main terms employed in the analyses, especially those of Chapters 5 through 7, and a summary of the abbreviations used in the text. Most of these terms are defined in more detail in Chapter 4 of the dissertation.

The terms are organized according into four categories, one each for terminology relating to specific words, to the (characterization of) verb classes, to the description of verbal semantics, to the syntactic (i.e. valency) analysis.

Words

Lexical unit (LU) – a word in one of its senses. If not specified otherwise, refers to verbal LUs in Sections 4-end

Verb – also used in the sense of LU: a verb in one of its senses

Lexeme – a word in all of its senses and forms

Argument – any phrase (including CPs) that occurs in a sentence with a verb. No distinction between required arguments (core FEs, Complements) and optional arguments (non-Core FEs, peripheral FEs, Adjuncts). Arguments can be characterized according to either their semantic role/FE (e.g. the Agent argument) or according to formal or functional properties (e.g. the prepositional argument). In some cases where it is necessary need to distinguish between arguments and adjuncts, I spell out the distinction explicitly (e.g. "argument of verb" vs. "adjunct not related to verb valency").

(Revised) Frame Element (FE): Verb-class-specific semantic roles (i.e. verbal arguments) that are characterized according to the semantic frame evoked by all verbs of a class. These correspond very closely to the Frame Elements of FrameNet. The present analysis, however, in some cases modifies the set of FEs posited in the FrameNet database, which are introduced as "revised FEs" but referred to simply as FEs or as arguments in the main analysis.

(Characterization of) Verb Classes

(Semantic) Frame – Frames as defined in FrameNet

(Verb) Class – A set of verbs that exhibit the same general/shared meaning and (typically) exhibit overlap in the valency constructions in which they appear. While I draw primarily on fine-grained classes similar to those in Levin (1993) and FrameNet (Ruppenhofer et al. 2010), verb classes can be formulated at finer- and coarser-grained levels of granularity.

Valency Frame– Formalization of the semantics and valency behavior of a verb class. The valency frame includes a list of the verbs in the verb class, a frame-semantic characterization of this class (including its participants and their semantic entailments), and the constructional range

of the class. The valency frame also includes this information for any (syntactic-semantic) sub-classes of verbs in the class.

(Syntactic-semantic) Sub-class – a sub-set of verbs in a given class which differ from other verbs in the class with respect to both (a) some shared meaning component(s) and (b) some shared aspect of valency behavior.

Constructional range – List of the full range of valency constructions that may appear with any one of the set of verbs that in a verb class.

Frame-based verb entry (FBVE) – detailed entry of verb, which associates the verb with its Valency Frame and, where relevant, its sub-class, as well as any syntactic, semantic, or pragmatic properties that set the verb apart from other verbs in its class or sub-class.

Semantics

General/shared meaning – general meaning associated with a group of semantically related verbs. Within Frame Semantics, this refers to the "semantic frame" evoked by all the verbs, as formalized the Frame Definitions in FrameNet. As such, I use general meaning, shared meaning, and frame semantics/semantic frame interchangeably.

(Additional) meaning component - aspects of meaning that differentiate verbs (or a verb) within a class from other verbs in the class.

(Verb) Descriptivity: A verb's level of descriptivity (~semantic weight) refers to the number of meaning components it is associated with. Low-descriptivity verbs include *change* (for Change verbs) and *steal* (for Theft verbs) and are associated with no obvious meaning components apart from the general/shared meaning. Verbs are high-descriptivity if they are associated with several meaning components. Level of descriptivity is a continuum, and verbs can be seen as having a higher or lower level of descriptivity. (See Snell-Hornby 1983, Boas 2008, Dux 2011.)

Syntax/Valency

Syntactic configuration – purely formal description involving phrase types and ordering (English) or case (German), e.g. NP V NP NP ; NP V ; NP V NP intoPP)

(Argument structure) construction (ASC) – combination of syntactic configuration (e.g. NP V NP intoPP) with an abstract meaning, independent of individual verb or verb class.

Valency construction (VC) – Verb-specific and verb-class-specific argument structure construction. Valency constructions refer to a mapping of the set of Frame Elements occurring in a sentence with their formal phrase type and syntactic grammatical functions. This term corresponds to that of Herbst (2014), and corresponds closely to "verb-class-specific construction" in Croft (2003) and "Frame Element Configuration" in FrameNet.

Valency distribution – A list of the set of VCs with which verb occurs (within a given data set), as well as its frequency in each of these VC.

Valency behavior – A more general characterization of a verb's valency distribution, stating which types of VCs a verb is most likely to appear in and which VCs it is (or appears to be) infelicitous in.

ABBREVIATIONS

Abbreviations of theoretical concepts

VC – Valency construction

GRMC – Grammatically relevant meaning component

LU – Lexical Unit

FE – Frame Element

SR – Semantic role (Section 2.3 only)

MC – Meaning component (Chapter 7 only)

Abbreviations of scholarly works and/or lexical resources

FN - FrameNet

VDE – Valency Dictionary of English

COCA – Corpus of Contemporary American English

LRH – Levin and Rappaport Hovav (2005)

AH – American Heritage

MW – Merriam-Webster

CT – Collins Times

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