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The Effects of Interactivity on Learning:
Implications for Stereotype Change

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The Effects of Interactivity on Learning:

Implications for Stereotype Change

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Dedication

I dedicate this dissertation to my mom and my late dad. With their love and support, I have been able to accomplish more than I could have imagined for myself. Mom, thank you for always having high expectations for me. Dad, I know you were there with me through good times and touch times. Thank you both for being my parents.

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The Effects of Interactivity on Learning:
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With explosive growth of computers and communication technologies, so called new media or interactive media have become ubiquitous in consumers' daily lives. As the use of interactive media is frequently found to be linked with favorable outcomes of interest in many fields, including Advertising, Marketing, Education, and Public Health, interactivity, the theoretical construct that accounts for the effectiveness of interactive media, has stimulated a great deal of discussions among researchers and resulted in a voluminous body of the literature on interactivity. However, the complexity of interactivity has led to a number of different theoretical and operational definitions of the construct, while the findings of research were often inconsistent or sometime conflicting, and applicable in a relatively narrow context.

Responding to these issues, this dissertation sought to provide a comprehensive view of interactivity with a review of interdisciplinary literature and to find theoretical links in research on interactivity between disciplines. The dissertation was particularly interested in the relationships between interactivity and learning. By revealing

similarities between a communication perspective on interactivity and a constructivist model of leaning, it developed a theoretical model that hypothesized positive effects of interactivity on a deep level of learning. The theoretical model was then applied on the topic of stereotyped social groups, namely, people with schizophrenia and homeless people, while the effects of interactivity on attitudes and behavior intentions related to these groups were examined.

The tests of hypotheses and research questions showed that interactivity did not have significant effects on deep learning, whereas it played a significant moderating role in influencing attitudes and behavior intentions related to the stereotyped groups. The dissertation provided explanations for the observed findings and suggested areas for future research. It concluded with theoretical, methodological, and practical implications of the findings.

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Chapter I. Introduction

With explosive growth of computer and communication technologies, so called new media or interactive media have become ubiquitous in consumers' daily lives. While the World Wide Web (the Web) is perhaps the most popular interactive medium, the examples of other interactive media include CD-ROM, interactive TV, interactive kiosk, videodisc, and media facilitating teleconferencing and videoconferencing. Highly interactive communication afforded by the new media have altered virtually all aspects of society, while offering novel alternatives to persuasion and learning that were not feasible through traditional communication channels.

Acknowledging the potential of interactive media, there have been many rigorous attempts to make use of interactive media for improved outcomes of interest. For instance, in Advertising and Marketing, interactive media provided venues for interactive advertising and interactive marketing communications, which were considered to be an effective approach to enhancing consumer satisfaction and commercial profits (e.g., Alba et al. 1997; Cowles and Crosby 1990; Deighton 1996; Haeckel 1998; Hoffman and Novak 1996). In Education, interactive media with multimodal capability were used as a learning tool that encouraged active learner participation and allowed for distance learning (e.g., Beal 2002; Boisvert 2000; Bork 2000; Bowes 2001; Fabry 1998; Lee 2001; Sorg 2000). In Public Health, interactive media were incorporated as part of intervention and campaign strategies to improve both specific illness-related behaviors as well as overall quality of life (e.g., Burgoon et al. 2002b; Lieberman 2001; see also Street, Gold and Manning 1997, for examples of interactive media applications for health promotion).

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While the results of use of interactive media were generally found to be positive, at the core of interactive media's effectiveness laid the concept of interactivity. There is increasing recognition of the need to focus research attention on the theoretical concept of interactivity that underlies the effects of interactive media rather than individual interactive media *per se* (Leckenby and Li 2000). The trend toward studying interactivity as a theoretical construct stems from the efforts to understand the most distinguishing characteristic commonly present in interactive media and to provide parsimonious explanations on the effects of interactive media. The trend is also in line with the view that interactivity is a property of communication rather than of media or technology (McLoughlin and Oliver 1995; Rafaeli 1988; Rafaeli and Sudweeks 1997; Rogers 1986). This view holds that interactivity is not an invariant characteristic of media, but its level varies within a medium. According to this view, interactivity is not limited to certain new media such as the Internet and CD-ROM, but also "present in the operation of traditional media" (Rafaeli 1988, p. 110).

Interactivity was defined in a number of ways, each of which reflected a unique perspective of the discipline, within which it was defined, and applied to a relatively narrow context (Johnson 2002). Different definitions captured different aspects of the construct and were translated into different operationalizations, resulting in inconsistent or sometimes conflicting findings (Johnson 2002; Liu and Shrum 2002). Given the complexity of the construct, it is difficult and impractical to provide the definition of interactivity that is universally applicable to all contexts and disciplines. While acknowledging the potential risk of adding another incomprehensive definition to numerous existing ones, this dissertation attempts to extend a few recent efforts that tried to clarify the conceptual definition of interactivity based on a comprehensive review (see Johnson 2002; Liu and Shrum 2002; McMillan and Hwang 2002) and to provide a

definition of interactivity that may close some gaps found in the current literature of interactivity.

An overarching goal of the dissertation is to provide an interdisciplinary perspective on the construct of interactivity and its relationship with other consumer variables. The dissertation, therefore, reviews relevant literature in Advertising, Marketing, Journalism, Psychology, Education and Public Health, and tries to find theoretical links between the disciplines. Especially, the dissertation is interested in the relationship between interactivity and learning. It aims to reveal similarities between conceptualizations of interactivity and perspectives on learning in the interdisciplinary literature and to develop a theoretical model to test the relationship between interactivity and learning. The theoretical model is then applied to a topic associated with the public's common stereotypes (e.g., schizophrenia). By doing so, the dissertation seeks to test the theoretical model to examine the effects of interactivity on learning in general and learning of stereotype-relevant information in particular.

Current research on interactivity tends to be based on correlational data and existing content (e.g., existing Web site). Although such research has advantage on external validity and the ability to make implications in a specific context, the uncontrolled study environment makes it difficult to tease apart a causal link of interactivity. By conducting an experiment, in which interactivity is manipulated and extraneous factors are controlled, the dissertation seeks to add empirical evidence to the limited body of research on the causal effects of interactivity.

The dissertation is organized into eight chapters. Chapter I has been a general introduction with goals of the dissertation. Chapter II reviews relevant literature on interactivity. It describes common approaches to conceptualizing interactivity in the interdisciplinary literature, followed by a review on elements and dimensions of

interactivity. Based on the review, Chapter II discusses the perspective on interactivity adopted in the present research and dimensions of interactivity under study. Chapter III provides definitions of key dependent variables with a review of literature that lays foundations for developing hypotheses and research questions. Subsequent to the literature review on each dependent variable, hypotheses respective of each dependent variable are generated and research questions are developed. Chapter IV gives an overview of the research design as well as a stereotype topic on which hypotheses are tested. Chapters V, VI, and VII discuss the methods and results of the pretest, pilot study, and main experiment, respectively. Finally, Chapter VIII gives a general conclusion, including implications and contributions of the dissertation.

Chapter II. Conceptualizing Interactivity

The purpose of this chapter is to introduce the perspective of the present research on interactivity. Interactivity is a fairly complex construct and often "means different things to different people in different contexts" (McMillan 2002a, p. 163). Therefore, it is important to clarify what interactivity means in given research.

A number of definitions of interactivity exist in the literature, each of which reflects the researcher's unique perspective of the construct in his or her discipline. While some researchers attempted to provide a comprehensive review of individual definitions of interactivity (see Johnson 2002; McMillan and Hwang 2002), this research focuses on identifying key common approaches taken in the current literature of interactivity in conceptualizing interactivity. Identification of common approaches helps revealing similarities between individual conceptualizations of interactivity that seem different due to use of different terminology and a lack of cross-reference. It also makes it manageable to address gaps between conceptualizations.

The review on interactivity in this chapter is based on the literature in social science including Advertising, Marketing, Communication, Journalism, and Education. Some similar approaches are found in the literature outside social science such as Engineering and Computer Science, when structural aspects of interactivity are studied (discussed later). However, the focus of Engineering and Computer Science research tends to be on operational software programs or modules, and hardware and infrastructure technologies that enable interactive communication. This focus is beyond the scope of this dissertation and excluded in the review.

The first section of this chapter explains three main perspectives on interactivity in the literature, followed by the perspective taken in this research and its advantages. The second section of the chapter lays out elements of interactivity that describe the nature and characteristics of interactivity conceptualized in the present research. The third section reviews dimensions of interactivity commonly discussed in the literature. The chapter concludes by identifying dimensions of interactivity that are critical for the adopted conceptualization of interactivity and thus to be further discussed in later chapters.

Three Approaches to Conceptualizing Interactivity

From the review of literature on interactivity, generally three main approaches to conceptualizing interactivity are identified: (1) interactivity as structural properties of interactive media, (2) interactivity as the user's perceptual and behavioral responses, and (3) interactivity as a communication process. The first two approaches are concerned with structural and experiential aspects of interactivity and represent two main traditions of early interactivity research. The third approach, although developed earlier than the first two approaches, is gaining increasing attention in recent research and considered to provide a relatively comprehensive view on the construct. In the following section, the first two approaches are discussed together and the third approach is discussed in more detail as it is adopted in the present research.

Structural & Experiential Aspects of Interactivity

Early research on interactivity tended to focus on either structural or experiential aspects of interactivity, although it wasn't until recently that they were termed as such. Burgoon and her colleagues were among the first to differentiate structural interactivity

and experiential interactivity (Burgoon et al. 2000; Burgoon et al. 1999-2000). However, a clear definition is provided by Liu and Shrum (2002). Structural interactivity was defined as "the hardwired opportunity of interactivity provided during an interaction, which often depends on the nature of a medium or a communication technology" and experiential interactivity as "the interactivity of the communication process as perceived by the communication parties" (Liu and Shrum 2002, p.55). Structural interactivity refers to structural properties, or affordances or constraints, of a given communication format (Burgoon et al. 1999-2000; Tremayne 2002). In this view, interactivity is a characteristic of media or communication technology (Tremayne 2002). Experiential interactivity, on the other hand, pertains to the user's perceptions and experiences of interactivity during interactions with interactive media.

Structural aspects of interactivity were the initial focus of many studies on interactivity (McMillan 2002a; Tremayne 2002). Interactivity was not a new concept, but rather had been treated as an assumed element in such areas as interpersonal communications, relationship marketing, and feedback learning. However, the advent of new interactive media, including the Internet, animated discussions of interactivity and brought many researchers' close attentions to the concept. As McMillan (2002a) states, "Interactivity is not unique to new media…. [But] it is in the context of new media that the concept of interactivity has become a widely recognized subject of exploration" (p. 163). Consequently, early studies on interactivity centered on interactive features of interactive media and examined interactivity in terms of structural properties. In this line of research are content analyses of Web sites (e.g., Bucy et al. 1999; Dholakia and Rego 1998; Ghose and Dou 1998; Ha and James 1998; McMillan 1999; Stout, Villegas and Kim 2001; Witherspoon 1999); human factors or human-computer interface research (see McMillan 2002a, for a review); and instructional media research dealing with hypertext

media, multimedia, or computer-based learning (e.g., Ayersman 1996; Boisvert 2000; Ellis 2001; Liaw and Huang 2002; Yazon, Mayer-Smith and Redfield 2002). Interactive features examined in these studies were sometimes categorized into meaningful groups based on their functionality (e.g., user participation) or specific strategies or goals they might be able to serve (e.g., customization, collaborative learning) (McMillan 2002a).

Researchers studying experiential aspects of interactivity, on the other hand, shifted the focus from features of media or technologies to the user. In one stream, researchers explained interactivity in terms of user characteristics, defining interactivity as an element of user behavior or personality characteristic (McMillan 2002a; Tremayne 2002). The user's visual versus verbal orientation for processing interactive advertising (e.g., Bezjian-Avery, Calder and Iacobucci 1998), readiness for interactive media (e.g., Liu 2003), and reasons for using interactive media based on the Uses and Gratifications theory (e.g., Eighmey 1997; Eighmey and McCord 1998; King 1998) are a few topics studied in this research stream.

In the other, more popular stream of research on experiential aspects of interactivity, researchers were interested in the user's perceptual (both affective and cognitive) and behavioral responses to structural properties of interactive media. They believed that users' perceptions were central to conceptualizing interactivity of new media and far more influential than technological features in users' interactions with the media (McMillan 2002a). Therefore, their research involved studies of the user's perceived interactivity of interactive media; the user's attitude toward the interactive media; and patterns of behavior during interactions with the interactive media (e.g., Chen and Wells 1999; Hwang and McMillan 2002; Kim 2001; McMillan 2000; McMillan 2002b; McMillan and Hwang 2002; Wu 1999). While some researchers studied the experiential aspects of interactivity as the primary outcome of interest, others suggested

that experiential interactivity had mediating influence on such outcomes as attitude toward the brand and purchase intentions (e.g., Marcias 2000; McMillan 2002b); and credibility and attractiveness of communication partners, decision quality, and accurate information exchange (e.g., Burgoon et al. 1999-2000; Yin 2002).

Undoubtedly, research with emphasis on either aspect of interactivity has relative advantages for investigating different types of outcome variables. As McMillan (2002b) suggests, "perception-based models" (i.e., research on experiential interactivity) are appropriate for studying perceptually based outcomes of interactivity, whereas "feature-based models" (i.e., research on structural interactivity) are relevant for investigating the structure and function of the media.

Interactivity as Communication Process

Recently, in search of an alternative conceptualization of interactivity that is applicable to a broad range of interactive communication settings, increasing attention has been paid to the view of interactivity as a communication process (e.g., Johnson 2002; McMillan 2000; Rafaeli and Sudweeks 1997; Stewart and Pavlou 2002; Tremayne 2002). In this view, interactivity is characterized by the continuous thread of communication episodes, which is "contributed by mutual participation of all relevant actors" (Johnson 2002, p. 59).

This conceptualization emphasizes the notion that the user is an active participant of communication process, during which he or she customizes the meaning and experience of communication. Each time the user provides an input, he or she receives a more tailored response. Since the user participates in creating the message and the response is dependent of the user's input, this view emphasizes the meaning rather than the message of communication (see Johnson 2002, for a review). The "message" implies

that there is rather a rigid relationship between the sender and the receiver. The message is created with the sender's goal of communication and sent by the sender to the receiver. The receiver may react to the message, but have only limited, if any, control on its form and content. During the interactive communication process, however, the meaning of communication is mutually constructed and evolves as the interaction between communication participants proceeds (Johnson 2002). As discussed in Chapter III, this mutually constructed meaning, or what Rogers (1986) called "convergence" (p. 199-201), of interactive communication can facilitate greater understanding of the communication content and satisfaction of the user's needs (Johnson 2002).

Researchers subscribing to the view of interactivity as a communication process dismiss the idea that interactivity is a characteristic of the media or technology (structuralist approach) (McLoughlin and Oliver 1995; Rafaeli 1988; Rafaeli and Sudweeks 1997; Rogers 1986; Stewart and Pavlou 2002). Instead, they argue that interactivity resides in the process of exchanges and interactions between two or more parties (Stewart and Pavlou 2002; Tremayne 2002). The level of interactivity is promoted or inhibited by certain communication structures and by the decision of communication participants who choose to interact (Stewart and Pavlou 2002). Rafaeli, who advanced the conceptualization of interactivity as a process-related construct, emphasized that interactivity was not an invariant property of the media (Rafaeli and Sudweeks 1997), but "present in the operation of traditional media" as well as new media in varying degrees (Rafaeli 1988, p.110). So called interactive media are "those that *afford* interactivity, although it doesn't necessarily occur" (Tremayne 2002, p. 19, italics added). For instance, the Internet affords a high level of interactivity, allowing for the user's active participation and interactions in retrieving and modifying the information on the medium. However, its level of interactivity is comparable to that of traditional media

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such as newspaper if the main communication activity is to view linearly presented static information without any feedback (Johnson 2002). In contrast, although traditional media may not afford a high level of interactivity, "letters to the editor, talk shows on radio, and television listener participation in programs and in programming are all characterized by interactivity" (Rafaeli 1988, p. 110). Therefore, the key difference between traditional media and new, interactive media is the *potential* for interactive media to be highly interactive (Johnson 2002). McMillan (2002a) documents in detail how varying levels of interactivity can be facilitated by both traditional media and new media.

A similar approach to the conceptualization of interactivity is found in other disciplines. For instance, in Public Health, interactive health communication (IHC) is differentiated from IHC applications and IHC technologies. Responding to vast interest in the impact of interactive media and technologies on consumer health, the Office of Disease Prevention and Health Promotion of the U.S. Department of Health and Human Services convened the Science Panel on Interactive Communication and Health (SciPICH) in 1995. Here, IHC was defined as "the interaction of an individual—consumer, patient, caregiver, or professional—with or through an electronic device or communication technology to access or transmit health information or to receive guidance and support on a health-related issue" (Robinson et al. 1998, p. 1264). This definition encompasses technology-mediated health communication and excludes direct communication such as face-to-face clinician-patient counseling (Eng et al. 1999; Robinson et al. 1998). The term IHC also puts emphasis on the content rather than on the technology that facilitates IHC (Eng et al. 1999). The SciPICH instead used "IHC applications" to refer to "the operational software programs or modules that interface with the end user," such as health information and support Web sites, stand-alone software (e.g., CD-ROM) for

clinical decision-support and risk assessment, and video games. IHC applications are different from IHC technologies such that IHC technologies are "the hardware and infrastructure technologies that run or disseminate IHC applications, such as networks, computers, telecommunications equipment and the like" (Eng et al. 1999, p. 10).

There are a few advantages to conceptualizing interactivity as a communication process and as a property of communication rather than of media or technology. First, interactivity conceptualized as a communication process comes closest to how people communicate in interactive communication settings. Communication researchers define communication in terms of process (see Dance 1967; Rafaeli 1988; Rogers 1986). The view that interactivity is a communication process or "a process-related construct about communication" (Rafaeli and Sudweeks 1997) follows that interactivity is a natural attribute of communication, especially face-to-face communication, which represents the most interactive mode of human communication (Rafaeli 1988; Zack 1993). In face-to-face communication or person-to-person dialogue, communication participants are involved in a series of interactions during which, they adapt their responses in relation to the other person's responses. This is precisely how the view of interactivity as a communication process defines the construct. Johnson (2002), who conceptualized interactivity as a communication process, compared mediated interactive communication (e.g., interactive Internet-based communication) and interpersonal communication. Her comparisons demonstrate how the two modes of communication resemble each other in many areas.

Second, conceptualizing interactivity as a communication construct allows one to apply and extend existing communication theories and models for studying user responses and behaviors in interactive communication settings. As discussed earlier, interactivity is not a new concept, but has been always present with varying degrees in

human communications.   The new increased attention to interactivity stems from technology development that enabled the high level of interactivity in mediated communication settings, simulating interactivity of interpersonal, face-to-face communication. As we witnessed from the advent of the last communication technology (e.g., television), fundamental human communication behaviors do not change, although some modifications are made to adapt to new communication technology. From this perspective, the view of interactivity as a communication construct and a property of communication (vs. technology) helps one use existing communication theories as a guide to discern both fundamental and evolving human communication behaviors in new communication environments. Research by Burgoon et al. (2002), Duncan and Moriarty (1998), Hoffman and Novak (1996), and Johnson (2002) exemplifies the efforts to explain user responses and behaviors in new interactive communication environments by using existing communication theories and their integration.

Third, by holding that interactivity is not an invariant characteristic of interactive media, but the level of interactivity varies *within* a medium, this conceptualization of interactivity allows one to explain interactivity that may occur in various media. In other words, it has wide applicability to a range of media, including traditional media (e.g., television, radio, print) and new media (e.g., the Internet), in which varying degrees of interactivity may occur.

Finally, when asserting that the level of interactivity varies within a medium, an assumption made in the approach is that the level of interactivity at a particular interaction in a communication process using a given medium is a function of interactive characteristics of the medium (e.g., the level of interactivity afforded by structural properties of media) and the user's level of participation at the interaction (i.e., user response). From the perspective of interactivity as a process, Stewart and Pavlou (2002)

held that the level of interactivity was promoted or inhibited by certain communication structures and by the decision of communication participants who choose to interact. Therefore, this approach provides a relatively comprehensive and flexible view on interactivity with its acknowledgement of the other two approaches, namely, interactivity as structural properties of interactive media and interactivity as the user's perceptual and behavioral responses.

Considering the above advantages, the present research adopts the view of interactivity as a communication process. Interactivity is conceptualized as *an iterative, cumulative and evolving communication process, in which the user actively participates in progressively customizing the meaning and experience of communication.*

Elements of Interactivity

Based on the conceptualization of interactivity as a communication process, five key elements of interactivity are identified here: (1) interaction, (2) feedback, (3) synchronicity, (4) variability, and (5) emergent progression. Some of these elements were considered as characteristics, antecedents, or dimensions of interactivity by other researchers (see Figure 1). The present research views them as elements of interactivity because they describe characteristics of interactivity, which are presumably present in all dimensions of interactivity with varying degrees. Deconstructing interactivity into elements helps further understand the complex nature of interactivity.

Interaction

Interaction is the very foundation of interactivity and a primary constituent of interactivity (Johnson 2002; Piccoli, Ahmad and Ives 2001). For this reason, interactivity is often defined in terms of interaction (see Cho and Leckenby 1999; Haeckel 1998;

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Hoffman and Novak 1996; Hsu 1996; Lee 2001; Najjar 1996), while both terms are sometimes used interchangeably (see Zack 1993). Similar concepts used by other researchers include two-way communication, bidrectionality, direction of communication, information flow, turn-taking, and feedback (e.g., Alba et al. 1997; Anderson 1996; Downes and McMillan 2000; Fiske 1990; Johnson 2002; Liu and Shrum 2002; McMillan 2002a; McMillan and Hwang 2002; Rafaeli 1988; Tremayne and Dunwoody 2001; Zack 1993). Common in these concepts is reciprocal action or reciprocity.

Reciprocity is defined as "the extent to which communication is characterized by mutual action or participation" (Johnson 2002, p. 56). It implies "the back and forth exchanges or behaviors" and "actions and reactions" (Johnson 2002, p. 34). Johnson (2002), who defined interactivity as "behavior ("inter-activity") between two or more actors engaging in interaction, or a process of reciprocal action" (p. 28), considered reciprocity as a common denominator in "general definitions of interaction and more specific definitions of interactivity" (p. 35).

Other researchers agree that interaction or reciprocity (or other similar concepts) addresses a fundamental assumption of interactivity that communication flows back and forth among communication participants (Ha and James 1998; McMillan 2002a). Pavlik (1998) held, "Interactivity means two-way communication between source and receiver, or more broadly multidirectional communication between any number of sources and receivers" (p. 137). A similar view was echoed by Alba et al. (1997), who described "the quality of two-way communication" in the definition of interactivity (p. 38) and by Bezjian-Avery, Calder and Iacobucci (1998), who conceptualized interactive marketing as "the immediately iterative process" (p. 23). From interviews with experts in interactive communication from both industry and academe, Downes and McMillan

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(2000) found that the informants "assumed that interactive communication must be two-way" (p. 167), suggesting that interactivity presupposes reciprocity.

Three main types of interaction are identified in the literature: (1) user-user interaction, (2) user-message interaction, and (3) user-machine/technology interaction (e.g., Cho and Leckenby 1999; Haeckel 1998; Hoffman and Novak 1996; Liu and Shrum 2002; McMillan 2002a; Rice 1984). These three types of interaction sometimes guided categorizing of definitions of interactivity in the literature and foci of interactivity research (see Liu and Shrum 2002; McMillan 2002a).

Not all researchers would consider all three types of interaction as an element of interactivity, however. Scholars in interpersonal communication suggest that full interactivity, which is the most ideal form of interactivity, is found in face-to-face communication (user-user interaction) and that the degree of interactivity afforded in face-to-face communication may not be realized in other types of communication (e.g., mediated communications) (Rafaeli 1988). Other researchers argue that interaction with machine does not constitute true interactivity because "[h]uman-machine interaction simply involves the use of machines (e.g., computers) to engage in communication processes" and rather serves as a gateway to user-user interaction or user-message interaction (Cook 1994, in Cho and Leckenby 1999, p. 163).

However, the argument on which interaction(s) represents true interactivity or even the distinction of the types of interaction in itself is becoming less meaningful and sometimes impractical. First, from the view of interactivity as a communication process, interactivity is "a framework for a wide variety of communication arrangements" and thus "should apply to a wide range of communication settings: from the unmediated, face-to-face, and intimate to the relatively anonymous and mass mediated" (Rafaeli 1988, p. 111). In other words, interactivity should apply to all three types of interactions.

Second, communication technologies become highly sophisticated so that mediated communication can now simulate close to the level of interactivity achieved in face-to-face communication. Third, it is not always simple to distinguish the three types of interaction, especially human-machine interaction and human-message interaction in the mediated communication. The message the user interacts with may be sent by the system (i.e., machine) and it may be the system that facilitates user-message interaction. Thus, unless there is clearly a person responding to another person (user-user interaction), the user may be interacting with messages or the system via the message. McMillan's (2002a) conceptualization and examples of each of the three types of interaction serve as a useful guide to understand differences between the three interactions. For instance, she considered interaction with computer interface and input devices as part of user-machine interaction; and active interpretation, use, and creation of messages as examples of user-message interaction (McMillan 2002a).

Feedback

Another core element of interactivity is feedback. While feedback has a close connection to interaction, feedback emphasizes a perceptional and cognitive aspect of interactivity, whereas interaction concerns a behavioral aspect. Feedback takes into account the meaning of communication, as it represents a meaningful, relevant response to the previous message.

Feedback is a crucial element for the interactive communication process to be complete, and "without it, the sender has no way of knowing if the communication has been received and responded to" (Johnson 2002, p.12). Johnson (2002, p. 12) also referred to Duncan and Moriarty's (1998, p. 4) comment on its importance, "Feedback is

central to two-way communication; without it there is no dialogue." Conceptual explanations of feedback are provided by Fiske (1990) and reviewed by Johnson (2002).

Some researchers consider feedback or similar concepts such as two-way communication as interactivity itself or a dimension of interactivity (see Figure 1). However, a close examination of conceptual properties of feedback reveals the reactional nature of feedback. Fiske (1990), for instance, defines feedback as "the transmission of the receiver's reaction back to the sender" (p. 21). Fiske further explains that feedback is linear in nature although "[it] inserts a return loop from destination to source" (p. 22). Tremayne and Dunwoody (2001) echoed this view and said, "[Feedback] comes after the original message sent by the mass communicator" (p. 113). In other words, feedback is the receiver's reaction to the sender's initial message. Johnson (2002) argued, "Feedback is, by implication, the response of only the receiver" (p. 27). The role of the sender and the receiver is rather clearly defined and thus they are not equal participants in communication (Johnson 2002; Tremayne and Dunwoody 2001).

Due to its reactional nature, it is debatable as to whether feedback or other similar concepts (e.g., two-way communication) is interactivity itself or a dimension of interactivity from the interactivity-as-a-process perspective. Tremayne and Dunwoody (2001) suggested that feedback in the traditional sense does not adequately describe interactivity of computer mediated communication. Similarly, drawing on Rafaeli (1988)'s conceptualization of interactivity, McMillan (2002a) maintained that feedback is a concept close to reactivity, a stage before interactivity. The present research concurs with the above view and identifies feedback as an element of interactivity that characterizes (the lower level of) interactivity, rather than interactivity itself or a dimension of interactivity.

Synchronicity

Synchronicity, the third element of interactivity, refers to "the degree to which users' input into a communication and the response they receive from the communication are simultaneous (Liu and Shrum 2002, p. 55). It is also conceptualized as (response) speed, (response) time, immediacy of response or feedback, real-time interaction, and system responsiveness (Alba et al. 1997; Anderson 1996; Burgoon et al. 1999-2000; Hwang and McMillan 2002; Johnson 2002; Liu and Shrum 2002; McMillan 2002a; McMillan 2002b; McMillan and Hwang 2002; Steuer 1992), while it is operationalized as "the time elapsed between sending the input and receiving a response" (Liu and Shrum 2002, p. 55).

Steuer (1992), who was one of the first to include the concept in explaining interactivity, defined speed as "the rate at which input can be assimilated into the mediated environment" (p.85). He compared the degree of response speed across media and claimed that real-time interaction attempted by new media "represents the highest possible value for this variable" (p. 86). Alba et al. (1997), who identified response time as one of the two dimensions of interactivity, suggested that immediate response of face-to-face communication is the highest degree of response speed and can be achieved in electronic interactive communication.

Synchronicity is considered to be a significant contributor of perception of interactivity (Hwang and McMillan 2002; Liu and Shrum 2002; McMillan and Hwang 2002). McMillan and Hwang (2002) said, "The perception of [Web-based] interactivity is influenced by the speed at which messages can be delivered and at which persons can process messages" (p. 30). Creating the perception of synchronicity and thus the perception of interactivity is closely related to system responsiveness, namely system's ability to "respond to user action and request in a timely matter" (Liu and Shrum 2002, p.

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55; McMillan and Hwang 2002). In other words, system responsiveness is a necessary condition to obtain synchronous responses in mediated communication environments.

While some researchers consider synchronicity as a dimension of interactivity (see Figure 1), it is identified as an element of interactivity in this research. Interactivity does not always occur in synchronous communication, but that flexible timing is also a characteristic of interactive communication (Cairncross and Mannion 2001; Downes and McMillan 2000; Lee 2001; Liu 2002; Milley 2000; Piccoli, Ahmad and Ives 2001; Rimal and Flora 1997; Sorg 2000). Temporal flexibility of interactivity allows the user to "determine the circumstances and situational contexts within which the message will be processed" (Rimal and Flora 1997, p.27). It is believed to facilitate cognitive rehearsal and editability of communication messages (Burgoon et al. 1999-2000; Rimal and Flora 1997). Aforementioned Downes and McMillan (2000)'s study also found that the informants did not agree on the centrality of real-time interaction to interactivity. They concluded that importance of synchronicity was rather situational and that it might be more important to some types of interactive communication than others.

Based on the above arguments, and from the view of interactivity as a communication process, in which both synchronous and asynchronous interactions may occur, the present research considers synchronicity as an element that characterizes interactions that occur real-time within a process of interactive communication.

Variability

Variability, the fourth element of interactivity, has been given new emphasis recently, especially by communication scholars and other researchers who advocate the view of interactivity as a communication process (see Johnson 2002; Liu 2002; Rafaeli 1988; Rogers 1986; Stewart and Pavlou 2002; Yin 2002). These researchers believe that

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interactivity of a communication process can vary on a continuum from very low to very high regardless of the communication medium used (Rafaeli 1988; Rogers 1986). They oppose the idea that traditional media are non-interactive, whereas new media such as the Internet are interactive (Rafaeli 1988). They argue instead that communication activities can be little or very interactive in a given medium. Therefore, interactivity is considered to be a continuous variable rather than a dichotomous (present/absent) variable (Alba et al. 1997).

Emergent Progression

Interactivity as a communication process is also characterized by its evolving nature. Scholars with the view of interactivity as a process maintain that interactive communication is an iterative and cumulative process in which each communication activity builds on previous communication activities, "taking into account all that has transpired" during the communication process (Johnson 2002, p. 27; Rafaeli 1988). Ariely (2000) expressed a similar view in his discussion of consumers' dynamic information needs. He argued that consumers' information needs during the information acquisition process evolve as the currently acquired information changes the need for future information. In this process, which Ariely termed "dynamic heterogeneity," consumers employ "constructive preferences" and "contingent strategies" (p. 234). Information or the meaning of communication is then mutually constructed and emergent with each turn of communication activity. This emergent progression is the fifth element of interactivity. Due to this element, interactive communication represents more than the sum of discrete communication activities.

As discussed earlier, the above five elements of interactivity are sometimes considered as dimensions of interactivity or some other concepts to describe interactivity in the interactivity literature. They are defined as elements of interactivity in the present research, because they are basic characteristics of interactivity and thus presumably present in all dimensions of interactivity with varying degrees. In the following section, dimensions of interactivity frequently identified in the literature are reviewed and dimensions that are most pertinent to the conceptualization of interactivity as a process are discussed in detail.

Dimensions of Interactivity

Although researchers tended to conceptualize interactivity as a unidimensional construct in early research of interactivity, they soon realized the complexity of the construct and adopted a multidimensional approach (McMillan 2002a; McMillan 2002b; Rafaeli 1988). However, the complexity of the construct led to disagreements on the core set of interactivity dimensions, while the same dimensions were considered to be antecedents or consequences of interactivity by different researchers (see Johnson 2002; Liu 2002; Tremayne 2002). Figure 1 presents a summary of interactivity dimensions identified in the literature. It is by no means intended to be an exhaustive list of interactivity dimensions, but rather a list of dimensions frequently discussed and cited by interactivity researchers. It should be noted that some of these dimensions were conceptualized as interactivity itself by researchers who adopted an unidimensional approach (see Johnson 2002 and McMillan and Hwang 2002, for a review). The table includes only those that were identified with a multidimensional approach by the original author(s) and/or other authors citing the original author(s). This means that although the original author(s) did not necessarily identify them as dimensions *per se* and/or rather

discussed them as antecedents, characteristics, or consequences of interactivity, they were included in the Table if other authors, citing the original author(s), conceptualized them as dimensions. Excluded from the Table are those that were used to categorize interactive features or tools of the media. In other words, if interactivity dimensions were conceptually derived and applied to interactive features of the media such as the Web (e.g., Ha and James 1998), they were included in the Table. However, if interactive features of the media were first identified and then interactivity dimensions were used to group these features to create meaningful categories (e.g., Ghose and Dou 1998; Stout, Villegas and Kim 2001), they were excluded.

Figure 1. Dimensions of Interactivity

Authors	Dimensions	Original Authors' Conceptualization	Dependent Variables Examined[*]
Alba et al. (1997)	Response time Response contingency	Dimensions	NA
Anderson (1996)	Information flow Immediacy of feedback Type of perception Customizer of content Message availability	Dimensions	
Burgoon et al. (1999-2000)	Structural Properties Participation Mediation Contingency Information richness Geographic propinquity Synchronicity Identification Parallelism Anthropomorphism Experiential Properties Interactive involvement Mutuality Individuation	Properties	Influence Decision quality Accuracy (Mediators: Task attraction Credibility Utility)

[*] Dependent variables were not measured in some research because the research was a content-analysis or discussed interactivity conceptually, but did not examine it as an independent variable.

A_{ad}: Attitude toward the ad

A_{ws}: Attitude toward the Web site

A_{b}: Attitude toward the brand

Figure 1. Dimensions of Interactivity (continued)

Authors	Dimensions	Original Authors' Conceptualization	Dependent Variables Examined[*]
Downes and McMillan (2000)	Direction of comm. Flexible timing of comm. Sense of place Level of control Responsiveness Purpose of comm. (information exchange vs. persuasion)	Multi-faceted concept	NA
Ha and James (1998) Marcias (2000)	Playfulness Choice Connectedness Information collection Reciprocal comm.	Dimensions	Subjective & objective comprehension A_{ad} A_{ws} A_b (Marcias 2000)
Heeter (1989) McMillan (1999)	Complexity of choice available Efforts users must exert Responsiveness to the user Monitoring information use Ease of adding information Facilitation of interpersonal comm.	Dimensions	NA
McMillan (2002b) McMillan and Hwang (2002)	Direction of comm. User control Time	Elements	Perceived interactivity A_{ws} Relevance of site topic Behavior intentions

Figure 1. Dimensions of Interactivity (continued)

Authors	Dimensions	Original Authors' Conceptualization	Dependent Variables Examined[*]
Johnson (2002)	Reciprocal behavior Comm. among actors Unconstrained multi-way flow (exchange) of information Freedom to terminate, interrupt, repair, clarify or seek clarification	Requirements	Perceived interactivity Comprehension Situational involvement A_{ws} A_b
	High perceptual, cognitive, and behavioral activity Continuous & sustained Emergent, constructed information (cumulative)	Characteristics	
	Reciprocity Response speed Responsiveness Nonverbal cues	Dimensions	
	Control	Consequence	
Liu (2002)	Selectivity Ease of information access Monitor/information collection ability Mapping Internal interaction self-efficacy Ease of navigation Flexible timing	Antecedents	Site involvement Cognitive elaboration Focused attention Browsing time Learning Satisfaction A_b
	Response speed (synchronicity) Control/modifiability Reciprocity/interpersonal comm. (2-way comm.)	Dimensions	Purchase intentions

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Figure 1. Dimensions of Interactivity (continued)

Authors	Dimensions	Original Authors' Conceptualization	Dependent Variables Examined[*]
Piccoli, Ahmad and Ives (2001)	Time Place Space Technology Interaction Control	Dimensions of Virtual Learning Environment	Learning achievement Self-efficacy Satisfaction
Steuer (1992)	Speed Range (selectivity/choices available) Mapping (naturalness of system controls)	Factors	Telepresence
Street and Rimal (1997)	Responsiveness User control	Capabilities	NA
Wu (1999)	Navigability (navigation control) Responsiveness	Dimensions (Conceptualized interactivity as two-component construct)	Perceived interactivity A_{ws}

Figure 1. Dimensions of Interactivity (continued)

Authors	Dimensions	Original Authors' Conceptualization	Dependent Variables Examined*
Zack (1993) Yin (2002)	Simultaneous & continuous exchange of information Multiple, non-verbal cues Spontaneous, unpredictable, & emergent progression of remarks Ability to interrupt or preempt Mutuality Patterns of turn-taking & use of adjacency pairs	Characteristics	Comm. effectiveness: Appropriate comm. mode chosen; Accuracy, meaningfulness, effectiveness; Frequency of miscomm.; Coordination of group work (Zack 1993) Responsiveness Mutuality Satisfaction Trust Purchase intentions (Yin 2002)

A few commonly identified dimensions of interactivity emerge from a review of the literature, namely, (1) responsiveness, (2) user control, (3) multimodality, (4) reciprocity, and (5) synchronicity or speed of response. Among these, reciprocity and synchronicity were discussed earlier as elements of interactivity. In the following, the other three dimensions are explicated, followed by discussion on the pertinence of responsiveness and user control dimensions to the definition of interactivity as a communication process.

Responsiveness

Responsiveness, or response contingency, refers to "the degree to which the response by one party is a function of the response made by the other party" (Alba et al. 1997, p.38). Other similar concepts include contingency (Burgoon et al. 1999-2000), spontaneous and emergent progression of remarks and mutuality (Zack 1993), and type of perception (Anderson 1996).

Rafaeli (1988), who was the first to define interactivity in terms of responsiveness, held that responsiveness is the essence of interactivity as it distinguishes interactivity from reactivity and non-interactivity. He defined interactivity as "the extent that in a given series of communication exchanges, any third (or later) transmission (or message) is related to the degree to which previous exchanges referred to even earlier transmissions" (Rafaeli 1988, p. 111). The key concept in the definition is relatedness of response not only to the immediately preceding message, but also to all the messages exchanged previously during communication process. The emphasis of relatedness of responses in communication process was made clearer in his later definition of interactivity: "[Interactivity] is the extent to which messages in a sequence relate to each

other, and especially the extent to which later messages recount the relatedness of earlier messages" (Rafaeli and Sudweeks 1997).

Rafaeli (1988) argued that there is a distinction between interactivity (full interactivity), reactivity (quasi-interactivity), and non-interactivity based on the extent of responsiveness. Non-interactivity differs from interactivity and reactivity by its lack of role exchange between sender and receiver with each subsequent message. Not only the complete absence of interaction between communication participants, but also a lack of coherence in communication messages (i.e., a lack of responsiveness) characterizes non-interactivity. While both reactivity and interactivity are forms of two-way communication, reactivity differs from interactivity by "the nature of communication responses," namely, reactive vs. interactive response (Rafaeli 1988, p. 118). Both reactivity and interactivity are characterized by contingent responses to the previously sent message. However, reactive response is simply a reaction to the immediately preceding message, whereas interactivity acknowledges the content of all the responses that occurred previously. In other words, the content of response that is contingent on all of the previously exchanged messages is what distinguishes interactivity from reactivity.

Rafaeli (1988)'s responsiveness has received close attention from interactivity researchers, especially those who adopt the view of interactivity as a process construct (e.g., Deighton 1996; Ha and James 1998; Hoffman and Novak 1996; Johnson 2002; Morris and Ogan 1996; Street and Rimal 1997; Tremayne 2002). Heeter (1989), who was one of the first to take a multidimensional approach to conceptualizing interactivity, considered Rafaeli (1988)'s responsiveness as one of six key dimensions of interactivity (see Figure 1). Since Heeter's work, which provided a useful theoretical and operational framework for later interactivity research, responsiveness has been frequently identified as a primary dimension of interactivity by interactivity researchers (see McMillan 1999).

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Responsiveness also emerged as a main dimension of interactivity from interviews with experts in interactive communication from both industry and academe (Downes and McMillan 2000) as well as college students (Kim and Choi 2004). Participants in both studies indicated that capability of customizing messages, which results from responsive communications between communication participants, is "central to the notion of interactivity" (Downes and McMillan 2000, p. 171) and "what makes a Web site interactive" (Kim and Choi 2004). In Wu (1999)'s study of perceived interactivity of the Web site, perceived responsiveness of the Web site was highly correlated with perceived interactivity. The evidence from the above studies suggests that responsiveness not only represents the essential concept of interactivity theoretically, but also significantly contributes to perceptions of interactivity.

User Control

User control is perhaps the most commonly identified dimension of interactivity (see Figure 1) and considered as interactivity itself by some researchers (e.g., Cairncross and Mannion 2001; Eveland and Dunwoody 2001; McLoughlin and Oliver 1995; Piccoli, Ahmad and Ives 2001). According to McLoughlin and Oliver (1995), "The construct *control* means having power over events, strategies or circumstances, including the dimension of interpersonal control" (p. 396). In the context of interactive communication and marketing, user control has been explained in terms of complexity or range of choices available for users (Ha and James 1998; Heeter 1989; McMillan 1999; Steuer 1992), users' ability to interrupt, preempt, and terminate interaction as well as repair, clarify or seek clarification of meaning (Johnson 2002; Zack 1993), customizer or modifiability of the content and form (Anderson 1996; Steuer 1992), and message availability (Anderson 1996). In sum, user control is viewed as *the extent of discretion*

which the user can exert over the content, pace, and sequence of interactive communication environment.

Often education researchers, but also communication and marketing researchers (e.g., Ariely 2000), acknowledged the three aspects of user control in the conceptualization of the construct (i.e., control over the content, pace, and sequence) (see Figure 3). Content refers to the communication message or instructional material presented to the user; pace refers to the rate of presentation of the content and the time spent on processing the content; and sequence refers to the order of presentation of the content (Milheim and Martin 1991, reviewed in Piccoli, Ahmad and Ives 2001). Among the three aspects of user control, control over sequence tends to be studied and operationalized in user control research most frequently. For instance, Kritch, Bostow and Dedrick (1995) and Martens, Valcke and Portier (1997) manipulated interactive learning environment as control over order of instruction, whereas Ariely (2000) examined control of information flow as part of consumer information search behavior. In the Web environment, user control is interpreted as navigational control and freedom, and (non)linearity of Web site structure (Cairncross and Mannion 2001; Ha and James 1998; Hede 2002; Tremayne 2002; Wu 1999), which is essentially control over sequence.

User control is conceived as a continuum ranging from complete user (or learner) control to complete system (or instructor) control (McLoughlin and Oliver 1995; Milheim and Martin 1991). While interactivity affords users with a high level of control, the actual level of control accomplished is dependent of both the user and the system. On the one hand, the user may exert control to the extent that the system affords him or her with. As Eveland and Dunwoody (2001) said, "The level of control afforded the [user] is a direct function of the design of the Web site, with less structured sites providing more user control than sites with a clear structure, such as linear or hierarchically organized

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sites" (p. 55). Experts in interactive communication in Downes and McMillan (2000)'s study concurred with this view. They believed that although interactive communication shifted control towards the user, the amount of control was still skewed to the system, for the user comes to an interactive communication environment, of which parameters are set by the system.

On the other hand, it is up to the user to decide how much control he or she wants to exert in interactive communication. Liu and Shrum (2002) emphasized voluntary nature of user control and characterized user control with "voluntary and instrumental action that directly influences the [user's] experience" (p. 54). Although the system has control of the content of communication, the user can control the pace and sequence of presentation of the content to better accommodate his or her needs (Ayersman 1996). Although discussed from slightly different perspectives, Ha and James (1998)'s categorization of source-oriented interactivity versus audience-oriented interactivity shares a similar view of user control versus system control.

In sum, it appears that the user and the system have control over different aspects of interactive communication. While the amount of control may still need to move toward the user to obtain the equilibrium, the user has more control over the pace and sequence whereas the system has more control over the content in the most mediated interactive communication settings.

The interest in and the importance of the construct in interactive communication resulted in a number of empirical studies examining the effects of user control on various outcomes in Communication, Education and Marketing. However, what is the optimal level of user control is still debatable. Issues concerning the optimal level of user control are discussed in Chapter III.

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Figure 2. Selective Definitions of User Control

Author(s)	Definition
Ariely (2000)	"Interactive communication that gives consumers control over the content, order, and duration of product-relevant information causes information to have higher value and to become increasingly usable over time" (p. 245).
Ayersman (1996)	"[In hypermedia-based learning, the user] has control of the sequence and presentation of the information so that it suits his or her needs" (p. 501)
Cairncross and Mannion (2001)	Delivery control: "[Users] can control their own pace as they travel through an application, concentrating on material they are unfamiliar with or are particularly interested in and skipping over material they already know or which is irrelevant to their needs at that particular time" (p. 159).
Eveland and Dunwoody (2001)	Learner control over the pace, order and content of instruction
Johnson (2002)	"Control…over what [customers] choose to see, the duration of their exposure to it, and the sequence in which different pieces of information will be viewed" (p. 21-22)
McLoughlin and Oliver (1995)	"Students will be able to regulate their own learning, thus exercising choice and discretion over the sequence, pace and amount of information they can process. It also means having the scope to choose appropriate strategies to manipulate the cognitive processing demands within a lesson" (p. 396)
Miller (1997)	Reviewed literature that discussed user control in terms of control over order, pacing and/or sequencing
Piccoli, Ahmad and Ives (2001)	"The degree of discretion that students can exert over the pace, sequence, and content of instruction in a learning environment" (p. 408). "Virtual Learning Environments (VLEs) allow for control over the pace and sequence of material, and the time and place of [students'] study during instruction" (p. 404).
Rivera-Perez (1997)	Learner-control interactivity: "Users' choices of the content being studied (what), the sequence in which the material is presented (when), and the pacing of presentation (for how long)" (p. 7)
Williams (1996)	"Instructional designs where learners make their own decisions regarding some aspects of the "path," "flow," or "events" of instruction" (p. 957)

Multimodality

Multimodality or "multimodal versatility" (Rimal and Flora 1997, p. 21) refers to "the extent to which the communication is characterized by nonverbal and paralinguistic cues, which, in general, complement the [verbal or textual] information content of the response" (Johnson 2002, p. 56). Examples of nonverbal cues are "postures, gestures, facial expressions, and movements", whereas paralinguistic cues include "voice quality, tone of voice, pace of speech, inflexions, pitch, loudness, etc.," in verbal language and "punctuation, typefaces, underlining, layout, size, bolding, highlighting, etc. in written language" (Johnson 2002, p. 45). In the mediated communication, multimodality refers to multimedia or hypermedia, namely, media that afford multiple channels including text, pictures, graphics, animation, sound, and video to present information (Ellis 2001; Gillham and Buckner 1997; Konradt and Sulz 2001; Najjar 1996; Northrup 1995; Tolhurst 1995).

As interactive media such as the Web are characterized with their capability of delivering information with multiple channels, multimodality or multimedia has been used synonymously with interactivity or interactive media (see Leblanc et al. 2001; Marcias 2000; Najjar 1996). However, the conceptual relationship between multimodality and interactivity is not entirely apparent in the literature. Burgoon and her colleagues, for instance, identified media richness, information richness, and anthropomorphism as properties of interactivity (Burgoon et al. 2000; Burgoon et al. 1999-2000). They defined media and information richness as "whether the format utilizes one or more modalities such as text, audio, visual, or touch and the extent to which it supports symbol variety to present "rich" or "poor" social information"; and anthropomorphism as "the degree to which the interface simulates or incorporates humanlike characteristics" (Burgoon et al. 1999-2000, p. 36). Steuer (1992) and Coyle

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and Thorson (2001), on the other hand, believed that vividness and interactivity are two determinants of telepresence. Vividness is a similar concept to multimodality and richness of media or information as it is "the representational richness of a mediated environment as defined by its formal features: that is, the way in which an environment presents information to the senses" (Steuer 1992, p. 81). Telepresence refers to "the experience of presence in an environment by means of a communication medium" (Steuer 1992, p. 76). Telepresence and anthropomorphism are similar concepts in that they are concerned with simulating real life communication experience in a mediated environment. Difference between the above researchers' perspective is that Burgoon et al. considered multimodality (i.e., media and information richness) and simulated communication experience (i.e., anthropomorphism) as properties of interactivity, whereas Steuer and Coyle and Thorson held that multimodality (i.e., vividness) is an independent concept from interactivity, both of which contribute to creating simulated communication experience (i.e., telepresence).

While the above difference between two perspectives is yet to be resolved, multimodality does not represent interactivity conceptualized as a communication process. Steuer (1992) said, "Vividness is stimulus driven, depending entirely upon technical characteristics of a medium" (p. 81). Johnson (2002) pointed out that multimodality, in terms of media richness or information richness, is an "invariant property of the medium itself" (p. 84). Even in unmediated, face-to-face communication, multimodality is likely to be characteristics of communication participants (see gestures, facial expressions, voice quality), rather than a communication process. Following the above arguments, consideration of multimodality as an interactivity dimension goes directly against the view of interactivity as a communication process, which holds that interactivity is not a property of media or technology. Therefore, multimodality is not

further discussed as a pertinent dimension of interactivity in the present research. Instead, the present research focuses on responsiveness and user control dimensions and explains in the following why they are the most relevant dimensions of interactivity that is conceptualized as a communication process.

Focus on Responsiveness and User Control

As stated above, the view on interactivity taken in the present research determines interactivity dimensions investigated. Specifically, there are mainly three reasons to consider responsiveness and user control as the most pertinent dimensions.

First, responsiveness and user control dimensions reflect the interactivity-as-process view most well. As reviewed earlier, responsiveness is central to interactivity that is conceptualized as "a process-related construct about communication" (McMillan and Hwang 2002; Rafaeli and Sudweeks 1997, p. 3). It refers to relatedness of the third or later messages, interactions or feedback to all that was exchanged previously during communication process. Responsiveness distinguishes interactivity from reactivity in that reactivity is a response related to the immediately preceding message. Therefore, responsiveness assumes that there are more than two interactions or exchanges of message that recount to one another, which is, in other words, a process.

The emphasis on process is not made explicit in the literature on user control. However, researchers investigating user control over sequence assumes that the user is involved in a (communication or interaction) process (e.g., Ariely 2000; Cairncross and Mannion 2001; Hede 2002; Kritch, Bostow and Dedrick 1995; Martens, Valcke and Portier 1997; Tremayne 2002; Wu 1999).

In his research on user control over informational flow, Ariely (2000) discussed individual heterogeneity and dynamic heterogeneity, which benefit from information

control. Individual heterogeneity refers to "a stable overall difference in individuals' preferences for information presentation and processing," whereas dynamic heterogeneity means "the changing needs for information during the information acquisition process itself" (Ariely 2000, p. 234). Pertinent to the conceptualization of user control as a process construct is dynamic heterogeneity. The notion of dynamic heterogeneity is that the user's needs for information changes over the course of information acquisition process as currently acquired information changes the user's perceptions and mental model on a subject (e.g., product attributes) and thus changes the need for future information (Ariely 2000; Cairncross and Mannion 2001). The user thus controls subsequent information flow to satisfy dynamic heterogeneity which is contingent upon previous information presented. Ariely (2000) called this adaptation process of information acquisition as "constructive preferences" and "contingent strategies" (p. 234). From this perspective, the user control presupposes that the user is involved in an interaction or information exchange process.

Second, responsiveness and user control share similar conceptual properties and are indispensable to each other in both theoretical and operational definitions of interactivity. Responsiveness and user control (or at least some aspects of user control, such as user control over sequence that benefits dynamic heterogeneity) are conceptually similar in that both constructs draw on contingency and relevance of response in a communication or interaction process as discussed above. Responsiveness and user control are also conceptualized as properties of communication (versus properties of media) and thus vary on a continuum within medium (versus across media). The view on this issue by researchers studying responsiveness was discussed earlier. Researchers studying user control (see Ariely 2000) agree that the concept is not only limited to

electronic communication channels (e.g., the Web), but also applicable to traditional mass communication channels (e.g., print magazine).

Perhaps more importantly, due to the overlap in conceptual characteristics and interrelationships of the two constructs, it is meaningless to define interactivity in terms of either responsiveness or user control without the other. The key to responsiveness is relevance of feedback to the user's input. Without allowing the user to participate in and exert some control on a communication process, responsive communication is not feasible. Conversely, the user hardly has control if the response received is irrelevant to his or her choice. Therefore, the two constructs should be considered together to explain the most fundamental attributes of interactivity.

Third, responsiveness and user control are chosen for their potential of significant influence on learning, which is one of main outcomes of interest in this research. Researchers from an education perspective have been particularly keen to the effects of user control on learning, following the "structural isomorphism" argument. Applied in communication research by Eveland and Dunwoody (2001), structural isomorphism refers to the structural similarity of interactive communication, as organized by the user, to "the associative nature of human memory and information processing" (p.48). The central premise of the argument is that user control of interactive communication permits the user to manipulate the content, pace, and sequence of communication in a way that it "corresponds better with personal mental models and styles of learning, and therefore facilitate understanding" (Johnson 2002, p. 69; Aldrich, Rogers and Scaife 1998; Hsu 1996).

There is little research on the relationship between responsiveness and learning. However, there are theoretical reasons to suspect that responsiveness benefits learning. As explained earlier, responsiveness is the degree to which the response is perceived to

be relevant and appropriate in a progressive communication process. Responsiveness, by definition, takes into account all that has transpired during the communication process (Johnson 2002; Rafaeli 1988). Therefore, the more the user interacts with the other communication party, the more relevant and tailored response he or she receives and thus the greater understanding of the response he or she has. According to Johnson (2002), "The information the user obtains progressively becomes more appropriate and relevant, enabling greater understanding, and meeting the information needs of the user; it progressively becomes more meaningful" (p. 44). The relationship between responsiveness and user control dimensions and learning are discussed in greater detail in Chapter III.

This concludes the literature review on interactivity. The next chapter reviews literature on dependent variables and their relationship with interactivity, based on which hypotheses are formed.

Chapter III. Theory Development

Chapter II discussed the primary independent variable of this dissertation, namely, interactivity. In this chapter, the relationships of interactivity with other variables of interest are reviewed and from the review, hypotheses and research questions are developed.

The first section of the chapter explores the role of interactivity in learning. It reviews theories of learning and gives conceptual definitions of learning. Subsequently, it examines the evidence from the literature that suggests the significant impact of interactivity on learning. Following the review on learning, task involvement is introduced as a mediator of the relationship between interactivity and learning. Task involvement is conceptually defined and its relationships with interactivity and learning are explicated.

The second section of the chapter examines the potential role of interactivity in learning about a socially stereotyped group and changing attitudes and behavior intentions related to the stereotyped group. First, the literature on stereotypes from social cognitive perspective is reviewed. Second, based on this review as well as the review given in the first section of the chapter, (i.e., relationships of interactivity with learning and task involvement), the role of interactivity in learning and changing attitudes and behavior intentions in the context of social stereotypes is explored. The discussions in the second section of the chapter are followed by the generation of hypotheses and research questions to be examined in the present research. The chapter concludes with a summary of hypotheses and research questions.

Learning

Although it is a popular and familiar construct, theoretical and operational definitions of learning are not entirely clear in the literature. According to Ellis (2001), "There is little agreement concerning what constitutes learning and exactly how to measure its presence and extent" (p. 109). Tremayne (2002) concurs with this view, maintaining that the meaning of learning is "difficult to summarize and differs substantially depending on one's theoretical stance" (p. 30). To understand and define the construct of learning, therefore, it is necessary to understand learning theories and their perspectives on learning.

Learning Theories

A majority of learning models are largely guided by two competing theories, namely, objectivism (also called behaviorism) and constructivism (Leidner and Jarvenpaa 1995; Tremayne 2002). Objectivism, which was a dominant theory adopted in traditional models of learning, takes a behavioral approach based on Skinner's stimulus-response theory (Skinner 1974). The objectivist model posits that there is an objective, agreed-upon reality and that "the goal of learning is to understand this reality and modify behavior accordingly" (Leidner and Jarvenpaa 1995, pp. 266-267). The instructor is viewed as the expert and the source of objective knowledge, and therefore, the goal of teaching is a successful transfer of objective knowledge from the instructor to the learner. The instructor facilitates learning with consistent repetition of the material and positive scheduled reinforcement. Learning is assessed with the learner's recall of objective knowledge and evaluated by the extent of knowledge retained by the learner. In other words, learning is *the retention of objective knowledge transferred from the instructor to*

the learner. The objectivist model is considered most appropriate in factual or procedural-based learning (Leidner and Jarvenpaa 1995).

Although the objectivist model is still adopted in the lecture-oriented method of teaching, its instructor-centered approach and the emphasis on reproduction of knowledge, which relies on rote learning, were criticized by many modern education scholars and mostly gave way to alternate learning models (Leidner and Jarvenpaa 1995). Particularly, objectivism was directly challenged by constructivism. Taking a cognitive approach, constructivism denies the fundamental tenet of objectivism on external reality that is independent of the learner's mind (Leidner and Jarvenpaa 1995) and focuses on mental processes rather than observable behaviors. Constructivism holds that knowledge is created or constructed by the learner, rather than transmitted by the instructor. The learner is expected to discover his or her own reality of the world by themselves and at their own pace, and construct the meaning of reality through experience. Experiences earned from interacting with the world create schemas, or mental models. The schemas are then revised through a continuous process of assimilating new knowledge to old and modifying the old to accommodate the new. Learning is *a process of active discovery and meaning construction*. In this learner-centered approach, the instructor is viewed as facilitator or moderator of the learning process, who provides necessary resources and guidance for the learner. Learning is not assessed with an objective standard created by the instructor, but monitored by the learner himself or herself. Due to the self-monitoring method and the individualistic view of learning, critics of constructivism argue that it is hard to determine whether learning does take place in the constructivist learning model and, where learning is measurable, students eventually search for the preordained knowledge, which can be achieved more efficiently by the objectivist model (Leidner and Jarvenpaa 1995).

Responding to the criticisms, revised constructivist theories emerged. Constructivists with moderate approach acknowledge the objectivists' argument on the existence of an objective world, but still hold that individual learners construct their own reality of the objective world (Leidner and Jarvenpaa 1995). Among the revised theories, two most widely accepted are cognitive constructivism and social constructivism. Cognitive constructivism, which is sometimes considered to represent constructivism itself, focuses on the individual learner's interaction with his or her existing knowledge structure when the learner constructs the meaning of new information (Hsu 1996). Learning is *a process of interpreting, organizing, and transforming new experience and information based on the existing knowledge structure*. The extent of learning is dependent of the learner's cognitive structure and the stage of cognitive development. Therefore, understanding the learner's existing intellectual framework is central to understanding the learning process.

Social constructivism, advanced by Vygotsky (1978), rejects the assumption of cognitive constructivism that learning takes place at the individual level and in a cultural and historical vacuum (Tremayne 2002). Instead, it emphasizes the influence of cultural and social contexts in learning and views learning as a collaborative process. In other words, learning is *a process in which the learner constructs the meaning of reality by interacting and negotiating with other learners or other members of the society and culture*. Therefore, the social constructivist learning model promotes teamwork skills and group discussions which may be mediated and structured by the instructor.

Despite the different emphasis on key factors of learning, both cognitive constructivism and social constructivism share the following views on learning:

- The learner is an active constructor of his or her own knowledge;
- Learning is a continual process of meaning construction;

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- The learner is mindfully engaged in the learning process; and

- Learning is a cognitive consequence of interaction, either with the existing knowledge structure (cognitive interaction) or with peers (social interaction).

While constructivism in general and cognitive constructivism and social constructivism in particular tend to be dominant learning theories in modern education, many scholars in education acknowledge strengths of both objectivist and constructivist models of learning. They consider learning as occurring at two levels (Clements 1994; Entwistle, Thomson and Tait 1992; Hede 2002). One is at the surface level (surface learning), where the goal of learning is to acquire facts and reproduce them (objectivist view of learning). The other is at the deep level (deep learning), where the goal of learning is to relate factual information to previous knowledge and experience and to transform it to meaningful knowledge (constructivist view of learning). Some researchers view the two levels as separate aspects of learning (see Clements 1994; Entwistle, Thomson and Tait 1992), while others consider learning as sum of the two (see Hede 2002).

Interactivity & Learning

The above review of learning theories reveals similarities between the constructivist view on learning and the conceptualization of interactivity as a process. Both of them hold a process view (i.e., learning as a continual process and interactivity as a communication process); consider the learner (or the communication participant) as an active participant in the process; and emphasize the meaning of information and experience that the learner constructs during (responsive) interactions. It appears logical then to assume that some extent of learning, as defined from the constructivist

perspective, occurs naturally during interactive communication. Despite their common interest and similar perspective on interactive learning, however, establishing a theoretical link between constructivist learning and interactivity as a process has been rarely attempted between education research and communication research (Tremayne 2002).

In education research, especially in the area of instructional media, scholars tend to take the structuralist approach to interactive learning and focus on characteristics of interactive media that facilitate constructivist learning (see Chapter II for discussion on structuralist approach to interactivity). The constructivist theories are used as justification and a theoretical base for studying the role of interactive media in effective learning and designing of instructional media (see Ayersman 1996; Beal 2002; Fabry 1998; Martens, Valcke and Portier 1997; Piccoli, Ahmad and Ives 2001; Tremayne 2002; Yazon, Mayer-Smith and Redfield 2002). In communication research, it is only recent that the view of interactivity as a process regained researchers' close attention, although those who adopted the view tended to examine the relationship between interactivity and learning (see Johnson 2002; Tremayne 2002).

The following section reviews relevant literature across disciplines that presents evidence on the effects of interactivity on learning. Since the present research conceptualizes interactivity in terms of user control and responsiveness, the review focuses on the relationship between these two dimensions and learning. The review is followed by hypotheses on the effects of interactivity on learning, which would be tested in the present research.

<u>Effects of User Control</u>

The characteristic of interactive media or the dimension of interactivity that researchers believe to have most relevance to constructivist learning is user control. Interactive media allow the user to control the pace of learning, the sequence of learning and, to a lesser extent, the content of the learning material. In other words, interactive media facilitate learner-centered learning, which is advocated by the constructivists. However, empirical data on the effects of user control on learning have been mixed (see Eveland and Dunwoody 2001; Farrell 2000; Miller 1997; Rivera-Perez 1997, for a review). There are a few factors that underlie the equivocal results.

The prediction on the positive effects of user control on learning is largely based on the view on structural isomorphism (Ariely 2000; Eveland and Dunwoody 2001; Hsu 1996; Tremayne 2002). The concept of structural isomorphism was discussed in Chapter II. In essence, structural isomorphism means that the ability of interactive media to allow the user to control the order, pace, and content of learning emulates how the user processes information. Flexibility of interactive media as a result of user control thus facilitates learning by adapting to individual mental models and learning styles.

On the other hand, researchers who find no significant effects of user control suggest that a full control of interactive environment can be overwhelming for the user, especially those who are unfamiliar with it. They argue that the full user control increases disorientation and cognitive load while inhibiting learning (Cairncross and Mannion 2001; Eveland and Dunwoody 2001; Farrell 2000; Liaw and Huang 2002; Piccoli, Ahmad and Ives 2001). User control can be seen as a task in itself (Ariely 2000), in which case the user has a dual task, namely, controlling the interactive environment and learning the material. The additional task of controlling the interactive environment

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reduces processing resources available for learning, thereby decreasing the performance in learning.

However, some researchers point out methodological issues in studies where no significant effects of user control were found. Rivera-Perez (1997) argues that studies on user control confound its effects on learning by allowing unlimited time to learn for the high control condition, while constraining learning time for the low control condition by setting a specific time frame. Therefore, time spent on learning and the amount of viewing as a result become confounding factors. Miller (1997) and Tremayne (2002) found somewhat similar results, in which the user's navigational control led to different amount of viewing. Miller (1997) found that the participants with high control viewed fewer frames of learning material on the computer screen than those with low control, while achievement in learning was similar in both groups. She concluded that the participants with high control were more efficient in learning. Tremayne (2002) found that the freedom of navigation in the nonlinearly structured Web site led the participants with high control to skip some content (e.g., Web pages), resulting in less learning, as measured by recognition, than those without control who were forced to read all pages. In both studies, the amount of viewing confounded the effects on learning.

In addition, it appears that the measures of learning contribute to the limited effects of user control. As discussed earlier, the constructivist theories view learning as meaning construction and oppose the objectivist approach to measuring learning in terms knowledge retention. Therefore, if user control is to benefit the constructivist model of learning, its effects on learning should be measured by deep learning (e.g., comprehension) rather than surface learning (e.g., knowledge recall) (Ellis 2001; Liaw and Huang 2002; Tremayne 2002). However, a majority of studies used measures of surface learning to assess the effects of user control and found no significant effects of

user control (see Eveland and Dunwoody 2001; Martens, Valcke and Portier 1997; Rivera-Perez 1997). In his research, where both recognition and comprehension were measured, Tremayne (2002) demonstrated that high user control (versus low user control), as manipulated by learning from the nonlinearly structured Web site (versus the linearly structured Web site), resulted in better comprehension, but no significant difference in recognition. Ellis (2001) concurred with this view in his review of Jacobson and Spiro's (1995) study, observing that "Programs offering fewer links tended to be more effective in promoting the acquisition of facts, while programs offering extensive hyperlinking capability were more conducive to developing critical thinking skills and the ability to apply facts learned" (p. 114). Tremayne's (2002) and Jacobson and Spiro's (1995) data, therefore, corroborate the above argument that the effects of user control can be demonstrated more accurately with a measure of deep learning (e.g., comprehension) than of surface learning (e.g., knowledge recall).

Apart from the methodological issues, some researchers explain the limited effects of user control in terms of moderating factors of user control. They believe that the user's individual differences may moderate the effects of user control. As alluded above, the user's familiarity and expertise with an interactive environment tend to moderate the effects of user control (Ariely 2000; Eveland and Dunwoody 2001; Johnson 2002; Piccoli, Ahmad and Ives 2001). Naturally, if the user is familiar with an interactive environment and thus consumes less cognitive resource in controlling the environment, he or she can devote more cognitive resource to process information and learn better. Other user characteristics that are believed to moderate the effects of user control include cognitive style (e.g., field-(in)dependent), aptitude, and previous domain knowledge (see Cairncross and Mannion 2001; Farrell 2000; Hede 2002; Liu 2002; Martens, Valcke and Portier 1997; Miller 1997, for a review).

In addition to accounting for the moderating factors, researchers suggest that perhaps moderate user control benefits learning best (Cairncross and Mannion 2001; McLoughlin and Oliver 1995; Piccoli, Ahmad and Ives 2001; Rivera-Perez 1997). Cairncross and Mannion (2001) reviews that the user's free exploration of interactive media is sub-optimal for learning (Ford and Ford 1992; Mayes, Kibby and Anderson 1990; McKendree, Reader and Hammond 1995) and a more structured approach, in which the user receives guide and advice in his or her discovery of meaning, improves leaning (Boyle 1997; Pang and Edmonds 1999). For effective learning, they propose a "hierarchical-based menu system," which provides learners with "a framework to navigate within, where they are free to tailor the order in which information is presented to meet their own needs" (Cairncross and Mannion 2001, p. 160).

Some empirical evidence provides support for the above view on the limited user control. Farrell (2000), for instance, demonstrated that moderate learner control was associated with the greatest perception of control and benefited learners of all ability levels. Interestingly, he found that students with high learner control felt less in control than those with moderate control, possible because they felt overwhelmed. The results also showed that high learner control benefited learners of high ability the most, whereas low learner control had adverse effects on high ability learners' learning. The distinction between actual control versus perceived control was also noted by Liu (2002). She held that visitors of a Web site might not *feel* in control when the Web site offered a lot of control while the opposite could be true.

While Farrell (2000) manipulated the level of user control with types of navigation tools on the Web site, other researchers operationalized moderate control in terms of guided user control. Eveland and Dunwoody (2001) compared the effects on learning from print, the linearly designed Web site (low control), the nonlinearly

designed Web site (high control), and the Web site that incorporated advisements (limited control). They demonstrated that learning, as measured by recognition, was comparable between print and the Web site with advisement, whereas learning from print was superior to that from the other two Web designs. Arnone and Grabowski (1992) also reported similar results: learners performed significantly better when they were given learner-control with advisement rather than full learner-control. Overall, researchers tend to agree on the curvilinear relationship between user control and learning. However, it warrants future research to determine an optimal level of user control and establish the consistent relationships between user control and learning.

Effects of Responsiveness

There is only limited research that examines the effects of responsiveness on learning. Although its important theoretical relevance to interactivity was frequently discussed in the interactivity literature, the effects of responsiveness in itself were rarely examined. An exception is Johnson's (2002) research, in which she identified responsiveness as a theoretical dimension of interactivity and tested its effects on learning in an experiment. However, a closer review of literature reveals that a voluminous body of research on feedback learning is essentially addressing the potential role of responsiveness in learning because both constructs are conceptualized in a similar way. For instance, Farrell's (2000) following conceptualization of feedback is similar to that of responsiveness discussed in Chapter II:

> The responses are based on previous feedback. As the communication continues, the feedback progresses to reflect understanding. When a learner refines a search query and the computer responds with a refined list, message exchange is progressing (p. 11).

Scholars have long acknowledged the central role of feedback in promotion of learning and ensuring of meeting standards (Currie 1995; Hewson and Little 1998). Feedback was conceptualized as reward or reinforcement in early research based on Skinner's stimulus-response theory. Feedback was still considered important from the constructivist view as facilitator of learning. According to Latham (1997), "Ultimately, feedback serves as an indispensable step in the learning process by extending instruction beyond the initial question or activity" (p. 86). Bork (2000) also emphasized an "interactive dialogue" or a "learning conversation" in effective learning (p. 640).

Feedback often refers to what Goodman (1998) called "external feedback," feedback from an external source. The external source can be another person (e.g., teacher) or a computer program. As external feedback is designed to guide the learner to correct responses, it has been shown to be positively related to the learner's subsequent performance. Information about the learner's response in feedback helps the learner "generate a more accurate response on the next trial" (Goodman 1998, p. 227). Besides, more frequent and immediate external feedback is positively associated with fewer errors and less time to reach performance criteria (Goodman 1998).

Goodman (1998) distinguishes "task feedback" from external feedback. Task feedback is defined as "response-produced feedback which is a direct result or natural consequence of task execution" (Goodman 1998, p. 225; see also Adams 1971; Annett 1969; Greller and Herold 1975; Herold and Greller 1977). Examples of task feedback include sensory data that indicate task process, observable changes in task materials, and output characteristics such as speed, quality, and condition in relation to goal attributes (Goodman 1998). In a hypertext-based interactive learning setting such as the Web, task feedback would mean changes in computer screens or Web pages as a result of the user's click on a hyperlink. According to Goodman (1998), task feedback benefits permanent

learning (e.g., relatively permanent acquisition of skills, understanding, and knowledge), whereas external feedback is important for immediate performance effects.

In interactive learning research, the effects of feedback *per se* on learning have not been examined, although the capability of interactive media to provide feedback was frequently acknowledged (see Boisvert 2000; Bork 2000). However, it was believed that the process of feedback communication ("dialogue") between the learner and the tutor, or between groups of learners promotes reflective thinking and reconceptualization, leading to a deeper understanding of the learning material (Cairncross and Mannion 2001). In addition, a few studies on user control incorporated the concept of feedback (e.g., advisements on the user's choice on the sequence of information presentation) in the study design and found that user control combined with feedback were more effective than user control alone (e.g., Eveland and Dunwoody 2001; Tremayne 2002). These studies suggest that feedback, especially when combined with user control, benefits learning.

In the present research, feedback is conceptualized as an element of interactivity (see Chapter II, for discussion). It is considered similar to reactivity or reactive response, which is a lower level of interactivity. Conceptualizing interactivity as a higher level of feedback, which is progressively relevant feedback in an interaction process, interactivity is likely to have similar, if not better, learning effects on learning.

Hypotheses 1 & 2

Based on the above review of the literature, it is hypothesized that interactivity, defined in terms of user control and responsiveness, have positive effects on learning. The present research concurs with the view that learning occurs at both deep and surface levels and that the two types of learning serve different goals of learning (Clements 1994;

Entwistle, Thomson and Tait 1992; Hede 2002). However, as the conceptualization of interactivity in the present research is consistent with the constructivist view on learning (e.g., interactivity/learning as a process, learner as an active participant), it is hypothesized that interactivity particularly benefits the constructivist model of learning, namely, deep learning, whereas low interactivity can be as effective as high interactivity in enhancing surface learning. In addition, it is hypothesized that interactivity influences comprehensibility. Comprehensibility or self-assessed comprehension concerns the user's subjective assessment of deep learning (Mick 1992). As the user is given control over the learning environment and receives responsive feedback, the user's assessment of his or her learning is expected to be positively affected by interactivity. Hypotheses 1 and 2 are derived as follows:

> H1a: Deep learning will be greater when interactivity is high than when interactivity is low.

> H1b: Surface learning will be similar when interactivity is either high or low.

> H2: Self-assessed comprehension will be greater when interactivity is high than when interactivity is low

Task Involvement

Involvement is perhaps one of the most frequently studied constructs in Advertising and Marketing. Different types of involvement have been researched and found to play a unique role in influencing different aspects of consumer behaviors (Muehling, Laczniak and Andrews 1993). A specific type of involvement that the present research is interested in is task involvement.

A clear and distinct definition of task involvement is not found in the literature. It is sometimes simply referred to as "involvement in the task or the activities relating to it"

(Mishra, Umesh and Stem 1993, p. 334). Other times, it is described as externally motivated involvement (e.g., situational involvement) and defined as personal relevance that results from "factors or consequences associated with a particular task or situation" (Higie, Feick and Price 1991, p. 187). Personal relevance is also emphasized in Nicovich's (1999) definition of task involvement. According to him, task involvement is "the degree to which one finds the task personally self-relevant" (Nicovich 1999, p. 73). Nicovich (1999) differentiates task involvement from prior involvement, such that prior involvement is a motivation to perform an activity, whereas task involvement is a motivation to perform the activity well. In his research, Nicovich (1999) demonstrated that task involvement had mediating effects on attitude toward future behavior.

In the present research, task involvement is conceptualized somewhat similarly to that by Nicovich (1999). It is defined as *the degree of engagement in the process of performing a task*. It is different from enduring involvement in that it is not an individual difference variable. It is also different from situational involvement, which is usually manipulated by the researcher and treated as an independent variable. Task involvement in this research is conceptualized as a consequence or co-occurrence of performing a task that is given by the researcher and expected to have mediating effects on learning.

The role of involvement in learning is widely accepted by researchers. Some researchers suggest that learning may occur with little or no involvement (see Hawkins and Hoch 1992; Hawkins, Hoch and Meyers-Levy 2001; Heath 2000; Krugman 1965; Tuan 1997). But, for the most part, researchers agree that involvement positively affects information processing and learning. When involvement is high, individuals are motivated to allocate greater cognitive resources and exert more energy in their information processing (Celci and Olson 1988). Therefore, they are more likely to attend to, comprehend, and elaborate salient information. According to Elaboration Likelihood

Model, highly involved individuals attend to the issue-relevant arguments that are perceived to be central merit of the object (Petty, Unnava and Strathman 1991). In the Marketing context, highly involved consumers execute a brand processing strategy, while focusing attention on brand-relevant information and carefully scrutinizing it (Mitchell 1981). As highly involved consumers process brand information through the "central route," their attitude toward the brand tends to last over time.

According to Tremayne (2002), involvement, conceptualized in terms of motivation in his research, accounts for the difference between education research and communication research on the effects on learning. He holds that, compared to communication research, education research tends to find consistent effects of motivation on learning because learning in an education setting is inherently motivating, whereas learning needs to be externally motivated in communication setting.

Tremayne's (2002) above view is consistent with different approaches to the relationship between involvement and learning between the two disciplines. In communication-oriented research, involvement is often considered as a moderating variable for learning and externally stimulated (see Johnson 2002). In education research, involvement appears to be viewed as a mediating variable. Researchers in education acknowledge that students' motivation to learn and engagement in the process of learning is a direct indicator for high performance in learning. They thus seek to find effective teaching methods and applications that enhance students' motivation, which then increases learning outcomes. Beal (2002) discusses a growing movement toward "engaged learning" in education, which is a subset of constructivism (p. 6). Konradt and Sulz (2001) argue that motivation, which may be enhanced by task characteristics, encourages the learner to approach training offers and maintains them to interact with the

learning task. Hede (2002) holds that motivation benefits learning by cognitively engaging the learner in the learning process.

While researchers emphasize designing of learning environment and applications to serve as an (extrinsic) motivational factor (Hede 2002; Konradt and Sulz 2001), they find that interactivity and interactive applications provides a unique opportunity to enhance learner motivation and involvement. Interactivity in itself is characterized as highly involving activity. Johnson (2002) describes interactivity as perceptually, cognitively, and behaviorally involving activity. Farrell (2000) defines interactivity in terms of "relationship between the learner and the instructional module with varying degrees of engagement" (p. 1) and argues that the involving nature, or "motivational aspects," of interactivity benefits learners regardless of their different ability levels and cognitive styles (p. 15).

In terms of what aspect(s) of interactivity enhances learner involvement, researchers interested in features of interactive applications maintain that multimodality by the use of graphics, hypertext, and audio/video elements encourages learners' interactive engagement in the learning environment and increases cognitive activity (Bowes 2001; Fabry 1998; Stout, Villegas and Kim 2001). Researchers interested in theoretical constructs suggest that user control and responsiveness enhance the user's involvement in the interaction process. Miller (1997) holds that by allowing the user choices in information acquisition and processing, user control makes the learning process more relevant for the user and more responsive to his or her individual information needs and motives. The relevant and responsive learning process increases the user's motivation to process the information and information processing intensity, which then leads to an increase in learning (Miller 1997). Using a similar reasoning, Liu (2002) argues that user control and reciprocal communication increase personal relevance

of a Web site (i.e., Web site involvement). She states, "control activates self-needs and self-concepts that are personally relevant, which can increase the perceived relevancy of the Web site" (Liu 2002, p. 59). She also maintains that users of two-way communication are active message creators and thus more engaged in the communication. She found support for her argument from her study and also demonstrated that Web site involvement mediated the effects of user control on cognitive elaboration.

Hypothesis 3

A review of the above literature leads to a second set of hypotheses of this research. It is hypothesized that interactivity will increase the user's engagement in the communication process (i.e., task involvement), which in turn will increase the user's learning. As interactivity is hypothesized to influence deep learning, the mediating effects of task involvement are expected to be found on deep learning rather than surface learning.

H3a: Task involvement will be greater when interactivity is high than when interactivity is low.

H3b: Task involvement will mediate the relationship between interactivity and deep learning.

Social Stereotypes

While the primary interest of this dissertation is in the effects of interactivity on learning, it also seeks to examine the relationship between interactivity and learning hypothesized above in the context of social stereotypes. It is widely acknowledged that social stereotypes are difficult to change as they represent long engrained beliefs in the society. While not all social stereotypes are incorrect, it poses a special challenge when

some social stereotypes need to be corrected. In attempts to explain how stereotypes develop, what functions they serve, and how they can be changed, researchers have studied stereotypes from three main perspectives, namely, psychodynamic perspective, sociocultural perspective, and social cognitive perspective (Ashmore and del Boca 1981; Crocker and Lutsky 1986). The psychodynamic perspective explains stereotypes in terms of motivational forces. In this perspective, stereotypes develop in order to meet basic psychological needs, such as self-enhancement and justification of personal experiences (e.g., childhood) and social occurrences (Corrigan 2000; Hamilton and Sherman 1994) . The sociocultural perspective examines how stereotypes are acquired and reinforced through social learning by family, peers, media and other influencers (Hamilton and Sherman 1994). According to this perspective, stereotypes are used to justify prevalent social injustices (Corrigan 1998). The social cognitive perspective views stereotypes as "belief systems or cognitive structures that can guide information processing" (Hamilton and Sherman 1994, p. 2). The primary interest in this perspective is how the cognitive structures develop and influence information processing, thereby affecting perceptions of and interactions with members of stereotyped groups (Hamilton and Sherman 1994). While the three perspectives provide complementary, rather than competing, explanations for various phenomena of stereotypes (Hamilton and Sherman 1994), the present research focuses on the social cognitive approach because it provides the closest theoretical link to the role of interactivity in learning and attitude change. In the following section, a review on the definition and cognitive processes of stereotypes is provided and the role of interactivity in changing stereotypic perceptions and attitudes is explored.

Cognitive Efficiency of Stereotype

From the social cognitive perspective, a stereotype is defined as follows (Hamilton and Sherman 1994, pp. 2-3):

> [A stereotype is] "a cognitive structure that contains the perceiver's knowledge, beliefs, and expectations about a human group" (Hamilton and Trolier 1986, p.133). Stereotypes are abstract knowledge structures linking a social group to a set of traits or behavioral characteristics. As such stereotypes act as expectancies that guide the processing of information about the group as a whole and about particular group members (Hamilton, Sherman and Ruvolo 1990). In addition to these generalized expectancies, one's knowledge about particular group members (or exemplars) also may influence judgments about groups and their members.

The social cognitive perspective provides several explanations as to how stereotypes function in the processing of information (see Hamilton and Sherman 1994). Of particular interest in the present research is the categorization process of stereotypes as a way to enhance cognitive efficiency. People have a limited cognitive processing capacity to understand and interact with rich and complex information about individual members of the society. By categorizing the rich and complex information on the basis of similarities and differences, stereotypes help people "quickly generate impressions and expectations of individuals who belong to a stereotyped group" (Corrigan (1998). The categorization process of stereotypes reduces the amount of information to process and expands one's base of knowledge by ignoring individual differences of each member of a stereotyped group, but gaining a large amount of functionally accurate information about the group. Stereotypes, therefore, are an "efficient means of categorizing information about social groups" (Corrigan (1998)) and a natural response to the demands of information overload (Baddeley (1982); Esses, Haddock and Zanna 1994; Judd and Park 193; Krueger 1996; Mullen, Rozell and Johnson 1996).

As much as stereotypes function to facilitate the processing of large amount of information fast and without much effort, new information that is inconsistent with stereotypes is harder to process. The information that is inconsistent with stereotypes, or stereotype-inconsistent information (e.g., information that is intended to correct stereotypes), requires greater resources during encoding and thus is more difficult to process than stereotype-consistent information. In contrast, conceptual fluency of stereotype-consistent information reduces the amount of cognitive resources necessary to process that information and thus is easier to comprehend (see Hamilton and Sherman 1994; Sherman et al. 1998, for a review). In addition to this conceptual filtering, demand for cognitive resources by stereotype-inconsistent information also leads stereotypes to act as attentional filters "by directing encoding efforts toward [stereotype-] consistent information and away from [stereotype-] inconsistent information (Sherman et al. 1998, p. 590).

Several studies found support for the above argument. When cognitive resources were constrained by the study manipulation (e.g., additional task, constraint on time to perform the primary task), stereotype-consistent information was more likely to be processed and used to make judgment about a stereotyped group. Garcia-Margues and Mackie (1999), for instance, demonstrated that the ability of stereotype-inconsistent information to increase perceived variability of social groups was hampered when cognitive load increased and thus cognitive resources were constrained. In a similar study, van Knippenberg, Dijksterhuis and Vermeulen (1999) found that stereotypical biases influenced judgment and memory under high cognitive load. They showed that when cognitive resources were constrained (i.e., high cognitive load), a negative stereotype associated with a crime (i.e., stereotype consistent with the crime), compared to a positive stereotype (i.e., stereotype inconsistent with the crime), evoked higher

estimates of guilt, harsher punishment, and better memory of incriminating evidence, whereas no difference was found when cognitive load was low. They also found that stereotype-consistent information was preferentially selected to base judgment of a criminal act even if similar attention was devoted to both stereotype-consistent and stereotype-inconsistent information. From this, they suggested a memory advantage for stereotype-consistent information under high cognitive load.

Hypothesis 4

The above review suggests that information that is intended to change incorrect stereotypes (i.e., stereotype-inconsistent information) will be difficult to learn, especially if cognitive resources are scant. The review, however, also suggests that learning of the corrective information may be facilitated if cognitive resources are made available. While a few facilitators of the processing of stereotype-inconsistent information are identified in the literature (see Garcia-Margues and Mackie 1999; van Knippenberg, Dijksterhuis and Vermeulen 1999), the present research proposes that interactivity plays a role in learning of stereotype-inconsistent information, that is, information that is intended to change incorrect stereotypes.

There is no research evidence in the current literature that suggests the effects of interactivity on learning of stereotype-consistent versus stereotype-inconsistent information. However, if interactivity can enhance task involvement, and thus increase people's motivation to process information and the intensity of information processing (H2), it is suspected that interactivity can motivate people to allocate greater cognitive resources and learn stereotype-inconsistent information. As discussed previously, highly involved people tend to be motivated to allocate greater cognitive resources and exert more energy in their information processing and thus more likely to attend to,

comprehend, and elaborate information (Celci and Olson 1988). Based on this reasoning, it is hypothesized that interactivity will facilitate learning of stereotype-inconsistent information, that is, information that is intended to change incorrect stereotypes. Particularly, following the argument made for Hypotheses 1a and 1b, it is expected that interactivity will facilitate deep learning rather than surface learning of stereotype-inconsistent information.

As previously mentioned, not all stereotypes about a stereotyped group are incorrect and undoubtedly, some people have more correct stereotypes than others. If one's current perceptions about a stereotyped group tend to be correct, then there is little latitude for interactivity to enhance learning of correct information about the stereotyped group. Interactivity may play a significant role, however, if one's current stereotypic perceptions tend to be incorrect and it is difficult for the person to learn information that is intended to change his or her incorrect stereotypic perceptions (i.e., stereotype-inconsistent information). Therefore, it is expected that when interactivity is low, individuals with correct perceptions about a stereotyped group will demonstrate greater deep and surface learning of the correct information about a stereotyped group than individuals with incorrect perceptions. When interactivity is high (versus low), individuals with incorrect perceptions about a stereotyped group will be more motivated to learn correct information about the stereotyped group and thus their learning of the correct information will be as great as individuals with correct perceptions. Consistent with H1a and H1b, it is expected that interactivity will particularly facilitate their deep learning of the correct information, compared to surface learning. In other words, when interactivity is high, individuals with incorrect perceptions about a stereotyped group will demonstrate similar deep learning of stereotype-inconsistent information as individuals with correct perceptions, whereas their surface learning of the correct information will

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not be necessarily enhanced by interactivity and thus be less than that of individuals with correct perceptions.

> H4a: When interactivity is low, individuals with correct perceptions about a stereotyped group will have greater deep learning of correct information about the stereotyped group than individuals with incorrect perceptions about the stereotyped group. When interactivity is high, however, individuals with incorrect perceptions about the stereotyped group will demonstrate similar deep learning as individuals with correct perceptions about the stereotyped group.

> H4b: When interactivity is either high or low, individuals with correct perceptions about a stereotyped group will have greater surface learning of correct information about the stereotyped group than individuals with incorrect perceptions about the stereotyped group.

Attitudes & Behavior Intentions

One of key reasons why it is important to change incorrect perceptions about a stereotyped group is because it may impact on changing attitudes and behavior intentions related to the stereotyped group. Psychologists note that stereotype itself is value-neutral because it represents a knowledge structure that people naturally construct in order to make sense of their social world (Berg 1990; Corrigan 1998; Corrigan and Penn 1999; Lotz and Hu 2001). However, stereotypes about a social group in general and incorrect stereotypes in particular tend to result in stigmatizing attitudes and discrimination against the stereotyped group. Researchers find that stereotyped social groups often receive unfair and even abusive treatments from other members of the society, such as diminished income, loss of job, unfair housing, false press charges, verbal abuse and physical violence (Corrigan 1998; Corrigan 2000; Corrigan and Penn 1999).

In relation to the role of interactivity in changing incorrect perceptions about a stereotyped group (H4a and H4b), the present research examines the role of interactivity in changing attitudes and behavior intentions related to the stereotyped group. A number

of researchers and theorists have discussed the relationship between learning and changes in attitude and behavior intentions. In general, learning is considered as a prerequisite for formation or change in attitudes and behavior intentions (Johnson 2002). In his information-processing model, McGuire (1989) argued that attitude change follows comprehension of the message. Other models, such as early hierarchy of effects models, essentially share the same view, when they assume the linear order effects of cognition, affect, and conation.

Hypothesis 5 & Research Questions

In the present research, the same assumption about the relationship between learning and changes in attitude and behavior intentions is made. It is hypothesized that interactivity has effects on changing attitude and behavior intentions through learning. In other words, if interactivity can facilitate learning of correct information about a stereotyped group (H4a and H4b), it is expected that individuals who learn the correct information about the stereotyped group will have favorable attitude and behavior intentions related to the stereotyped group. Consistent with H4a and H4b, the effects of interactivity on changing attitude and behavior intentions are expected to be greater for individuals with incorrect perceptions about a stereotyped group than for individuals with correct perceptions.

> H5a: When interactivity is low, individuals with correct perceptions about a stereotyped group will have more favorable attitude toward a stereotyped group than individuals with incorrect perceptions about a stereotyped group. When interactivity is high, however, individuals with incorrect perceptions about the stereotyped group will have as favorable attitude toward the stereotyped group as individuals with correct perceptions about the stereotyped group.

H5b: When interactivity is low, individuals with correct perceptions about a stereotyped group will have more favorable behavior intentions related to a stereotyped group than individuals with incorrect perceptions about a stereotyped group. When interactivity is high, however, individuals with incorrect perceptions about the stereotyped group will have as favorable behavior intentions related to the stereotyped group as individuals with correct perceptions about the stereotyped group.

In addition to the effects of interactivity on changing attitudes and behavior intentions related to a stereotyped group, the present research explores the potential role of interactivity in changing attitudes and behavior intentions related to other stereotyped groups that are not discussed in the communication. When individuals learn correct information about a stereotyped group and thus change their attitudes and behavior intentions related to the group, it may serve as an opportunity for them to examine their stigmatizing attitudes toward other stereotyped groups. Based on Hypotheses 5a and 5b, therefore, it is speculated that interactivity may play a role in changing attitudes and behavior intentions related to other stereotyped groups if it has impact on attitudes and behavior intentions related to the targeted stereotyped group. Due to a lack of existing evidence, however, a formal hypothesis is not formed, but a research question is raised as follows.

RQ1: Does interactivity play a role in changing attitudes and behavior intentions related to a different stereotyped group that is not targeted in the communication?

Finally, the present research examines if interactivity motivates individuals to seek additional information about the topic of the communication. Previously, in Hypothesis 3, the role of interactivity in motivating individuals to learn was discussed. Similarly, it is expected that individuals who learn in an interactive communication process will be motivated to seek additional information about the communication topic.

Due to a lack of existing evidence however, a research question, rather than a formal hypothesis, is asked to examine the potential effects of interactivity on intentions to seek additional information.

RQ2: Does interactivity play a role in motivating individuals to seek additional information about the topic of the communication?

Figure 4 summarizes hypotheses and research questions to be examined in the present research.

Figure 3. Summary of Hypotheses & Research Questions

H1a:	Deep learning will be greater when interactivity is high than when interactivity is low.
H1b:	Surface learning will be similar when interactivity is either high or low.
H2:	Self-assessed comprehension will be greater when interactivity is high than when interactivity is low.
H3a:	Task involvement will be greater when interactivity is high than when interactivity is low.
H3b:	Task involvement will mediate the relationship between interactivity and deep learning.
H4a:	When interactivity is low, individuals with correct perceptions about a stereotyped group will have greater deep learning of correct information about the stereotyped group than individuals with incorrect perceptions about the stereotyped group. When interactivity is high, however, individuals with incorrect perceptions about the stereotyped group will demonstrate similar deep learning as individuals with correct perceptions about the stereotyped group.
H4b:	When interactivity is either high or low, individuals with correct perceptions about a stereotyped group will have greater surface learning of correct information about the stereotyped group than individuals with incorrect perceptions about the stereotyped group.
H5a:	When interactivity is low, individuals with correct perceptions about a stereotyped group will have more favorable attitude toward a stereotyped group than individuals with incorrect perceptions about a stereotyped group. When interactivity is high, however, individuals with incorrect perceptions about the stereotyped group will have as favorable attitude toward the stereotyped group as individuals with correct perceptions about the stereotyped group.
H5b:	When interactivity is low, individuals with correct perceptions about a stereotyped group will have more favorable behavior intentions related to a stereotyped group than individuals with incorrect perceptions about a stereotyped group. When interactivity is high, however, individuals with incorrect perceptions about the stereotyped group will have as favorable behavior intentions related to the stereotyped group as individuals with correct perceptions about the stereotyped group.
RQ1:	Does interactivity play a role in changing attitudes and behavior intentions related to a different stereotyped group that is not targeted in the communication?
RQ2:	Does interactivity play a role in motivating individuals to seek additional information about the topic of the communication?

Chapter IV. Research Design

The dissertation research was conducted in three phases: a pretest, a pilot study, and a main experiment. This chapter gives an overview of the research design and describes objectives and methods of the studies conducted in the three phases. Prior to discussing the research design, however, this chapter introduces a specific stereotype topic to be used in developing the experiment stimulus and testing hypotheses. As discussed in Chapter III, the present research not only examines the effects of interactivity on learning in general, but also its impact on attitudes and behavior intentions related to a stereotyped group. A stereotyped group that was chosen to examine the effects of interactivity was people with mental illness, specifically, schizophrenia. In this chapter, key issues of stereotypes of mental illness and schizophrenia are discussed, while the importance of addressing the stereotypes of mental illness is highlighted.

In addition to people with schizophrenia, another stereotyped group was identified to examine the research questions. As discussed in Chapter III, the research questions of the present research are concerned with the carry-over effects of attitudes and behavior intentions related to one stereotyped group on the other stereotyped group. To address the research questions, a topic of homelessness was selected because homeless people are often associated with the mentally ill (Phelan et al. 1997) and thus attitudes and behavior intentions related to these two groups may be closely associated with each other. In the pretest, therefore, current stereotypic perceptions of homeless people as well as people with schizophrenia were assessed, while changes in attitudes and behavior intentions related to this group were examined in the main experiment.

Key Issues of Mental Illness and Schizophrenia

According to the first Surgeon General's Report on Mental Health, mental illness is:

"the term that refers collectively to all mental disorders. Mental disorders are health conditions that are characterized by alterations in thinking, mood, or behavior (or some combination thereof) associated with distress and/or impaired functioning" (U.S. Department of Health and Human Services 1999, p. vii).

Mental illness is estimated to affect 22.1 percent of Americans ages 18 and older—about one in five adults—in a given year (Regier et al. 1993). When applied to the 1998 U.S. Census residential population estimate, this figure translates to 44.3 million people (National Institute of Mental Health 2001). Schizophrenia in particular affects approximately 2.2 million American adults or about 1.1 percent of the population age 18 and older in a given year (National Institute of Mental Health 2001).

Despite its high prevalence, mental illness is often under-recognized and left untreated. Both academic researchers and health professionals identify negative stereotypes about mental illness as a major contributing factor and emphasize the importance of addressing them for proper management of the illness (New Freedom Commission on Mental Health 2003; Stuart and Arboleda-Florez 2001; U.S. Department of Health and Human Services 1999). Negative stereotypes about mental illness result in less sympathetic attitude among the public toward people with mental illness. In his review of literature (e.g., Albrecht, Walker and Levy 1982; Skinner et al. 1995), Corrigan (1998) reports that mental illness is considered similar to drug addiction, prostitution, and criminality rather than to physical disability. Penn, Chamberlin and Mueser (2003) note that people use labels associated with mental illness pejoratively (e.g., "schizophrenic") to describe unusual and odd behaviors in general.

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Negative stereotypes about mental illness are also associated with false criminal accusations and discrimination against people with mental illness and their families on job and housing opportunities (Breakey et al. 1992; Corrigan 1998; Corrigan 2000; Corrigan and Penn 1999). Such discrimination affects self-esteem and ability to make friends and play other social roles among people with mental illness (Corrigan 1998; Link et al. 1992; Link and Phelan 1999). Mental illness, in effect, strikes with a two-edged sword as individuals not only suffer from illness symptoms that interfere with achieving many social roles and quality of life, but also from social discrimination due to illness-associated stigma that unjustly deprives them of opportunities to maintain the basic living standard (Corrigan 2000).

While the public has stereotypes about mental illness in general, evidence from research suggests that people do differentiate between specific mental disorders and hold disease-specific stereotypical understanding (e.g., Link et al. 1999; Pescosolido et al. 1999; Stuart and Arboleda-Florez 2001). For instance, while stressful circumstances in a person's life is considered as a general cause for mental illness, biological problems (e.g., chemical imbalance in the brain) are viewed as a cause for schizophrenia and depression and a person's own bad character for drug dependence (Link et al. 1999). People with schizophrenia are believed to be incompetent to make decisions regarding treatment and money management, whereas those with drug and alcohol dependence are perceived to be dangerous (Pescosolido et al. 1999). Based on these findings, researchers emphasize the importance of targeting a specific disorder for effective educational campaigns on stereotypes of mental illness (e.g., Stuart and Arboleda-Florez 2001).

The present research has chosen schizophrenia among other mental illnesses as a topic for the experiment stimulus because the public has some knowledge about the illness, and yet they are confused with other mental illnesses (e.g., split or multiple

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personality), while they hold consistent, but incorrect beliefs about people with schizophrenia (Health Canada 1991; Stuart and Arboleda-Florez 2001). Besides, compared to other mental illnesses, the public's attitude toward schizophrenia tends to be neither so positive (e.g., depression) nor so negative (e.g., alcohol and drug dependence) (Link 1987; Pescosolido et al. 1999), minimizing ceiling or floor effects on this variable.

Overview of the Research Design

As mentioned earlier, the dissertation research was conducted in three phases. In the first phase, a pretest was conducted (1) to assess stereotypic perceptions of people with schizophrenia and homeless people currently held by the study sample, and (2) to examine the reliability of measures. Fourteen variables relevant for stereotypic perceptions were measured in the pretest (see Figure 5). Participants received a URL of a Web-based survey via email and responded to the survey at the place and the time of their choice during one day period. In the second phase, a pilot study was conducted (1) to test an experiment stimulus and an interactivity manipulation, and (2) to examine the reliability of all measures that would be used in the main experiment. Participants were invited into a university computer lab, in which they reviewed the experiment stimulus on a Web site and responded to Web-based questionnaires that measured control and dependent variables. Eleven variables measured in the pretest were also measured in the pilot study. In addition, eight variables that are relevant to the interactivity manipulation were measured (see Figure 5). Finally, in the third phase, the main experiment was conducted to examine the hypotheses and the research questions. The method of the main experiment was similar to that of the pilot study, although some revisions to the design and the measures were made based on the results of the pilot study. Participants were also invited into a university computer lab for the main experiment and followed a

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similar same procedure as in the pilot study. Figure 5 summarizes the methods of the three studies.

Participants

Participants of the present research consisted of college students. Participants were recruited from undergraduate Advertising classes in a large southeastern university and provided extra course credit in exchange of their participation.

A number of academic studies and news reports have indicated that a significant number of college students and older adolescents of a similar age suffer from a mental health problem (see Granello and Granello 2000; McGinn and Depasquale 2004; Voelker 2003; Wingert and Kantrowitz 2002). But negative stereotypes of mental illness prevalent on college campuses discourage students suffering from a mental health problem to seek proper care (see Cooper, Corrigan and Watson 2003), as the admission of the problem likely results in negative attitudes and rejections from fellow students. In fact, researchers find that negative stereotypes of mental illness among college students are significantly associated with their perceptions of dangerousness of people with mental illness and willingness to help or reject them (e.g., Corrigan, Green and Lundin 2001; Corrigan et al. 2003); social distance to, or willingness to interact with, people with mental illness (e.g., Chung, Chen and Liu 2001; Corrigan, Green and Lundin 2001); acceptance of people with mental illness in the community (e.g., Schwartz and Armony-Sivan 2001); and tolerance for people with mental illness (e.g., Granello and Granello 2000). These findings suggest that addressing stereotypes of mental illness plays a critical role in creating favorable attitudes toward and acceptance of mental illness on college campuses and encouraging students to seek appropriate mental health services. By using college students as study participants, the present research tries to provide

implications for educational campaigns that aim to address college students' stereotypes of mental illness.

Figure 4. Summary of Design and Methods

	Pretest	Pilot Study	Main Experiment
Objectives	(1) To assess stereotypic perceptions of people with schizophrenia and homeless people (2) To examine the reliability of measures	(1) To test efficacy of interactivity manipulation (2) To examine the reliability of all measures to be used in main experiment	To test hypotheses and address research questions
Study method	Online survey	Experiment in computer lab	Experiment in computer lab
Participants' key tasks	Complete a Web-based survey that measures perceptions of people with schizophrenia and homeless people, previous exposure to them, and participants' demographic information	Complete a Web-based questionnaire that measures perceptions of people with schizophrenia and homeless people; read the experiment stimulus on the study Web site; and respond to a second Web-based questionnaire that measures dependent, control, demographic variables, and manipulation checks	Read stimulus on the study Web site and respond to a questionnaire that measures dependent, control, demographic variables, and manipulation check

Figure 4. Summary of Design and Methods (continued)

Measures	Pretest	Pilot Study	Main Experiment
Independent variable			
• Perceptions of people with schizophrenia	O	O	O
Dependent variables			
• Self-assessed comprehension		O	O
• Deep learning (Comprehension)		O	O
• Surface learning (Knowledge retention)		O	O
• Task involvement		O	O
• Attitude toward interactivity		O	O
• Attitude toward people with schizophrenia	O	O	O
• Attitude toward homeless people		O	O
• Behavior intentions related to people with schizophrenia	O	O	O
• Behavior intentions related to homeless people	O	O	O
• Intentions to seek additional information		O	O
Control Variables			
• Perceptions of homeless people	O	O	O
• Family history of mental illness	O		
• Family history of schizophrenia	O		
• Family history of homelessness	O		
• Previous contact with people with mental illness	O	O	O
• Previous contact with homeless people	O	O	O
• Exposure to movies	O	O	O
• Social desirability	O	O	O
Demographic Variables	O	O	O
Interactivity manipulation check			
• Perceived interactivity		O	O
• Perceived user control		O	O
• Perceived responsiveness		O	O

Chapter V. Pretest

In the first phase of the dissertation research, a pretest was conducted to assess stereotypic perceptions of people with schizophrenia and homeless people that were currently held by the study sample, and to examine the reliability of measures. This chapter describes the methods and results of the pretest.

Design

The pretest was conducted through a Web-based survey. The survey was posted on the study Web site and the address of the Web site was emailed to students who signed up to participate. The survey was available on the Web until approximately 100 participants responded, and could be completed by participants at the time and the place of their choice.

The pretest was described as a "survey of social issues" to the participants. Participants were told that they would be asked about their thoughts on two groups of people, namely, people with schizophrenia and homeless people. After reading the instructions of the survey, participants responded to a battery of questions, which measured stereotypic perceptions of people with schizophrenia and homeless people, including characteristics of the people and perceived causes of the problem; attitudes toward them; intentions to interact with them; family history of schizophrenia, mental illness, and homelessness; previous contact with people with mental illness and homeless people; social desirability; exposure to movies that portrayed people with mental illness; and participants' demographic information (see Figure 6). The survey was estimated to take 15 minutes.

Figure 5. Variables Measured in the Pretest

Perceptions of people with schizophrenia
Perceived characteristics of people with schizophrenia
Perceived causes of schizophrenia
Perceptions of homeless people
Perceived characteristics of homeless people
Perceived causes of homelessness
Attitude toward people with schizophrenia
Perceived dangerousness of people with schizophrenia
Attitude toward homeless people
Perceived dangerousness of homeless people
Behavior intentions related to people with schizophrenia
Social distance to people with schizophrenia
Behavior intentions related to homeless people
Social distance to homeless people
Family history of
Schizophrenia
Other mental illnesses
Homelessness
Previous contact with
People with mental illness
Homeless people
Social desirability
Exposure to movies
Demographic variables (sex, age, major, ethnicity)

Participants

A total of 91 students enrolled in undergraduate Advertising classes participated in the pretest for exchange of extra course credit. A majority of participants majored in Liberal Arts (27%) or Communications (58%), including Advertising (23%) and Communication Studies (18%). Ethnicities of the participants included Caucasian (65%), Hispanic (14%), Asian (13%), and other (4%). Females comprised 75 percent of the sample and the average age of the sample was 20 years ($SD = 1.29$).

Measures

<u>Stereotypic Perceptions of People with Schizophrenia</u>

Stereotypic perceptions of people with schizophrenia were assessed with two sets of measures, which were developed for this research based on a review of the relevant literature (e.g., Angermeyer and Matschinger 1996; Boisvert and Faust 1999; Health Canada 1991; Holmes et al. 1999; Levey and Howells 1994; Levey and Howells 1995; Penn, Chamberlin and Mueser 2003; Penn et al. 1994; Penn et al. 1999; Penn and Link 2002; Penn and Nowlin-Drummond 2001; Stuart and Arboleda-Florez 2001; Wahl 1987; Wahl, Borostovik and Rieppi 1995) (see Table 1). The first measure consisted of 21 statements that described characteristics of people with schizophrenia (perceived characteristics of people with schizophrenia). Participants rated on a 9-point Likert-type scale (strongly agree to strongly disagree) the extent of their agreement with the statements. The second measure consisted of ten items that described causes of schizophrenia (perceived causes of schizophrenia). Participants rated on a 9-point Likert-type scale (highly likely to highly unlikely) the extent of the likelihood of each item for causing schizophrenia.

Some items in the scale were reverse coded so that a higher score would represent correct perceptions. The 31 items of the two scales combined, after they were standardized, yielded the reliability of .67 (Cronbach's α) ($M = 6.40$, $SD = .50$).

Table 1. Measures of Stereotypic Perceptions of People with Schizophrenia

Perceived Characteristics of People with Schizophrenia	Mean (*SD*)
How strongly do you agree or disagree with the following statements about people with schizophrenia (a type of mental illness)?	
(1) People with schizophrenia often see things that other people do not.	6.47 (2.07)
(2) People with schizophrenia are typically geniuses.[*]	5.89 (1.66)
(3) People with schizophrenia tend to avoid interacting with other people.	4.88 (1.49)
(4) People with schizophrenia lose touch with reality.	6.77 (1.31)
(5) People with schizophrenia often hear voices that other people do not.	6.95 (1.36)
(6) People with schizophrenia are not as smart as other people their age.[*]	7.13 (1.38)
(7) People with schizophrenia have problems communicating.	5.57 (1.86)
(8) People with schizophrenia are mentally retarded.[*]	7.01 (1.86)
(9) People with schizophrenia have split or multiple personality.[*]	3.11 (1.46)
(10) Schizophrenia is a relatively common illness.	4.67 (1.66)
(11) Schizophrenia occurs more often in men than women.[*]	4.82 (1.61)
(12) Schizophrenia affects one's ability to concentrate.	6.49 (1.71)
(13) You can tell if someone has schizophrenia just by the way they look.[*]	7.92 (1.29)
(14) Everyone with schizophrenia experiences the same set of symptoms.[*]	7.81 (1.32)
(15) There are no effective treatments for schizophrenia.[*]	6.14 (1.84)
(16) People with schizophrenia may be unaware that they are ill.	6.74 (1.69)
(17) People with schizophrenia can lead productive lives.	6.87 (1.54)
(18) Symptoms of schizophrenia can be managed by taking medications.	6.56 (1.48)
(19) With treatment, People with schizophrenia can carry out day-to-day tasks.	7.00 (1.62)
(20) People with schizophrenia have difficulty with relationships.	6.28 (1.52)
(21) Medications and therapies can help people with schizophrenia to function like the majority of society.	6.64 (1.59)

Table 1. Measures of Stereotypic Perceptions of People with Schizophrenia (continued)

Perceived Causes of Schizophrenia	Mean (*SD*)
How likely do you think the following factors contribute to causing someone to have schizophrenia?	
(1) Bad luck[*]	6.79 (2.83)
(2) Genetic factors	7.88 (1.38)
(3) Complications during pregnancy or at birth	6.30 (2.31)
(4) Family history of schizophrenia	7.99 (1.18)
(5) Poor parenting[*]	6.34 (2.42)
(6) Weak will power[*]	7.31 (1.90)
(7) Stressful circumstances in life[*]	6.08 (2.24)
(8) Character flaws[*]	6.91 (2.20)
(9) Chemical imbalance in the brain	8.30 (0.87)
(10) God's will[*]	5.78 (2.76)
Total	6.53 (.51)

[*] Reverse coded

Stereotypic Perceptions of Homeless People

Stereotypic perceptions of homeless people were measured in a similar way as stereotypic perceptions of people with schizophrenia. Based on a review of the relevant literature (e.g., Lee, Link and Toro 1991; Link et al. 1996; Link et al. 1995; Phelan et al. 1997; Toro and McDonell 1992), 14 statements that reflected people's perceptions of characteristics of homeless people and 14 perceived causes of homelessness were identified (see Table 2). Participants rated, on a 9-point Likert-type scale, the extent of their agreement (strongly agree to strongly disagree) with the 14 statements about characteristics of homeless people and the extent of the likelihood (highly likely to highly unlikely) of the 14 causes of homelessness.

Some items in the scale were reverse coded so that a higher score would represent perceptions consistent with common stereotypic perceptions identified in the above literature. The 28 items of the two scales combined, after they were standardized, yielded $\alpha = .66$ ($M = 5.49$, $SD = .63$).

Table 2. Measures of Stereotypic Perceptions of Homeless People

	Mean (*SD*)
How strongly do you agree or disagree with the following statements about homeless people?	
(1) There are more female homeless people than male homeless people.[*]	7.03 (1.32)
(2) A significant percentage of homeless people are African American.	4.09 (1.74)
(3) Homeless people are not educated.	4.58 (2.07)
(4) A majority of homeless people are over 40 years of age.	4.74 (1.78)
(5) A majority of homeless people are married.[*]	6.43 (1.58)
(6) Homeless people do not have contact with their family.	5.77 (1.75)
(7) A person can choose not to be homeless.	6.41 (2.20)
(8) Homeless people can take responsibility for important matters in their lives.[*]	2.99 (1.58)
(9) Laziness contributes to homelessness.	6.12 (1.87)
(10) Homeless people do not want to work.	5.13 (2.19)
(11) Homeless people tend to have a mental problem.	5.31 (2.08)
(12) Homeless people tend to be physically handicapped.	4.24 (1.74)
(13) Homeless people tend to be addicted to drugs.	5.83 (1.22)
(14) Homeless people tend to be alcoholics.	6.22 (1.42)
How likely do you think the following factors contribute to causing someone to have schizophrenia?	
(1) Bad luck	5.19 (2.31)
(2) God's will	3.80 (2.57)
(3) Lack of thrift and proper money management	7.32 (1.29)
(4) Lack of effort	6.90 (1.67)
(5) Lack of ability and talent	4.34 (1.86)
(6) Loose morals	4.65 (1.95)
(7) Low wages	5.96 (2.33)
(8) Scarcity of jobs	6.08 (2.50)
(9) Poor schools	5.44 (2.47)
(10) Racial discrimination	4.92 (2.57)
(11) Economic downturn	6.56 (2.13)
(12) Shortage of affordable housing	5.91 (2.32)
(13) Government aid	5.28 (2.40)
(14) Economic system that favors the rich over the poor	5.29 (2.48)
Total	5.49 (.63)

[*] Reverse coded

Attitude toward People with Schizophrenia

Researchers believe that the public's stigmatizing attitudes toward people with mental illness originate from their perceptions of dangerousness of people with mental illness (e.g., Link and Cullen 1986; Link et al. 1999; Penn, Chamberlin and Mueser 2003; Penn et al. 1999; Pescosolido 1999; Phelan et al. 2000). In the present research, therefore, attitude toward people with schizophrenia was operationalized as perceived dangerousness of people with schizophrenia and measured with the perceived dangerousness scale that was adapted from the previous research (Link and Cullen 1986). Participants rated eight statements about dangerousness of people with schizophrenia on a 9-point Likert-type scale (strongly agree to strongly disagree) (see Table 3). One of the statements ("People with schizophrenia are not more dangerous than the general public") was reverse coded so that a higher score would represent greater perceptions of dangerousness of people with schizophrenia. The eight items yielded $\alpha = .76$. Without the reversed item, the reliability improved slightly ($\alpha = .79$) ($M = 4.13$, $SD = 1.15$).

Table 3. Measure of Perceived Dangerousness of People with Schizophrenia

(1) People with schizophrenia have likely been in jail or prison at least once in their lifetime.
(2) People with schizophrenia are not more dangerous than the general public.[*]
(3) People with schizophrenia are more likely to commit violent crimes than other people.
(4) If a group of former schizophrenia patients lived nearby, parents should not allow their children to go outside alone.[†]
(5) One important thing about people with schizophrenia is that you can't tell what they will do from one minute to the next.[†]
(6) If I know that someone has had schizophrenia, I will be less likely to trust him or her.[†]
(7) The main purpose of mental hospitals should be to protect the public from people with schizophrenia.[†]
(8) Although some people with schizophrenia may seem all right, it is dangerous to forget for a moment that they have schizophrenia.[†]

[*] Reverse coded
[†] Adapted from Link and Cullen (1986)

Attitude toward Homeless People

Similar to attitude toward people with schizophrenia, attitude toward homeless people was operationalized as perceived dangerousness of homeless people. Participants rated nine statements about dangerousness of homeless people on a 9-point Likert-type scale (strongly agree to strongly disagree). Among the nine statements, seven statements were borrowed from Link et al. (1995) (see Table 4). One of the items ("Homeless people are not more dangerous than the general public") was reverse coded so that a higher score would represent greater perceptions of dangerousness of people with schizophrenia. The nine items yielded $\alpha = .72$ ($M = 5.24$, $SD = 1.04$).

Table 4. Measure of Attitude toward Homeless People

(1) Homeless people have likely been in jail or prison at least once in their lifetime.
(2) Homeless people are not more dangerous than the general public.[*]
(3) Homeless people are more likely to commit violent crimes than other people.[†]
(4) Even when homeless people seem all right, it is important to remember that they may be dangerous.[†]
(5) It's only natural to be afraid of a person who lives on the street.[†]
(6) If I knew a person who had been homeless, I would be less likely to trust him or her.[†]
(7) In the interest of public safety, homeless people should not be allowed to gather in public places.[†]
(8) The more homeless people there are in an area, the worse the neighborhood becomes.[†]
(9) The presence of homeless people spoils parks for families and children.[†]

[*] Reverse coded
[†] Adopted from Link et al. (1995)

Behavior Intentions Related to People with Schizophrenia

Previous research examined behavior intentions related to people with mental illness by measuring willingness to interact with people with mental illness, namely, social distance to people with mental illness (e.g., Link et al. 1999; Penn et al. 1994; Pescosolido et al. 2000; Phelan et al. 2000). Similarly, in the present research, behavior

intentions related to people with schizophrenia were operationalized as social distance to people with schizophrenia and measured with a scale adapted from previous research (e.g., Pescosolido et al. 1999; Phelan et al. 1997; Stuart and Arboleda-Florez 2001) (see Table 5). Participants rated, on a 9-point Likert-type scale (highly likely to highly unlikely), six statements about their willingness to interact with people with schizophrenia. A greater score on the measure would indicate more willingness to interact with people with schizophrenia. The six items yielded α = .91 (M = 5.61, SD = 1.96).

Table 5. Measure of Behavior Intentions Related to People with Schizophrenia

How likely would you be to do the following?
(1) Have a person with schizophrenia do odd jobs for you.
(2) Have a person with schizophrenia live in your community (e.g., living in the same building or the same neighborhood).
(3) Spend an evening socializing with a person with schizophrenia
(4) Make friends with a person with schizophrenia.
(5) Have a person with schizophrenia marry into your family.
(6) Have a person with schizophrenia work closely with you on a project in the community.

Behavior Intentions Related to Homeless People

Behavior intentions related to homeless people was also operationalized as social distance to homeless people, adapting the measure of social distance to people with schizophrenia (see Table 6). The six items yielded α = .84 (M = 3.81, SD = 1.66).

Table 6. Measure of Social Distance to Homeless People

How likely would you be to do the following?
(1) Have a homeless person do odd jobs for you.
(2) Have a homeless person live in your community (e.g., near where you live).
(3) Spend an evening socializing with a homeless person.
(4) Make friends with a homeless person.
(5) Have a homeless person marry into your family.
(6) Have a homeless person work closely with you on a project in the community.

Previous research showed that family history of an illness was significantly associated with people's perceptions and salience of the illness (Rimal and Kim 2002 2002). Adapted from the previous research, a set of questions were asked about participants' family history of schizophrenia, any other mental illnesses, and homelessness (see Table 7). Participants responded to the questions by answering Yes, No, Not applicable, or Don't know. If there was a family history of mental illness, they were also asked to indicate a type of mental illness diagnosed (see Table 8).

Table 7. Family History of Schizophrenia, Other Mental Illnesses, and Homelessness (% (Frequency))

To the best of your knowledge, did or does anyone listed below have schizophrenia/other mental illnesses [was or is anyone listed below homeless]?	Schizo-phrenia	Other Mental Illnesses	Homeless-ness
(1) One or both of your grandparents	4.4 (1)	8.8 (8)	2.2 (2)
(2) Your father	1.1 (1)	6.6 (6)	0 (0)
(3) Your mother	0 (0)	8.8 (8)	0 (0)
(4) Your brother	0 (0)	2.2 (2)	1.1 (1)
(5) Your sister	0 (0)	6.6 (6)	0 (0)
(6) Your uncle	0 (0)	2.2 (2)	2.2 (2)
(7) Your aunt	4.4 (4)	8.8 (8)	1.1 (1)
(8) Your cousin	2.2 (2)	9.9 (9)	3.3 (3)
(9) Your friend	4.4 (4)	18.7 (17)	7.7 (7)
(10) Your roommate	1.1 (1)	3.3 (3)	1.1 (1)
(11) Yourself	0 (0)	9.9 (9)	0 (0)

Table 8. Other Mental Illnesses Diagnosed (Frequency)

	Self	Others[*]
Attention Deficit Hyperactivity Disorder (ADHD)	1	4
Alcoholism	0	3
Alzheimer	3	0
Anxiety	1	2
Autism	0	1
Bipolar	1	14
Bulimia / Eating Disorder	1	1
Down Syndrome / Mental Retardation	0	4
Epilepsy	0	1
Major depression	5	34
Multiple Personality	0	1
Obsessive Compulsive Disorder	1	2
Post traumatic stress disorder	0	1

[*] Family members (e.g., grandparents, parents, siblings, uncles, aunts, and cousins), friends and roommates were aggregated into "Others."

Previous Contact

In addition to family history, previous contact with people with mental illness and homeless people were measured as previous research found it to be a significant predictor of people's attitudes and perceptions of these two groups of people (e.g., Corrigan and Penn 1999; Holmes et al. 1999; Link and Cullen 1986; Lyons and Ziviani 1995; Secker, Armstrong and Hill 1999; Stuart and Arboleda-Florez 2001). Participants responded Yes or No to two sets of five questions about their previous contact and experience with people with mental illness and homeless people, which were adapted from Link and Cullen (1986) (see Table 9). The aggregated responses ranged from zero to five for both previous contact with people with mental illness ($M = 1.98$, $SD = 1.48$) and previous contact with homeless people ($M = 1.74$, $SD = 1.44$).

Table 9. Measure of Previous Contact

Please answer either Yes or No to the following questions about [people with mental illness / homeless people].
(1) Besides the people in the above question (i.e., question on family history), have you ever known personally [a person who had mental illness / a person who was homeless]?
(2) Have you ever worked for pay or done volunteer work with [people who had mental illness / homeless people]?
(3) Do you have any friends who work for pay or do volunteer work with [people who had mental illness / homeless people]?
(4) Have you ever visited an agency in a community where [former mental patients /homeless people] are given job training?
(5) Have you ever been in [a mental health clinic or psychiatric hospital /a homeless shelter] as a visitor?

Social Desirability

Previous research suggested that people's tendency to give socially desirable answers were particularly strong for social issues and issues associated with stigma (Link et al. 1995; Penn, Chamberlin and Mueser 2003). Therefore, participants' social desirability was measured with the Marlow-Crowne social desirability scale. Instead of using the original Marlow-Crowne scale that consisted of 20 items (Crowne and Marlowe 1960), however, a shorter version, developed by Strahan and Gerbasi (1972), was used in this research. Strahan and Gerbasi (1972) split the 20 items of the original Marlow-Crowne scale into smaller scales of 10 items and found the reliability of the scales to range from .59 to .70. In this research, the ten items that were found to have good reliability with female college students were used (α = .61), since the sample for the present research were drawn from a female-dominant population (i.e., students enrolled in undergraduate Advertising classes). Strahan and Gerbasi (1972) listed five positively worded statements first and then five negatively worded statements. In this research, however, positively worded statements and negatively worded statements (reverse coded)

were listed alternately in order to minimize potential effects of response set (see Table 10). The ten items yielded α = .62 (*M* = 4.79, *SD* = 1.07).

Table 10. Measure of Social Desirability

(1) I'm always willing to admit it when I make a mistake.
(2) I like to gossip at times.[*]
(3) I always try to practice what I preach.
(4) There have been occasions when I took advantage of someone.[*]
(5) I never resent being asked to return a favor.
(6) I sometimes try to get even rather than forgive and forget. [*]
(7) I have never being irked when people expressed ideas very different from my own.
(8) At times I have really insisted on having things my own way. [*]
(9) I have never deliberately said something that hurt someone's feelings.
(10) There have been occasions when I felt like smashing things. [*]

[*] Reverse Coded

Exposure to Movies

The literature suggested the media had significant influence on people's perceptions and attitudes toward people with mental illness (e.g., Allen and Nairn 1997; Angermeyer and Matschinger 1996; Granello and Pauley 2000; Granello, Pauley and Carmichael 1999; Hyler 1988; Philo 1996; Stout, Jennings and Kim 2004). As a way to measure the media effects, participants were asked if they had watched each of 24 movies that portrayed people with mental illness or schizophrenia (Yes or No) (see Table 11).

Table 11. Measure of Exposure to Movies

Movies	% (Frequency)
(1) A Beautiful Mind	74.7 (68)
(2) Angel Baby	0 (0)
(3) Benny and Joon	24.2 (22)
(4) Dare to Love	1.1 (1)
(5) Don Juan de Marcos	11.0 (10)
(6) Donnie Darko	44.0 (40)
(7) Me, Myself, and Irene	68.1 (62)
(8) One Flew over the Cuckoo's Nest	36.6 (33)
(9) Pi	15.4 (14)
(10) Psycho	49.5 (45)
(11) Shine	17.6 (16)
(12) Silence of the Lambs	72.5 (66)
(13) Spider	5.5 (5)
(14) The Cell	41.8 (38)
(15) The Fight Club	78.0 (71)
(16) The Gingerbread Man	2.2 (2)
(17) The Messenger	14.3 (13)
(18) The Saint of Fort Washington	0 (0)
(19) The Snake Pit	0 (0)
(20) The Three Faces of Eve	3.3 (3)
(21) Through a Class Darkly	1.1 (1)
(22) Whale Music	0 (0)
(23) What About Bob	51.6 (47)

Demographic Variables

Five demographic variables were measured, including sex, age, classification in the college (e.g., freshmen, sophomore, junior, senior, graduate, and other), major, and ethnicity. Demographic variables were used to profile the participants of the study.

Results & Discussion

The results of the pretest showed that participants held fairly correct perceptions about people with schizophrenia ($M = 6.53$, $SD = .51$), whereas perceptions about homeless people tended to be consistent with common stereotypes of homeless people identified in the literature ($M = 5.49$, $SD = .63$). Participants were likely to identify symptoms (e.g., delusions, hallucinations) and causes (e.g., biological factors) of schizophrenia correctly, although they still viewed schizophrenia as multiple or split personality. While they believed that people with schizophrenia had problems of concentrating and might not be unaware of their conditions, they separated schizophrenia from an illness that affects one's intelligence (e.g., mental retardation).

With regards to the perceptions of homeless people, participants appeared to hold an image of a homeless person being male, single and without contact with the family, and addicted to drugs and alcohols. The perceptions of homeless people as alcoholics were particularly strong ($M = 6.22$, $SD = 1.42$). Participants were more likely to view homeless people as alcoholics than as the mentally ill ($M = 5.31$, $SD = 2.08$) or drug addicts ($M = 5.83$, $SD = 1.22$). In terms of causes of homelessness, participants considered individual factors as more responsible than environmental factors. For instance, participants strongly believed that laziness, lack of effort, and lack of thrift were causes of homelessness, while a homeless person could choose not to be homeless. Economic factors such as economic downturn and scarcity of jobs were also attributed to homelessness.

As for attitudes toward people with schizophrenia and homeless people, participants did not necessarily view people with schizophrenia as dangerous ($M = 4.13$, $SD = 1.15$), but viewed homeless people as more dangerous ($M = 5.24$, $SD = 1.04$). These perceptions of dangerousness appeared to explain the different degrees of

willingness to interact with the two groups of people. Participants were more willing to interact with people with schizophrenia (M = 5.61, SD = 1.96) than with homeless people (M = 3.81, SD = 1.66).

With regards to family history of schizophrenia, other mental illnesses, and homelessness, the results showed that few participants had a family member or an acquaintance that had any of the three problems, while major depression and bipolar were the most frequently diagnosed mental illnesses among their acquaintances.

Among the 23 movies that portrayed a person(s) with mental illness, a majority of participants (97%) watched at least one of the 23 movies that portrayed a person with mental illness or schizophrenia. On average, participants watched six movies (M = 6.15, SD = 3.08), with a range of zero to 13 movies. Three participants (3%) did not watch any of the 23 movies, while one participant (1%) watched 13 movies. Approximately half of the participants (51%) watched five to ten movies. Most popularly watched movies include "The Fight Club" (78.0%), "A Beautiful Mind" (74.7%), "Silence of the Lambs" (72.5%), and "Me, Myself, and Irene" (68.1%).

Overall, measures used in the pretest had low reliability. Especially, measures to assess stereotypic perceptions of people with schizophrenia (α = .67) and homeless people (α = 66) were low. These measures were developed for this research since the existing literature does not provide a standard measure to assess stereotypic perceptions of these two groups. Previous research on stereotypes often assessed participants' perceptions about stereotyped groups by measuring the extent of their agreement with statements that described characteristics of the stereotyped groups (e.g., van Knippenberg, Dijksterhuis and Vermeulen 1999). Responses to the statements were then examined individually, rather than aggregated. In the present research, individual measures were aggregated to represent overall perceptions of the two stereotyped groups. However, the

individual measures might have assessed the perceptions of different aspects of the two stereotyped groups, which were not necessarily related to each other. In other words, people's perceptions about some characteristics of the stereotyped groups were not necessarily related to the perceptions about other characteristics of the same groups. As the measure of reliability represents correlations between individual items in the scale, the aggregated measure of the items that measured perceptions of different aspects of the stereotyped group would not have yielded high internal consistency. While the present research made an initial attempt to develop a multi-item measure of perceptions of people with schizophrenia and homeless people, it warrants future research for developing a reliable standard measure.

Chapter VI. Pilot Study

Following the test of the pretest, a pilot study was conducted in the second phase of the dissertation research. Two main objectives of the pilot study were to test the efficacy of the interactivity manipulation and to examine the reliability of all measures to be used in the main experiment. A majority of measures used in the pretest were adopted in the pilot study while some revisions were made based on the results of the pretest. The first section of this chapter outlines the design and the procedure of the pilot study, followed by the description of the interactivity manipulation. The second section describes new and revised measures used in the pilot study and the results of the tests of the reliability. The last section of the chapter discusses the results of the preliminary analysis of the pilot study.

Design

The pilot study was conducted with a 2 (interactivity) X 3 (stereotypic perceptions), between-subject design. Two levels (high versus low) of interactivity were manipulated, whereas stereotypic perceptions of people with schizophrenia were measured and categorized into three levels (incorrect, mixed, and correct stereotypic perceptions), using a tercile split.

Participants received a pre-manipulation questionnaire, an experiment stimulus, and a post-manipulation questionnaire. Participants in both high and low interactivity conditions were asked the same questions during the course of the experiment. However, the order of some questions in the pre-manipulation questionnaire and the questions embedded in the experiment stimulus differed in the two conditions in order to facilitate the interactivity manipulation. Specifically, participants in the low interactivity condition

were asked about their perceptions of people with schizophrenia in the pre-manipulation questionnaire, whereas participants in the high interactivity condition were asked the same questions during the exposure to the experiment stimulus after the pre-manipulation questionnaire. The rest of the questions in the pre-manipulation questionnaire and the post-manipulation questionnaire were asked in the same order for all participants. Questions on perceptions about homeless people and attitude toward homeless people were asked in both pre-manipulation questionnaire and post-manipulation questionnaire to examine changes in the two variables before and after the exposure to the experiment stimulus. Figure 6 summarizes the design of the pilot study and the variables measured.

Participants

A total of 53 students enrolled in undergraduate Advertising classes participated in the pilot study for exchange of extra course credit. A majority of participants majored in Liberal Arts (23%) or Communications (58%). Ethnicities of the participants included Caucasian (53%), Asian (23%), Hispanic (11%), and other (13%). Females comprised 76% of the sample and the average age of the sample was 20 years ($SD = 3.64$).

Figure 6. Design and Variables Measured in the Pilot Study

	High Interactivity	Low Interactivity
Instructions of the Experiment	O	O
Pre-Manipulation Questionnaire		Perceptions of people with schizophrenia Perceived characteristics of people with schizophrenia Perceived causes of schizophrenia
	Perceptions of homeless people • Perceived characteristics of homeless people • Perceived causes of homelessness	
	Attitude toward homeless people	
Experiment Stimulus	Perceptions of people with schizophrenia • Perceived characteristics of people with schizophrenia • Perceived causes of schizophrenia	
	Read a story about a person with schizophrenia	
Post-Manipulation Questionnaire	Self-assessed comprehension	
	Deep learning (Comprehension)	
	Surface learning (Knowledge recall)	
	Task involvement	
	Attitude toward people with schizophrenia	
	(Post) Attitude toward homeless people	
	Behavior intentions related to people with schizophrenia	
	Behavior intentions related to homeless people	
	Information seeking intentions	
	(Post) Perceptions of homeless people • Perceived characteristics of homeless people • Perceived causes of homelessness	
	Perceived interactivity	
	Perceived user control	
	Perceived responsiveness	
	Previous contact with people with mental illness	
	Pervious contact with homeless people	
	Social desirability	
	Exposure to movies	
	Demographic variables (sex, age, major, ethnicity)	

Procedure

The pilot study was conducted in a university computer lab. When participants arrived at the lab, they were seated in front of an individual computer and randomly assigned to one of the two interactivity conditions (high versus low). All of the study materials, including the experiment stimulus and the questionnaires, were presented on the Web.

The pilot study was described as a "study on social issues" to participants. Participants were told that they would be asked to read a story about someone and to provide feedback about the story, the person in the story, and the Web site. They read the instructions of the study and began the experiment by completing the pre-manipulation questionnaire on the next Web page. In this questionnaire, participants in the low interactivity condition were asked about their perceptions of characteristics of people with schizophrenia and homeless people, causes of schizophrenia and homelessness, and dangerousness of homeless people. In the high interactivity condition, participants were asked about their perceptions of characteristics of homeless people, causes of homelessness, and dangerousness of homeless people (see Figure 6).

After the pre-manipulation questionnaire, participants continued to the stimulus Web pages, in which the interactivity manipulation was embedded. Participants in both high and low interactivity conditions read the same story about a person with schizophrenia. However, participants in the high interactivity condition were asked about their perceptions of people with schizophrenia and causes of schizophrenia before they read a story, whereas participants in the low interactivity condition were not asked any questions, but read the story in a predetermined, chronological order. The questions asked in the high interactivity condition were the same questions that were asked in the pre-manipulation questionnaire in the low interactivity condition.

Once they finished viewing the stimulus Web pages, they were asked to complete the post-manipulation questionnaire, which measured dependent and control variables. When all participants finished the post-manipulation questionnaire, they were asked verbally about general impressions of the story and the Web site. Finally, participants were provided a written debriefing form, thanked, and dismissed.

Interactivity Manipulation

As conceptualized in Chapter II, interactivity was manipulated in terms of user control and responsiveness. User control was operationalized as control over sequence of information, whereas responsiveness was operationalized as relevance of information to questions that were asked prior to viewing the information.

The experiment stimulus consisted of nine Web pages, each of which contained a story about a person named Mary, who developed schizophrenia after a normal childhood. The story was written as if it was narrated by Mary's parents about Mary's childhood and family background, development of symptoms of schizophrenia, facts and treatments of schizophrenia, and adjustment with life with schizophrenia. As they followed through the stimulus Web pages, participants were shown topics of the story covered in the nine Web pages. Participants in the high interactivity condition were able to choose a topic to view on the next Web page (high user control). Once they chose a topic, they were asked about their perceptions of people with schizophrenia on the following Web page. After answering the questions, they were led to the next Web page that contained a story relevant to the questions they were asked on the previous Web page (high responsiveness). This type of interactions (i.e., choosing a topic, answering questions, and reading a story) continued until they read all of the nine Web pages. Participants in the low interactivity condition were not given an option to choose a topic to view on the

next Web page, but followed the stimulus Web pages in a predetermined, chronological order (low user control). They were not asked questions before reading a story on the next Web page, either (low responsiveness).

In order to control for the amount of exposure of the stimulus, the "Go Back" function of the Web browser was disabled and the links to the visited Web pages were deactivated, while participants were asked to view each Web page only once. The stimulus Web pages used in the experiment are shown in Appendix A.

Measures

In the pilot study, a total of 19 variables were measured (see Figure 7). Of the 19 variables, 11 variables, which were concerned with perceptions, attitudes and behavior intentions related to people with schizophrenia and homeless people, previous contact, social desirability, exposures to movies, and participants' demographic information, were measured in a similar way as in the pretest. Of the variables measured in the pretest, family history of schizophrenia, other mental illnesses, and homelessness were dropped in the pilot study. Family history was initially considered as a relevant variable that might influence participants' perceptions, attitudes and behavior intentions related to people with schizophrenia and homeless people, and thus treated as a control variable. However, the results of the pretest showed that occurrences on the measure were rare and that the variable did not give much information. Besides, it was deemed that similar information could be obtained by previous contact with the above three groups of people, which is a more frequently measured variable in the research on stereotypes of mental illness (e.g., Penn, Chamberlin and Mueser 2003). New variables added in the pilot study included self-assessed comprehension, deep and surface learning, task involvement, information seeking intentions, and interactivity manipulation checks.

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Same Measures from the Pretest

Stereotypic Perceptions of People with Schizophrenia

As in the pretest, stereotypic perceptions of people with schizophrenia were measured with perceptions of characteristics of people with schizophrenia (21 statements) and perceived causes of schizophrenia (10 causes) (see Table 13). The 31 items of the two scales combined, after they were standardized, yielded the reliability of $\alpha = .70$ ($M = 6.37$, $SD = .53$). The 31 items were averaged into an index. The index was then used to create the three groups of the second independent variable, namely, the correct perceptions group, the mixed perceptions group, and the incorrect perceptions group (tercile-split). One-way analysis of variance with planned contrasts showed that stereotypic perceptions between the three groups were statistically significantly different from each other ($F(2, 42) = 80.78$, $p < .00$) (see Table 12).

Table 12. Three Groups of Stereotypic Perceptions

		N	Mean (*SD*)	*F*(*df*)	*p*
Stereotypic Perceptions	Incorrect	15	5.79 (.32)	80.78 (2, 42)	.00
	Mixed	15	6.37 (.13)		
	Correct	15	6.93 (.25)		

Table 13. Measures of Stereotypic Perceptions of People with Schizophrenia

Perceived Characteristics of People with Schizophrenia	Mean (*SD*)
How strongly do you agree or disagree with the following statements about people with schizophrenia (a type of mental illness)?	
(1) People with schizophrenia often see things that other people do not.	6.83 (2.11)
(2) People with schizophrenia are typically geniuses.*	5.77 (1.94)
(3) People with schizophrenia tend to avoid interacting with others.	5.28 (1.83)
(4) People with schizophrenia tend to lose touch with reality.	7.43 (1.49)
(5) People with schizophrenia often hear things that other people do not.	7.43 (1.34)
(6) People with schizophrenia are not as smart as other people their age.*	7.15 (1.63)
(7) People with schizophrenia tend to have problems communicating.	6.21 (1.94)
(8) People with schizophrenia are mentally retarded.*	7.08 (1.74)
(9) People with schizophrenia have split or multiple personality.*	3.29 (1.47)
(10) Schizophrenia is a relatively common illness.	5.15 (1.82)
(11) Schizophrenia occurs more often in men than women.*	4.89 (1.60)
(12) Schizophrenia affects one's ability to concentrate.	6.43 (1.81)
(13) You can tell if someone has schizophrenia just by the way they look.*	7.38 (1.68)
(14) People with schizophrenia tend to experience the same set of symptoms.*	5.26 (2.22)
(15) There are no effective treatments for schizophrenia.*	6.00 (1.93)
(16) People with schizophrenia may be unaware that they are ill.	6.88 (1.48)
(17) People with schizophrenia are able to lead productive lives.	6.06 (1.75)
(18) Symptoms of schizophrenia can be managed by taking medications.	6.87 (1.45)
(19) With treatment, people with schizophrenia are able to carry out day-to-day tasks.	7.23 (1.38)
(20) People with schizophrenia tend to have difficulty with relationships.	6.51 (1.72)
(21) Medications and therapies can help people with schizophrenia to function like the majority of society.	7.29 (1.49)

Table 13. Measures of Stereotypic Perceptions of People with Schizophrenia (continued)

Perceived Causes of Schizophrenia	Mean (*SD*)
How likely do you think the following factors contribute to causing someone to have schizophrenia?	
(11) Bad luck*	7.55 (2.20)
(12) Genetic factors	7.60 (1.42)
(13) Complications during pregnancy or at birth	5.85 (2.14)
(14) Family history of schizophrenia	7.62 (1.43)
(15) Poor parenting*	5.62 (2.40)
(16) Weak will power*	7.34 (1.98)
(17) Stressful circumstances in life*	4.17 (2.22)
(18) Character flaws*	5.75 (2.34)
(19) Chemical imbalance in the brain	8.08 (1.13)
(20) God's will*	5.89 (2.65)
Total	6.37 (.53)

* Reverse coded

Other Variables

The other variables that were operationalized and measured in the same way as in the pretest included attitude and behavior intentions related to people with schizophrenia and homeless people, previous contact with people with mental illness and homeless people, social desirability, and participants' demographic information. Among these variables, attitude toward homeless people, as operationalized as perceived dangerousness of homeless people, were measured in pre- and post-manipulation questionnaires. The reliability of these measures is shown in Table 14.

Table 14. Measures Taken from the Pretest

Measures	Reliability (α)
Perceived dangerousness of people with schizophrenia	.83
Perceived dangerousness of homeless people	
Pre-manipulation measure	.79
Post-manipulation measure	.87
Social distance to people with schizophrenia	.86
Social distance to homeless people	.86
Social desirability	.57*

* The reliability improved from α = .50 after deleting one item, "I like to gossip at times," (reverse-coded).

Revised Measures

Stereotypic Perceptions of Homeless People

      Stereotypic perceptions of homeless people were measured in a similar way as in the pretest. In the pretest, 14 statements describing characteristics of homeless people and 14 causes of homelessness were used to measure perceptions of homeless people. In the pilot study, however, as this variable was measured twice, before and after the exposure to the experiment stimulus, some items were dropped in order to keep the duration of the pilot study in a reasonable length (e.g., approximately 30 minutes). Stereotypes of homeless people that were more commonly discussed in the literature were selected, resulting in 10 descriptions of the characteristics of homeless people and 7 causes of homelessness (see Table 15). The 17 items, after they were standardized, produced $\alpha = .48$ for the pre-manipulation measure and $\alpha = .43$ for the post-manipulation measure. The reliability improved to $\alpha = .59$ for both pre- and post-manipulation measures after three statements about characteristics of homeless people and one cause of homelessness were deleted iteratively. The four items that did not work well with the rest of the items were "Homeless people do not have contact with their family," "A person can choose not to be homeless," "Homeless people can take responsibility for important matters in their lives," and "God's will" as a cause of homelessness.

Table 15. Measures of Stereotypic Perceptions of Homeless People

	Mean (SD)	
	Pre-manipulation Measure	Post-manipulation Measure
Perceived Characteristics of Homeless People		
How strongly do you agree or disagree with the following statements about homeless people?		
(15) There are more female homeless people than male homeless people.*	6.51 (1.65)	6.23 (1.62)
(16) A majority of homeless people are married.*	7.08 (1.30)	6.48 (1.34)
(17) Homeless people do not have contact with their family.†	5.42 (2.01)	5.60 (1.81)
(18) A person can choose not to be homeless. †	6.53 (2.23)	6.04 (2.17)
(19) Homeless people can take responsibility for important matters in their lives.* †	3.09 (1.83)	3.40 (1.67)
(20) Laziness contributes to homelessness.	6.67 (1.57)	6.54 (1.49)
(21) Homeless people tend to have a mental problem.	4.74 (1.79)	4.94 (1.95)
(22) Homeless people tend to be physically handicapped.	3.87 (1.75)	4.23 (1.73)
(23) Homeless people tend to be addicted to drugs.	5.80 (1.51)	5.53 (1.59)
(24) Homeless people tend to be alcoholics.	6.23 (1.69)	6.12 (1.31)
Perceive Causes of Homelessness		
How likely do you think the following factors contribute to causing someone to have schizophrenia?		
(15) God's will†	3.15 (2.31)	3.08 (2.29)
(16) Lack of thrift and proper money management	7.15 (1.61)	7.21 (1.71)
(17) Lack of effort	7.21 (1.54)	7.19 (1.44)
(18) Low wages	6.25 (2.25)	5.94 (2.42)
(19) Scarcity of jobs	5.47 (2.64)	5.50 (2.49)
(20) Economic downturn	5.72 (2.51)	5.72 (2.45)
(21) Shortage of affordable housing	5.89 (2.63)	5.87 (2.10)
Total	5.73 (.62)	5.61 (.55)

* Reverse Coded
† Deleted to improve the reliability

The results of the pretest showed that among the 23 movies measured, 9 movies were hardly known to the participants and thus dropped in the pilot study. As a result, a total of 14 movies were measured in the pilot study and the responses to the 14 movies (Yes or No) were added into an index (see Table 16).

Table 16. Measure of Exposure to Movies

Movies	% (Frequency)
(24) A Beautiful Mind	79.2 (42)
(25) Benny and Joon	17.0 (9)
(26) Don Juan de Marcos	11.3 (6)
(27) Donnie Darko	32.1 (17)
(28) Me, Myself, and Irene	47.2 (25)
(29) One Flew over the Cuckoo's Nest	26.4 (14)
(30) Pi	17.0 (9)
(31) Psycho	43.4 (23)
(32) Shine	17.0 (9)
(33) Silence of the Lambs	54.7 (29)
(34) The Cell	34.0 (18)
(35) The Fight Club	71.7 (38)
(36) The Messenger	9.4 (5)
(37) What About Bob	30.2 (16)

New Measures

Self-Assessed Comprehension

The measure of self-assessed comprehension was borrowed from Mick (1992) and consisted of two items (easy/difficult, confusing/understandable) that asked about participants' experience reading the story on the Web site. The two items were varied on a 9-point semantic differential scale and coded in a way that a higher score would represent greater self-assessed comprehension. The two items were significantly correlated (Pearson product moment coefficient of correlation $r = .54$, $p < .00$) and averaged into an index.

<u>Deep and Surface Learning</u>

Deep learning is operationalized as comprehension and surface learning as knowledge recall. Knowledge recall involves retention or retrieval of independent facts, which is consistent with the objectivist view of learning. Comprehension involves more than retention or retrieval of independent facts, but "the ability to integrate them into meaningful "system"" (Tremayne 2002, p. 83), which reflects the constructivist view of learning.

Comprehension and knowledge recall were measured with 24 comprehension questions and 24 knowledge recall questions, respectively, in a multiple-choice or true-false format (see Appendix B). Participants were also given an option to choose "Don't know" in order to reduce pressures for guessing and to obtain more accurate estimates of learning (Jacoby and Hoyer 1989). The key difference between the comprehension questions and the knowledge recall questions was that the knowledge recall questions were directly derived from the content of the story on the Web site, whereas the comprehension questions were developed by paraphrasing and synthesizing the information in the story (Jacoby and Hoyer 1989). Correct answers were scored as +1, incorrect as −1 (to compensate for guessing behavior), and "don't know" as 0 (Mick 1992).

Even though questions were based on the content of the story, participants could have known about people with schizophrenia and answered the questions correctly without having read the story on the stimulus Web site. Therefore, a difficulty level of each question was examined by calculating the mean of each question and subtracting it from one (Rimal and Kim 2002). For instance, if the mean of a question was .82, then the difficulty level of this question was calculated as $1 - .82 = .18$. Each correct response was then weighted in proportion to its difficulty level. Weighted responses to

the comprehension questions ranged from -2.59 to 5.91 ($M = 1.95$, $SD = 1.74$). Weighted responses to the knowledge recall questions ranged from -7.50 to 9.77 ($M = .03$, $SD = 4.60$). The 24 responses, each for comprehension and knowledge recall, were added into an index.

 Task Involvement

Task involvement was measured with the Personal Involvement Inventory for Advertising (PIIA) (Zaichkowsky 1994) with two additional items (engaging/not engaging, motivating/not motivating) (see Table 17). The items in the scale were coded in a way that a higher score would represent greater task involvement. The 12 items were averaged into an index ($\alpha = .92$).

Table 17. Measure of Task Involvement

Below is a set of word pairs. Please check the space closest to the word that best reflects your experience reading the story on the Web site.
(22) Important / Unimportant[*]
(23) Boring / Interesting
(24) Relevant / Irrelevant[*]
(25) Exciting / Unexciting[*]
(26) Means noting to me / Means a lot to me
(27) Appealing / Unappealing[*]
(28) Fascinating / Mundane[*]
(29) Worthless / Valuable
(30) Involving / Uninvolving[*]
(31) Not needed / Needed
(32) Engaging / Not engaging[*] (new)
(33) Motivating / Not motivating[*] (new)

[*] Reverse coded

Information Seeking Intentions

After the post-manipulation questionnaire, participants were told that they completed the study and asked whether they were interested in getting additional information about people with schizophrenia, people with other mental illnesses, or

homeless people (Yes or No). They were also asked to provide an email address if they wanted to receive any of the additional information. Out of 53 participants, eight percent, six percent, and nine percent wanted to receive more information about people with schizophrenia, people with other mental illnesses, and homeless people, respectively.

Interactivity Manipulation Checks

The efficacy of the interactivity manipulation was examined with three sets of questions, each of which measured perceived overall interactivity, perceived user control, and perceived responsiveness. Perceived user control and perceived responsiveness were measured with multiple-item scales, whereas perceived overall interactivity was measured with a single item ("The Web site is interactive.")

Participants rated, on a 9-point Likert-type scale, the extent of their agreement (strongly agree to strongly disagree) with four statements about controllability of the Web site, borrowed from Liu (2002), and six statements about responsiveness of the Web site created for this research (see Table 18). Negatively phrased items were reverse coded so that a greater score would indicate greater perceptions of user control or responsiveness.

The reliability of the four statements about perceived user control yielded $\alpha = .61$, which improved to $\alpha = .68$ after deleting the item, "While navigating in the Web site, I had absolutely no control over what I could do on the Web site." The three items were thus averaged into an index. The reliability of the six statements about perceived responsiveness was $\alpha = .28$. The reliability improved to $\alpha = .50$ after deleting the item, "My choice(s) on the previous Web page was (were) absolutely necessary to see the story on the next Web page." The five items were averaged into an index.

In Chapter II, it was discussed that user control and responsiveness were closely related, but distinct dimensions of interactivity. To examine the distinctness of the two

dimensions, a principal components factor analysis with varimax rotation was performed on the items retained to form indices for perceived user control and perceived responsiveness. The results showed that all of the three items to measure perceived user control were loaded on the same factor, whereas one of the five items ("I would have gotten the same Web page no matter what I did on the Web site") to measure perceived responsiveness were cross-loaded (see Table 18).

The efficacy of the interactivity manipulation was examined with a series of t tests, each on perceived overall interactivity, perceived user control, and perceived responsiveness (see Table 19). The results on the perceived overall interactivity showed that participants in both high interactivity condition ($M = 6.08$, $SD = 1.94$) and low interactivity condition ($M = 6.22$, $SD = 1.83$) perceived the overall interactivity of the Web site similarly, $t(1, 51) = .28$, $p > .39$. However, the results on the perceived user control and perceived responsiveness showed that participants in the high interactivity condition perceived themselves to be in more control ($M = 5.83$, $SD = 1.72$, $t(1, 49) = 2.27$, $p < .01$), and the content of the Web site to be more responsive ($M = 6.91$, $SD = 1.04$, $t(1, 51) = 2.12$, $p < .02$) than those in the low interactivity condition ($M = 4.76$, $SD = 1.65$ for perceived user control; and $M = 6.32$, $SD = .98$ for perceived responsiveness). The cross-over effect of the interactivity manipulation on prior perceptions of people with schizophrenia was not significant ($t(1, 43) = 1.11$, $p > .14$).

Table 18. Factor Analysis of User Control and Responsiveness

	Dimensions of Interactivity	
	User Control	Responsiveness
Perceived User Control		
(1) I felt that I had a lot of control over my visiting experiences at this Web site.	**0.81**	-0.01
(2) While I was on the Web site, I could choose freely what I wanted to see.	**0.75**	0.14
(3) While navigating in the Web site, I had absolutely no control over what I could do on the Web site.[*†]		
(4) While navigating in the Web site, my actions decided the kind of experiences I got.	**0.72**	-0.21
Perceived Responsiveness		
When I clicked on a link to view a next Web page:		
(1) I was shown a story that was relevant to thoughts or questions I had in mind.	-0.03	**0.71**
(2) The story on the next Web page was not what I expected to see.[*]	-0.16	**0.65**
(3) I found the story on the next Web page suitable.	-0.07	**0.80**
(4) I would have gotten the same Web page no matter what I did on the Web site.	**0.53**	-0.14
(5) The story on the next Web page was inappropriate.	0.01	**0.83**
(6) My choice(s) on the previous Web page was (were) absolutely necessary to see the story on the next Web page. [†]		
Eigenvalue	1.87	2.52
Percent of Variance Explained	23.43	31.46

[*] Reverse coded
[†] Deleted to improve the reliability

Table 19. Interactivity Manipulation Checks and Cross-over Effects

		N	Mean (SD)	t (df)	p
Overall Interactivity	High	27	6.08 (1.94)	.28(1, 51)	.39
	Low	26	6.22 (1.83)		
User Control	High	25	5.83 (1.72)	2.27(1, 49)	.01
	Low	26	4.76 (1.65)		
Responsiveness	High	27	6.91 (1.04)	2.12(1, 51)	.02
	Low	26	6.32 (.98)		
Stereotypic Perceptions	High	23	6.45 (.47)	1.11(1, 43)	.14
	Low	22	6.28 (.58)		

An examination of the cross-over effect of stereotypic perceptions of people with schizophrenia on the three measures of perceived interactivity revealed that the three groups of stereotypic perceptions had significant different perceptions of overall interactivity ($p < .00$) and user control ($p < .00$), whereas perceived responsiveness was similar between the three groups ($p > .12$) (see Table 20). Specifically, the mixed perceptions group ($M = 4.87$, $SD = 1.85$) perceived the Web site to be significantly less interactive than the correct perceptions group ($M = 6.87$, $SD = 1.51$, $t(1, 42) = 3.18$, $p < .00$) and the incorrect perceptions group ($M = 6.33$, $SD = 1.80$, $t(1, 42) = 2.33$, $p < .01$), while the latter two groups did not differ ($t(1, 42) = .85$, $p > .20$). With regards to perceived user control, the correct perceptions group ($M = 6.31$, $SD = 1.65$) perceived themselves to be significantly more in control than the mixed perceptions group ($M = 4.24$, $SD = 1.45$, $t(1, 41) = 3.34$, $p < .00$) and the incorrect perceptions group ($M = 5.20$, $SD = 1.87$, $t(1, 41) = 1.79$, $p < .04$), while the difference between the latter two group was marginally significant ($t(1, 41) = 1.57$, $p < .06$).

Table 20. Cross-Over Effects of Stereotypic Perceptions of People with Schizophrenia on Interactivity

		N	Mean (*SD*)	*F*(*df*)	*p*
Overall Interactivity	Incorrect	15	6.33 (1.80)	5.42 (2, 42)	.00
	Mixed	15	4.87 (1.85)		
	Correct	15	6.87 (1.51)		
User Control	Incorrect	15	5.20 (1.87)	5.57 (2, 41)	.00
	Mixed	15	4.24 (1.45)		
	Correct	15	6.31 (1.65)		
Responsiveness	Incorrect	15	6.21 (1.10)	1.44 (2, 42)	.12
	Mixed	15	6.73 (1.00)		
	Correct	15	6.80 (1.00)		

Results & Discussion

Interactivity Manipulation

One of the objectives of the pilot study was to test the efficacy of the interactivity manipulation. The results of the pilot study showed that the interactivity manipulation was only partially successful. Among the three measures of interactivity manipulation check, the two conditions of interactivity (high and low) differed on perceived user control and perceived responsiveness, but not on perceived overall interactivity. Even on the perceived user control and the perceived responsiveness, although the difference between the two conditions was statistically significant ($p < .01 \sim .02$), the differences in the means were marginal ($\Delta M = 1.07$ for perceived user control and $\Delta M = .59$ for perceived responsiveness). Besides, the measures of perceived user control and perceived responsiveness had rather low reliability ($\alpha = .61 \sim .68$ for perceived user control and $\alpha = .28 \sim .50$ for perceived responsiveness), while one of the items of the measure of perceived responsiveness was cross-loaded on the perceived user control.

A few explanations may be provided for the above results on the interactivity manipulation. One explanation concerns the sensitivity of the measures. In other words,

the measures might not have truly reflected participants' experience at the Web site. For instance, the perceptions of overall interactivity were measured with a single item, "The Web site was interactive." Interactivity of a Web site in the present research meant user controllability and responsiveness. Therefore, the Web site was created in terms of the two interactivity dimensions while controlling for other dimensions (e.g., multimodality). However, such a Web site might not have been sophisticated enough to be perceived as "interactive" by the participants in the high interactivity condition, resulting in no significant difference in the perceived overall interactivity between the two interactivity conditions.

A similar explanation can be given for the marginal mean difference in perceived user control between the two conditions of interactivity. User control was manipulated in terms of presence or absence of control over sequence, rather than the extent of control. Participants in the high interactivity condition were given control exclusively over the sequence of the information, whereas participants in the low interactivity condition were not given any control. Although they had some control, participants in the high interactivity condition might not have agreed strongly when they were asked if they had *a lot of* control over their visiting experience at the Web site and if they could choose *freely* what they wanted to see.

The marginal mean difference in perceived responsiveness is attributable to the incomparability of the high versus low conditions of interactivity as well as the sensitivity of the measure. In the high interactivity condition, participants were asked questions about people with schizophrenia and then shown a story about a person with schizophrenia that was relevant to the questions asked previously. In the low interactivity condition, participants read a story about the person with schizophrenia without being asked. While participants in the high interactivity condition viewed the story following

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the questions to be relevant (relevance of stories to the questions), participants in the low interactivity condition might have viewed the stories on different Web pages as relevant to each other (relevance between stories). Therefore, when they were asked if they were shown a relevant story on the subsequent Web page, participants in both conditions were likely to have responded similarly.

The low reliability of perceived user control ($\alpha = .61 \sim .68$) and perceived responsiveness ($\alpha = .28 \sim .50$) may be related to the issues discussed above. The test of internal consistency (Chronbach's α) could have shown a low correlation between items in the measures, because some items in the measures were not sensitive to participants' experience at the Web site (e.g., limited control over sequence) or applicable for participants in one of the conditions only as a result of incomparability of the two manipulation conditions. For instance, the statement in the responsiveness manipulation check measure, "My choice(s) on the previous Web page was (were) absolutely necessary to see the story on the next Web page," was applicable for participants in the high interactivity condition only.

The findings on the interactivity manipulation suggest that the measures of interactivity manipulation checks should be revised so to be consistent with participants' experience at the Web site, that is, what is *actually* manipulated. The measure of perceived user control needs to be revised so that it measures the presence or absence of user control rather than the extent of the control. In terms of the responsiveness manipulation, the two conditions should be changed to be comparable, so that participants in both conditions evaluate responsiveness of the Web site on the same bases. At the same time, the measure of perceived responsiveness needs to be revised so that it is relevant and specific to what participants actually experience, or are expected to

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experience, in the Web site. If these issues are resolved, the reliability of the measures is likely to improve as well.

Reliability of Measures

Another objective of the pilot study was to examine the reliability of all measures to be used in the main experiment. The measures taken from the pretest had similar reliability as in the pretest, whereas the new measures had overall good reliability. The measures of stereotypic perceptions of people with schizophrenia and homeless people and social desirability had low reliability ($\alpha = .57 \sim .70$). The measures of attitude and behavior intentions related to people with schizophrenia and homeless people had the reliability in an acceptable range ($\alpha = .79 \sim .86$). The new measures such as self-assessed comprehension ($r = .54$) and task involvement ($\alpha = .92$) were found to have high reliability.

Despite the low reliability found in the pretest, the measures of stereotypic perceptions of people with schizophrenia and homeless people, and social desirability were still used in the pilot study because there was a lack of other measures. Attempts to improve the reliability by iteratively deleting items in the measure were made for stereotypic perceptions of homeless people and social desirability, resulting slightly increased Chronbach's α's. On the other hand, attempts to improve the reliability were not made for stereotypic perceptions of people with schizophrenia, because the primary purpose of the measure was to categorize participants into three groups based on their perceptions, rather than to achieve internal consistency. Nonetheless, as discussed in Chapter IV, it calls for future research to develop standard reliable measures to examine these constructs.

Other Findings

In addition to the above findings on the interactivity manipulation and the measurement reliability, a few other important results were found in the pilot study. First, the three groups of stereotypic perceptions of people with schizophrenia, although statistically significant different, were only marginally different in the means. Overall, the three groups of stereotypic perceptions were found to have fairly correct perceptions about people with schizophrenia ($M = 5.79, 6.39$, and 6.93 for the incorrect, mixed, and correct perceptions groups, respectively). Consistent with the findings in the pretest, participants were likely to identify symptoms (e.g., delusions, hallucinations) and causes (e.g., biological factors) of schizophrenia correctly, whereas a majority of them thought schizophrenia was equivalent to split or multiple personality. This finding may mean that college students in the sample did have good understanding of people with schizophrenia, or they tended to give socially desirable answers, but the measure was not sensitive enough to account for it. More research is necessary to address this issue. As it was to be tested in the main experiment, a positive relationship between (correct) perceptions of people with schizophrenia and (favorable) attitudes and behavior intentions related to people with schizophrenia would suggest that college students do have fairly correct perceptions and less stigmatizing attitudes toward people with schizophrenia than originally supposed. A negative relationship between these variables would indicate a measurement issue. In other words, the measure is not sensitive enough to account of social desirability in participants' responses and, therefore, even if participants' perceptions of people with schizophrenia are found to be correct, their actual perceptions of people with schizophrenia may not be necessarily correct.

Second, it was found that weighted responses to comprehension questions were more positively skewed than weighted responses to knowledge recall questions.

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Responses to comprehension questions ranged from -2.59 to 5.91 ($M = 1.95$, $SD = 1.74$), whereas responses to knowledge recall questions ranged from -7.50 to 9.77 ($M = .03$, $SD = 4.60$). The result suggests that comprehension questions were easier than knowledge recall questions for participants to answer. The key difference between comprehension questions and knowledge recall questions was that comprehension questions measured abstract knowledge that was not necessarily specific to the story in the experiment stimulus, whereas knowledge recall questions measured specific facts that were described in the experiment stimulus.

A probable explanation as to why comprehension questions were easier than knowledge recall questions is that comprehension questions might have measured participants' current stereotypes while they were attempting to measure abstract knowledge related to people with schizophrenia. The more removed were the comprehension questions from the specific content of the experiment stimulus and the more were participants required to make inferences, the more likely were participants to have relied on their stereotypes about people with schizophrenia. As it was found that participants had fairly correct stereotypic perceptions about people with schizophrenia, they might have answered comprehension questions regarding people with schizophrenia correctly if the questions in fact measured participants' stereotypes of people with schizophrenia. On the other hand, knowledge recall questions asked about specific facts in the content of the experiment stimulus. Therefore, if participants did not learn from the stimulus, it would have been harder to answer knowledge recall questions. This finding suggests that the measure of comprehension needs to be revised so that it is more sensitive to the purpose of the measure (i.e., measuring deep learning) and improves the validity of the measure, that is, it measures what it is supposed to measure.

Finally, the results of the pilot study showed that the entire duration of the study was rather long. It took 40 to 45 minutes on average for participants to finish the tasks involved in the pilot study. The duration of the pilot study was particularly lengthened by repeated measurements of stereotypic perceptions and attitudes toward homeless people before and after the exposure to the stimulus. The length of the pilot study created fatigue and boredom among participants, which could lead to inaccurate responses to the questionnaires.

In sum, the results of the pilot study suggest that the interactivity manipulation needs to be revised so to be comparable between the two conditions; measures should be more sensitive to the purpose of the measures; and the overall design of the experiment needs to be modified so that participants' tasks may be completed within a reasonable time period (e.g., 30 minutes or less). In the following chapter, revisions made to the main experiment based on the results of the pilot study are discussed, and the methods and results of the main experiment are presented.

Chapter VII. Main Experiment

In the third phase of the dissertation research, a main experiment was conducted to test hypotheses and address research questions. Based on the results of the pilot study, the design of the study and some measures were revised. The first section of this chapter describes the revised design and measures, followed by the results on the interactivity manipulation check. The second section reports on the results of hypotheses testing and the examination of research questions. Finally, the chapter concludes with discussion of the findings of the main experiment.

Design

The design of the main experiment was the same as the pilot study. It was conducted with a 2 (interactivity) X 3 (stereotypic perceptions), between-subject design. Two levels (high versus low) of interactivity were manipulated, whereas stereotypic perceptions of people with schizophrenia were measured and categorized into three levels (incorrect, mixed, and correct stereotypic perceptions), using a tercile split.

As in the pilot study, participants received a pre-manipulation questionnaire, an experiment stimulus, and a post-manipulation questionnaire. Based on the results of the pilot study, however, a few questions in the pre- and post-manipulation questionnaires and some content in the experiment stimulus were removed in order to shorten the duration of the experiment, whereas a variable was added in the pre-manipulation questionnaire to control its potential effects on the dependent variables. In the pre-manipulation questionnaire, questions about attitudes toward homeless people were removed whereas questions about attitude toward people with schizophrenia were added. In the post-manipulation questionnaire, questions regarding stereotypic perceptions of

homeless people were removed. The questions about stereotypic perceptions and attitudes toward homeless people were originally designed to measure changes in perceptions and attitudes related to homeless people before and after the exposure to the stimulus. However, the repetitive measurements of these variables lengthened the total duration of the experiment considerably and created boredom among participants. Although they could have provided useful information, they were deemed less critical than other questions and thus removed. The questions about attitudes toward people with schizophrenia were added because the pre-existing attitudes could influence participants' attitudes and behavior intentions related with people with schizophrenia after the exposure to the experiment stimulus and thus needed to be controlled for. In the experiment stimulus, the content that was not directly related to dependent measures was edited out (e.g., epidemiology of schizophrenia, technical medical information about schizophrenia).

Participants in both high and low interactivity conditions were asked the same questions during the course of the experiment. However, the order of questions in the pre-manipulation questionnaire and the questions embedded in the experiment stimulus differed in the two conditions to facilitate the interactivity manipulation. Questions concerning stereotypic perceptions of people with schizophrenia and homeless people were asked in a different order depending on the interactivity manipulation conditions. Specifically, participants in the low interactivity condition were asked about their stereotypic perceptions of people with schizophrenia in the pre-manipulation questionnaire and their stereotypic perceptions of homeless people during the exposure to the experiment stimulus. Conversely, participants in the high interactivity condition were asked about their stereotypic perceptions of homeless people in the pre-manipulation questionnaire and their stereotypic perceptions of people with schizophrenia during the

exposure to the experiment stimulus. The rest of the questions in the pre-manipulation questionnaire and the post-manipulation questionnaire were asked in the same order for all participants. Figure 7 summarizes the design of the main experiment and the variables measured.

Participants

A total of 113 students enrolled in undergraduate Advertising classes participated in the experiment for exchange of extra course credit. Undergraduate majors of the participants included Liberal Arts (24%), Advertising (23%), Public Relations (19%), Communication Studies (11%), Journalism (8%), Radio-Television-Film (8%) and other (7%). A majority of the participants were Caucasian (59%), followed by Asian (20%), Hispanic (10%), African American (5%) and other (5%). Females comprised 63% of the sample and the average age of the sample was 20 years (*SD*=1.9).

Figure 7. Design and Variables Measured in the Main Experiment

	High Interactivity	Low Interactivity
Instructions of the Experiment	O	O
Pre-Manipulation Questionnaire	Perceptions of homeless people • Perceived characteristics of homeless people • Perceived causes of homelessness	Perceptions of people with schizophrenia • Perceived characteristics of people with schizophrenia • Perceived causes of schizophrenia
	Attitude toward people with schizophrenia	
Experiment Stimulus	Perceptions of people with schizophrenia • Perceived characteristics of people with schizophrenia • Perceived causes of schizophrenia	Perceptions of homeless people • Perceived characteristics of homeless people • Perceived causes of homelessness
	Read a story about a person with schizophrenia	
Post-Manipulation Questionnaire	Self-assessed comprehension	
	Deep learning (Comprehension)	
	Surface learning (Knowledge recall)	
	Task involvement	
	(Post) Attitude toward people with schizophrenia	
	Attitude toward homeless people	
	Behavior intentions related to people with schizophrenia	
	Behavior intentions related to homeless people	
	Information seeking intentions	
	Perceived interactivity	
	Perceived user control	
	Perceived responsiveness	
	Previous contact with people with mental illness	
	Pervious contact with homeless people	
	Social desirability	
	Exposure to movies	
	Demographic variables (sex, age, major, ethnicity)	

Procedure

The procedure of the main experiment was similar to that of the pilot study. The difference was the order of questions asked in the pre-manipulation questionnaire and during the exposure to the experiment stimulus. After reading the instructions of the study, participants in both conditions were asked about their attitudes toward people with schizophrenia in the pre-manipulation questionnaire. However, participants in the high interactivity condition were asked about their perceptions of homeless people, whereas participants in the low interactivity condition were asked about their perceptions of people with schizophrenia in the pre-manipulation questionnaire. Upon completing the pre-manipulation questionnaire, participants continued to the stimulus Web page, in which the interactivity manipulation was embedded. Participants in the high interactivity condition followed the same procedure as in the pretest. They were asked about their stereotypic perceptions of people with schizophrenia and then read a story in the following Web page that was relevant to the question asked in the previous Web page. The procedure for participants in the low interactivity condition changed in the main experiment. They were also asked questions before reading a story in the following Web page, but the questions were about their perceptions of homeless people. The questions asked in the high (low) interactivity condition during the exposure of the experiment stimulus were the same questions that were asked in the pre-manipulation questionnaire in the low (high) interactivity condition.

Once they finished viewing the stimulus Web pages, they were asked to complete the post-manipulation questionnaire, which measured dependent and control variables. When all participants finished the post-manipulation questionnaire, they were provided a written debriefing form, thanked, and dismissed.

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Interactivity Manipulation

The results of the pilot study suggested that two conditions of the interactivity manipulation were not comparable and that the measures of the interactivity manipulation check were not relevant for participants in both conditions. Therefore, the interactivity manipulation was revised in the main experiment so that participants in both conditions would have similar interactions in the stimulus Web site, except those that concerned the interactivity manipulation. In addition, participants in the main experiment were told that they might spend as much or little time as they wanted in reading the story. An observation of participants in the pilot study suggested that due to the artificial settings of the study, participants in both high and low interactivity conditions might have felt compelled to read the content of the stimulus carefully, which could potentially confound the effects of interactivity. By leaving the browsing time up to the participants, the effects of interactivity on participants' engagement and motivation to read the stimulus content would be measured more accurately.

As in the pilot study, the experiment stimulus consisted of nine Web pages, each of which contained a story about a person named Mary, who developed schizophrenia after a normal childhood. The manipulation of the high interactivity condition was the same as in the pilot study. Participants were able to choose an order of the story to read (high user control). Once they chose a topic of the story to read next, they were asked about their perceptions of people with schizophrenia on the next Web page. After answering the questions, they read a story on the following Web page that was relevant to the questions they were asked on the previous Web page (high responsiveness). This type of interactions (i.e., choosing a topic, answering questions, and reading a story) continued until they read all of the nine Web pages.

The manipulation of the low interactivity condition was modified in the main experiment. User control was manipulated in a similar way as in the pilot study (no user control), whereas responsiveness was manipulated so that participants would have low perceptions of responsiveness while they had similar interactions in the stimulus Web site. Specifically, as in the high interactivity condition, participants in the low interactivity condition were also asked questions before they read a story about a person with schizophrenia. The questions asked in the low interactivity condition, however, were about homeless people rather than people with schizophrenia. Therefore, although participants in both conditions had a similar interaction in the stimulus Web site (i.e., answering questions and reading stories), participants in the low interactivity condition had irrelevant experiences in the Web site (low responsiveness).

In addition, the order of reading the stories in the low interactivity was changed from the pilot study. In the pilot study, participants in the low interactivity condition read the stories in a chronological order, from Mary's childhood to her high school and college years to recovery of symptoms. In the main experiment, however, participants in the low interactivity condition read the stories in a random order. This change was made because reading stories in a chronological order could have certain effects on learning. By forcing participants in the low interactivity condition to read stories in a chronological order while letting participants in the high interactivity condition freely choose the order of the stories, the effects on learning might have been confounded.

As in the pilot study, the "Go Back" function of the Web browser was disabled and participants in both interactivity conditions were asked to view each Web page only once, in order to control for the amount of exposure of the stimulus. The stimulus Web pages used in the experiment are shown in Appendix C.

Measures

In the main experiment, a total of 19 variables were measured. Among the 19 variables, self-assessed comprehension, attitudes and behavior intentions related to people with schizophrenia and homeless people, previous contact, social desirability, information seeking intentions, and demographic variables were measured in the same way as in the pilot study. The rest of the variables were revised as discussed below. The reliability of the same measures taken from the pilot study is shown in Table 21.

Table 21. Measures Taken from the Pilot Study

Measures	Reliability (α)
Self-assessed comprehension	.69[a]
Attitude toward people with schizophrenia	
Pre-manipulation measure	.76[b]
Post-manipulation measure	.77[b]
Attitude toward homeless people	.81
Behavior intentions related to people with schizophrenia	.88
Behavior intentions related to homeless people[c]	.89
Social desirability	.59

[a] The measure of the reliability for self-assessed comprehension is a Pearson product moment correlation coefficient.
[b] A reverse-coded item, "People with schizophrenia are not more dangerous than the general public," was dropped to improve reliability.
[c] The index underwent a squared transformation in order to approximate a normal distribution.

Stereotypic Perceptions of People with Schizophrenia

The measure of stereotypic perceptions of people with schizophrenia was revised so that it would measure stereotypic perceptions that were more relevant for questions on deep and surface learning. This variable was measured to create three groups of stereotypic perceptions, namely, incorrect, mixed and correct stereotypic perceptions of people with schizophrenia. The three groups would be then compared in terms of deep and surface learning, and the role of interactivity in the three groups' learning would be examined in the tests of hypotheses. As it was hypothesized that the correct perceptions

group would learn better than the incorrect perceptions group without facilitation of interactivity (i.e., low interactivity), it was deemed necessary to measure stereotypic perceptions that were more likely to influence their responses to the measures of deep and surface learning. As a result, 12 statements that described characteristics of people with schizophrenia and seven causes of schizophrenia were selected to measure stereotypic perceptions of people with schizophrenia (see Table 23). The 19 items of the two scales were standardized and averaged into an index (α = .61). One-way analysis of variance with planned contrasts showed that the means of the stereotypic perceptions between the three groups were significant different from each other ($F(2, 97) = 161.47$, $p < .00$) (see Table 22).

Table 22. Three Groups of Stereotypic Perceptions

		N	Mean (*SD*)	*F*(*df*)	*p*
Stereotypic Perceptions	Incorrect	33	5.58 (.28)	161.47 (2, 97)	.00
	Mixed	34	6.24 (.15)		
	Correct	33	7.00 (.46)		

Stereotypic Perceptions of Homeless People

As discussed above, the measure of stereotypic perceptions of homeless people was used to facilitate the interactivity manipulation in the main experiment. In the pilot test, 14 descriptions of characteristics of homeless people and 14 causes of homelessness were used to measure this variable (see Table 24). In the pretest, some items were dropped in an attempt to shorten the length of the measure and the duration of the study as this variable was measured in both pre- and post-manipulation questionnaires. In the main experiment, the original measure that was used in the pilot study was adopted because enough number of questions on stereotypic perceptions of homeless people needed to be asked before reading a story about a person with schizophrenia, in order to

create low perceptions of responsiveness in the low interactivity condition. Among the 28 items of the two scales, one item, "Homeless people can take responsibility for important matters in their lives," was dropped to improved reliability. The remaining 27 items were standardized and averaged into an index ($\alpha = .76$).

Table 23. Measures of Stereotypic Perceptions of People with Schizophrenia

Perceived Characteristics of People with Schizophrenia	Mean (*SD*)
How strongly do you agree or disagree with the following statements about people with schizophrenia (a type of mental illness)?	
(22) People with schizophrenia often see things that other people do not.	6.66 (1.76)
(23) People with schizophrenia tend to lose touch with reality.	7.19 (1.45)
(24) People with schizophrenia often hear things that other people do not.	7.17 (1.30)
(25) People with schizophrenia tend to avoid interacting with others.	5.57 (1.93)
(26) People with schizophrenia are not able to maintain daily routines.	4.83 (1.88)
(27) People with schizophrenia tend to have problems communicating.	5.95 (1.72)
(28) People with schizophrenia tend to be mentally retarded.[*]	7.03 (1.84)
(29) People with schizophrenia have split or multiple personality.[*]	3.81 (2.10)
(30) Schizophrenia affects one's ability to concentrate.	6.73 (1.72)
(31) There are no effective treatments for schizophrenia.[*]	6.13 (1.84)
(32) Schizophrenia is treated most well by staying in the hospital.[*]	6.12 (2.10)
(33) People with schizophrenia are able to lead productive lives.	6.33 (1.72)
Perceived Causes of Schizophrenia	
How likely do you think the following factors contribute to causing someone to have schizophrenia?	
(21) The way a person is raised[*]	5.68 (2.55)
(22) Character flaws[*]	6.34 (2.34)
(23) God's will[*]	5.97 (2.78)
(24) Genetic factors	7.34 (1.45)
(25) Family history of schizophrenia	7.35 (1.76)
(26) Stressful circumstances in life[*]	4.27 (2.16)
(27) Chemical imbalance in the brain	8.01 (.93)
Total	6.29 (.65)

[*] Reverse coded

Table 24. Measures of Stereotypic Perceptions of Homeless People

Perceived Characteristics of Homeless People	Mean (*SD*)
How strongly do you agree or disagree with the following statements about homeless people?	
(25) There are more female homeless people than male homeless people.*	6.63 (1.31)
(26) A significant percentage of homeless people are African American.	4.21 (1.80)
(27) Homeless people are not educated.	4.21 (2.02)
(28) A majority of homeless people are over 40 years of age.	4.31 (1.82)
(29) A majority of homeless people are married.*	6.53 (1.21)
(30) Homeless people do not have contact with their family.	5.51 (1.84)
(31) A person can choose not to be homeless.	5.95 (2.17)
(32) Homeless people can take responsibility for important matters in their lives.*	3.44 (1.93)
(33) Laziness contributes to homelessness.	5.76 (2.05)
(34) Homeless people do not want to work.	4.88 (2.10)
(35) Homeless people tend to have a mental problem.	4.85 (2.11)
(36) Homeless people tend to be physically handicapped.	3.95 (1.75)
(37) Homeless people tend to be addicted to drugs.	5.56 (1.60)
(38) Homeless people tend to be alcoholics.	6.13 (1.61)
Perceived Causes of Homelessness	**Mean (*SD*)**
How likely do you think the following factors contribute to causing someone to have schizophrenia?	
(22) Bad luck	5.51 (2.25)
(23) God's will	3.34 (2.59)
(24) Lack of thrift and proper money management	7.23 (1.29)
(25) Lack of effort	6.75 (1.63)
(26) Lack of ability and talent	4.18 (2.00)
(27) Loose morals	4.69 (2.00)
(28) Low wages	6.28 (2.02)
(29) Scarcity of jobs	5.98 (2.23)
(30) Poor schools	5.52 (2.45)
(31) Racial discrimination	5.14 (2.15)
(32) Economic downturn	6.61 (1.87)
(33) Shortage of affordable housing	6.16 (2.00)
(34) Government aid	5.27 (1.93)
(35) Economic system that favors the rich over the poor	5.77 (2.47)
Total	5.36 (.69)

* Reverse coded

Deep and Surface Learning

As in the pilot study, deep learning and surface learning were operationalized as comprehension and knowledge recall, respectively, and measured in a multiple-choice or true-false format. Some questions in both measures were revised in the main experiment, however. The results of the pilot study suggested that comprehension questions might have measured participants' stereotypes of people with schizophrenia rather than deep learning. So the questions were revised to be a little more specific to the content of the experiment stimulus, while they would still require participants to make inferences rather than retrieve facts from the content. In addition, both comprehension questions and knowledge recall questions were modified to be relevant to stereotypic perceptions of people with schizophrenia measured in the pre-manipulation questionnaire. As discussed earlier, the present research hypothesized that participants' prior stereotypic perceptions influence their later learning on the same topic (i.e., people with schizophrenia). Therefore, it was considered necessary to measure deep and surface learning of knowledge that was relevant to stereotypic perceptions measured previously.

Sixteen comprehension questions and sixteen knowledge recall questions were coded and weighted in the same way as in the pilot study (see Appendix D). Weighted responses to the comprehension questions ranged from -3.02 to 6.38 ($M = .92$, $SD = 1.81$). Weighted responses to the knowledge recall questions ranged from -5.04 to 5.94 ($M = .97$, $SD = 2.12$). The 16 responses, each for comprehension and knowledge recall, were added into an index.

Task Involvement

In the pilot study, task involvement was measured with the Personal Involvement Inventory for Advertising (PIIA) (Zaichkowsky 1994) with two additional items

(engaging/not engaging, motivating/not motivating). In the main experiment, a measure that was more specific to task involvement studied in the present research was developed and used in addition to the PIIA. For the new measure, participants rated five statements about their involvement with reading the story on the Web site on a 9-point Likert-type scale (strongly agree to strongly disagree) (see Table 26). The two items added to the PIIA in the pilot study were dropped in the main experiment and the original ten items were rated on a 9-point scale (see Table 25). The items in both scales were coded in a way that a higher score would represent greater task involvement. The reliability of the PIIA and the new measure was $\alpha = .92$ and $\alpha = .87$, respectively. Each measure was averaged into an index.

Table 25. Measure of Task Involvement—PIIA

Below is a set of word pairs. Please check the space closest to the word that best reflects your experience reading the story on the Web site.
(34) Important / Unimportant[*]
(35) Boring / Interesting
(36) Relevant / Irrelevant[*]
(37) Exciting / Unexciting[*]
(38) Means noting to me / Means a lot to me
(39) Appealing / Unappealing[*]
(40) Fascinating / Mundane[*]
(41) Worthless / Valuable
(42) Involving / Uninvolving[*]
(43) Not needed / Needed

[*] Reverse coded

Table 26. Measure of Task Involvement—New Measure

(1) It was difficult to concentrate and follow the story.[*]
(2) I was curious to find out what the next story was.
(3) I was not absorbed at all in reading the story. [*]
(4) I felt that I was engaged in reading the story.
(5) I was motivated to continue to read the story.

[*] Reverse coded

Exposure to movies was measured in the same way as in the pilot study, except that one movie, "I am Sam," was added, as a participant in the pilot study mentioned that the movie influenced her perceptions of people with mental illness significantly. Responses to the 15 movies were added into an index (see Table 27).

Table 27. Measure of Exposure to Movies

Movies	N	Percent
(38) A Beautiful Mind	113	73.5
(39) Benny and Joon	113	14.2
(40) Don Juan de Marcos	113	11.5
(41) Donnie Darko	113	37.2
(42) I am Sam	113	44.2
(43) Me, Myself, and Irene	113	64.6
(44) One Flew over the Cuckoo's Nest	113	43.4
(45) Pi	113	17.7
(46) Psycho	113	46.0
(47) Shine	113	16.8
(48) Silence of the Lambs	113	66.4
(49) The Cell	87	42.5
(50) The Fight Club	113	77.0
(51) The Messenger	113	8.8
(52) What About Bob	113	38.9

Interactivity Manipulation Checks

As in the pilot study, the efficacy of the interactivity manipulation was examined with three sets of questions, each of which measured perceived overall interactivity, perceived user control, and perceived responsiveness. Perceived user control and perceived responsiveness were measured with multiple-item scales, whereas perceived overall interactivity was measured with a single-item scale ("The Web site is interactivity.")

Based on the results of the pilot study, the measures for perceived user control and for perceived responsiveness were revised (see Table 29). The measure of perceived user control was revised to be relevant to what was actually manipulated (i.e., presence and absence of user control rather the extent of user control). The measure of perceived responsiveness was also modified to be relevant to participants' experience at the Web site in both conditions of interactivity. Each measure was averaged into an index ($\alpha = .86$ for perceived user control and $\alpha = .87$ for perceived responsiveness).

Discriminant validity of user control and responsiveness was also examined in the main experiment with a principal component factor analysis with varimax rotation. The results showed that the items of the two scales loaded on two different factors, suggesting that the two measures represented two separate dimensions of interactivity (see Table 28).

The efficacy of the interactivity manipulation was examined with a series of t tests, each on perceived overall interactivity, perceived user control, and perceived responsiveness. The results showed that participants in the high interactivity condition perceived the Web site to be significantly more interactive ($M = 6.04$, $SD = 1.73$, $t(1, 110) = 1.85$, $p < .03$), themselves to be in more control ($M = 6.33$, $SD = 1.57$, $t(1, 109) = 9.58$, $p < .00$), and the content of the Web site to be more responsive ($M = 7.09$, $SD = 1.07$, $t(1, 111) = 8.77$, $p < .00$) than those in the low interactivity condition ($M = 5.36$, $SD = 2.09$ for overall interactivity; $M = 3.61$, $SD = 1.40$ for perceived user control; and $M = 5.01$, $SD = 1.43$ for perceived responsiveness). The cross-over effect of the interactivity manipulation on prior perceptions was not significant ($t(1, 98) = .94$, $p > .23$) (Table 29).

Table 28. Factor Analysis of User Control and Responsiveness

	Dimensions of Interactivity	
	User Control	Responsiveness
Perceived User Control		
(1) I felt that I had control over my visiting experiences at this Web site.	**0.81**	0.19
(2) While I was on the Web site, I could choose what I wanted to see.	**0.78**	0.46
(3) While navigating in the Web site, I had absolutely no control over what I could do on the Web site.[*]	**0.74**	0.38
(4) My navigation choices decided the kind of information and experiences I got on the Web site.	**0.75**	0.02
(5) It was up to me to decide which Web page to view next. (new)	**0.61**	0.48
Perceived Responsiveness		
(7) When I clicked on a link to view a next Web page, I was shown a story that was relevant to thoughts or questions I had in mind.	0.31	**0.64**
(8) The story on the next Web page was not what I expected to see.[*]	0.02	**0.68**
(9) I found the story on the next Web page suitable.	0.23	**0.73**
(10) Questions asked on the previous Web page were inappropriate for the story shown on the next Web page.[*]	0.20	**0.81**
(11) Questions asked on the previous Web page were related to the story shown on the next Web page.	0.38	**0.80**
(12) Questions asked on the previous Web page and the story shown on the next Web page provided coherent information on the topic of the Web site.	0.41	**0.75**
Eigenvalue	3.24	3.89
Percent of Variance Explained	29.5	35.4

[*] Reverse coded

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Table 29. Interactivity Manipulation Checks

		N	Mean (SD)	t (df)	p
Overall Interactivity	High	57	6.04 (1.73)	1.85(1, 110)	.03
	Low	55	5.36 (2.09)		
User Control	High	57	6.33 (1.57)	9.58(1, 109)	.00
	Low	54	3.61 (1.40)		
Responsiveness	High	58	7.09 (1.07)	8.77(1, 111)	.00
	Low	55	5.01 (1.43)		
Stereotypic Perceptions	High	48	6.35 (.59)	.94(1, 98)	.23
	Low	52	6.23 (.70)		

Once it was found that two conditions of interactivity differed on the three measures of interactivity manipulation check, the extent to which the two dimensions of interactivity contributed to the perception of overall interactivity was examined. A regression was performed on the perceived overall interactivity with perceived user control and perceived responsiveness as independent variables. The overall model was significant, $F(2, 107) = 6.66$, $p < .00$, $R^2 = .11$. However, the results showed that the perception of overall interactivity was mainly derived by perceived user control rather ($\beta = .34$, $p < .00$) than by perceived responsiveness ($\beta = .01$, $p > .47$) (see Table 30).

Table 30. Relationships Between User Control, Responsiveness, and Overall Interactivity

	Standardized Coefficient (β)	t (df)	p
User Control	.34	2.795	.00
Responsiveness	.01	.080	.47
	$F(2, 107) = 6.66$, $p < .00$, $R^2 = .11$		

A test of the cross-over effects of stereotypic perceptions of people with schizophrenia on the three measures of interactivity manipulation check showed that the three groups of stereotypic perceptions did not differ in perceived overall interactivity ($p > .42$) and perceived user control ($p > .12$). However, the cross-over effects of the stereotypic perceptions on perceived responsiveness approached marginal significance (p

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> .09). A post-hoc Tukey test showed that the correct perceptions group (*M* = 6.46, *SD* = 1.75) perceived the content of the Web pages to be more responsive that the incorrect perception group (*M* = 5.56, *SD* = 1.34) (*t*(2, 97) = 2.22, *p* < .03), whereas these two perceptions groups did not differ from the mixed perceptions group (*M* = 6.12, *SD* = 1.83) (*t*(2, 97) = .83, *p* > .41 for the mixed versus the correct perceptions groups; *t*(2, 97) = 1.40, *p* > .17 for the mixed versus the incorrect perceptions groups) (see Table 31).

Table 31. Cross-over Effects of Stereotypic Perceptions on Interactivity

		N	Mean (*SD*)	*F*(*df*)	*p*
Overall Interactivity	Incorrect	33	5.55 (1.73)	.88 (2, 97)	.42
	Mixed	34	5.47 (1.94)		
	Correct	33	6.06 (2.21)		
User Control	Incorrect	33	4.43 (1.77)	2.15 (2, 95)	.12
	Mixed	33	5.47 (2.24)		
	Correct	32	4.94 (2.09)		
Responsiveness	Incorrect	33	5.56 (1.34)	2.51 (2, 97)	.09
	Mixed	34	6.12 (1.83)		
	Correct	33	6.46 (1.74)		

Tests of Hypotheses

Unless otherwise noted, hypotheses were tested with two-way ANOVA and, where appropriate, ANCOVA models with the interactivity manipulation, stereotypic perceptions of people with schizophrenia, and the interaction term as independent variables.

Effects on Deep Learning

Hypotheses 1a and 4a were concerned with the main and moderating effects of interactivity on deep learning, respectively. The effects on deep learning were examined with an ANCOVA model, in which previous contact with people with mental illness was used as a covariate, *F*(1, 95) = 3.93, *p* < .03. The overall ANCOVA model was not

significant, $F(6, 90) = 1.05$, $p > .20$, $R^2 = .07$, while previous contact with people with mental illness was the only significant variable in the model, $F(1, 95) = 3.93$, $p < .03$ (see Table 32). Thus, hypotheses 1a and 4a were not supported.

Table 32. Effects on Comprehension

		Mean (*SD*)	*F*(*df*)	*p*
Interactivity	High	.89 (1.87)	.54(1, 95)	.23
	Low	.76 (1.65)		
Stereotypic Perceptions	Correct	.87 (1.74)	.76(2, 94)	.24
	Mixed	.52 (1.76)		
	Incorrect	1.09 (1.77)		
Interactivity X Stereotypic Perceptions			.31(2, 94)	.37
Covariates				
Previous Contact with People with Mental Illness			3.93(1, 95)	.03
$F(6, 90) = 1.05$, $p > .20$, $R^2 = .07$				

Effects on Surface Learning

Hypotheses 1b and 4b were concerned with the main and moderating effects of interactivity on surface learning, respectively. The effects on surface learning were examined with an ANCOVA model, in which participants' sex was used as a covariate, $F(1, 94) = 4.05$, $p < .02$. The overall ANCOVA model was significant, $F(6, 89) = 2.01$, $p < .04$, $R^2 = .12$. The main effects of interactivity were also significant, $F(1, 94) = 4.08$, $p < .02$. The low interactivity group ($M = 1.46$, $SD = 2.16$) had greater knowledge recall than the high interactivity group ($M = .63$, $SD = 1.76$). The main effect of stereotypic perceptions and the interactive effect were not significant, $F(2, 93) = 1.04$, $p > .18$ and $F(2, 93) = 1.41$, $p > .13$, respectively (see Table 33). Thus, hypotheses 1b and 4b were not supported.

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Table 33. Effects on Surface Learning

		Mean (*SD*)	*F*(*df*)	*p*
Interactivity	High	.63 (1.76)	4.08 (1, 94)	.02
	Low	1.46 (2.16)		
Stereotypic Perceptions	Correct	1.42 (2.21)	1.04 (2, 93)	.18
	Mixed	.68 (2.07)		
	Incorrect	1.11 (1.70)		
Interactivity X Stereotypic Perceptions			1.41 (2, 93)	.13
Covariate				
Sex			4.05 (1, 94)	.02
$F(6, 89) = 2.01, p < .04, R^2 = .12$				

Effects on Self-Assessed Comprehension

Hypothesis 2 predicted the main effects of interactivity on self-assess comprehension. The overall ANOVA model was significant, $F(5, 92) = 5.49, p < .00, R^2 = .23$. The main effect of interactivity was also significant, $F(1, 96) = 26.29, p < .00$, while the main effect of stereotypic perceptions and the interactive effect were not, $F(2, 95) = .20, p > .41$ and $F(2, 95) = .06, p > .47$, respectively. The high interactivity group ($M = 8.48, SD = .66$) evaluated the story on the Web site to be more comprehensible than the low interactivity group ($M = 7.20, SD = 1.55$), $F(1, 96) = 26.29, p < .00$ (see Table 34). Hypothesis 2 was supported.

Table 34. Effects on Self-Assessed Comprehension

		Mean (*SD*)	*F*(*df*)	*p*
Interactivity	High	8.48 (.66)	26.29(1, 96)	.00
	Low	7.20 (1.55)		
Stereotypic Perceptions	Correct	7.92 (1.44)	.20(2, 95)	.41
	Mixed	7.89 (1.14)		
	Incorrect	7.66 (1.48)		
Interactivity X Stereotypic Perceptions			.06(2, 95)	.47
$F(5, 92) = 5.49, p < .00, R^2 = .23$				

Effects on Task Involvement

Hypothesis 3a predicted the main effects of interactivity on task involvement, whereas Hypothesis 3b predicted the mediating effects of task involvement on deep learning. The effects on task involvement were examined with two measures, namely PIIA and the new measure developed for this research. The overall ANOVA model for PIIA was significant, $F(5, 93) = 2.06$, $p < .04$, $R^2 = .10$. The main effects of interactivity and stereotypic perceptions were also significant, $F(1, 97) = 2.98$, $p < .04$ and $F(2, 96) = 3.20$, $p < .02$, respectively. The high interactivity group ($M = 6.97$, $SD = 1.13$) felt more involved in reading the story on the Web site than the low interactivity group ($M = 6.50$, $SD = 1.28$) did. The three groups of stereotypic perceptions also felt involved significantly differently. A post-hoc Tukey test showed that the incorrect stereotypic perceptions group ($M = 6.28$, $SD = 1.19$) differed significantly from the correct perceptions group ($M = 7.06$, $SD = 1.14$) ($p < .01$) and marginally significantly differed from the mixed perceptions group ($M = 6.82$, $SD = 1.25$) ($p < .07$), while the correct perceptions group and the mixed perceptions group were not different from each other ($p > .35$) (see Table 35). The interactive effect was not significant, $F(2, 96) = .01$, $p > .49$.

Table 35. Effects on Task Involvement—PIIA

		Mean (*SD*)	*F*(*df*)	*P*
Interactivity	High	6.97 (1.13)	2.98 (1, 97)	.04
	Low	6.50 (1.28)		
Stereotypic Perceptions	Correct	7.06 (1.14)	3.20 (2, 96)	.02
	Mixed	6.82 (1.25)		
	Incorrect	6.28 (1.19)		
Interactivity X Stereotypic Perceptions			.01 (2, 96)	.49
$F(5, 92) = 2.06$, $p < .04$, $R^2 = .10$				

The overall ANOVA model for the new measure was significant, $F(5, 90) = 2.97$, $p < .00$, $R^2 = .14$. The main effect of interactivity was significant, $F(1, 94) = 4.70$, $p < .03$, while the main effect of stereotypic perceptions was not, $F(2, 93) = 1.14$, $p > .16$. The high interactivity group ($M = 6.94$, $SD = 1.49$) felt more involved in reading the story on the Web site than the low interactivity group ($M = 6.25$, $SD = 1.44$) did. The interactive effect was also significant, $F(2, 93) = 3.65$, $p < .02$ (see Table 36). A post-hoc Tukey test showed that when interactivity was low, the three groups of stereotypic perceptions did not differ, $F(2, 93) = .38$, $p > .34$. When interactivity was high, however, the three groups of stereotypic perceptions differed significantly, $F(2, 93) = 4.18$, $p < .01$. Specifically, both correct ($M = 7.04$, $SD = 1.23$, $p < .03$) and mixed perceptions groups ($M = 7.52$, $SD = 1.16$, $p < .00$) felt significantly more involved than the incorrect perceptions group ($M = 6.03$, $SD = 1.81$), while the former two groups did not differ ($p > .17$) (see Table 37). With both measures of task involvement, Hypothesis 3a was supported. Since the relationship between interactivity and deep learning was not supported in the test of Hypothesis 1a, the mediating effects of task involvement were not tested.

Table 36. Effects on Task Involvement— New Measure

		Mean (*SD*)	*F*(*df*)	*p*
Interactivity	High	6.94 (1.49)	4.70 (1, 94)	.03
	Low	6.25 (1.44)		
Stereotypic Perceptions	Correct	6.58 (1.48)	1.14 (2, 93)	.16
	Mixed	6.88 (1.48)		
	Incorrect	6.29 (1.51)		
Interactivity X Stereotypic Perceptions			3.65 (2, 93)	.02
$F(5, 90) = 2.97$, $p < .00$, $R^2 = .14$				

Table 37. Post-Hoc Tukey Test on Task Involvement—New Measure

Interactivity	Stereotypic Perceptions	Mean (SD)	F(df)	p
High	Correct	7.04 (1.23)		
	Mixed	7.52 (1.16)	4.18(2, 93)	.01
	Incorrect	6.03 (1.81)		
Low	Correct	6.18 (1.60)		
	Mixed	6.04 (1.48)	.38(2, 93)	.34
	Incorrect	6.46 (1.29)		

Effects on Attitude toward People with Schizophrenia

The effects on attitude toward people with schizophrenia were examined with an ANVOCA model, with prior perceived dangerousness of people with schizophrenia, $F(1, 88) = 101.50$, $p < .00$; stereotypic perceptions of homeless people, $F(1, 88) = 6.89$, $p < .00$; and previous contact with homeless people, $F(1, 88) = 2.85$, $p < .05$ as covariates. The overall ANCOVA model was significant, $F(8, 81) = 17.56$, $p < .00$, $R^2 = .63$ (see Table 38). The main effects of interactivity and stereotypic perceptions were also significant, $F(1, 88) = 2.86$, $p < .05$ and $F(2, 87) = 2.59$, $p < .04$, respectively. The low interactivity group ($M = 3.74$, $SD = 1.18$) perceived people with schizophrenia to be significantly more dangerous than the high interactivity group ($M = 3.67$, $SD = 1.29$) did, $F(1, 88) = 2.86$, $p < .05$. The three stereotypic perceptions groups also had significantly different perceptions of dangerousness about people with schizophrenia, $F(2, 87) = 2.59$, $p < .04$. The interaction between interactivity and stereotypic perception was marginally significant $F(2, 87) = 1.87$, $p < .08$. A post-hoc Tukey test showed that when interactivity was low, the three stereotypic perceptions groups did not differ, $F(2, 87) = .04$, $p > .48$ (see Table 39). When interactivity was high, however, the three groups of stereotypic perceptions differed significantly, $F(2, 87) = 5.34$, $p < .00$. Specifically, the mixed perceptions group ($M = 3.29$, $SD = 1.12$) perceived people with schizophrenia to

be less dangerous than the correct perceptions group ($M = 4.14$, $SD = 1.48$, $p < .00$) and the incorrect perceptions groups ($M = 3.63$, $SD = 1.15$, $p < .06$) did, while the latter two groups did not differ from each other ($p > .09$). Hypothesis 5a was not supported.

Table 38. Effects on Attitudes toward People with Schizophrenia

		Mean (*SD*)	*F*(*df*)	*p*
Interactivity	High	3.67 (1.29)	2.86(1, 88)	.05
	Low	3.74 (1.18)		
Stereotypic Perceptions	Correct	3.98 (1.29)	2.59(2, 87)	.04
	Mixed	3.39 (1.26)		
	Incorrect	3.78 (1.11)		
Interactivity X Stereotypic Perceptions			1.87(2, 87)	.08
Covariates				
Prior Perceived Danger of People with Schizophrenia			101.50 (1, 88)	.00
Stereotypes about Homeless People			6.89(1, 88)	.00
Previous Contact with Homeless People			2.85(1, 88)	.05
$F(8, 81) = 17.56$, $p < .00$, $R^2 = .63$				

Table 39. Post-Hoc Tukey Test on Attitudes toward People with Schizophrenia

Interactivity	Stereotypic Perceptions	Mean (*SD*)	*F*(*df*)	*p*
High	Correct	4.14 (1.48)	5.34(2, 87)	.00
	Mixed	3.29 (1.12)		
	Incorrect	3.63 (1.15)		
Low	Correct	3.75 (.98)	.04(2, 87)	.48
	Mixed	3.53 (1.46)		
	Incorrect	3.89 (1.11)		

Effects on Behavior Intentions Related to People with Schizophrenia

The effects on behavior intentions related to people with schizophrenia were tested with an ANCOVA model with previous contact with people with mental illness as a covariate, $F(1, 98) = 19.38$, $p < .00$. The overall ANCOVA model was significant, $F(6,$

93) = 4.66, $p < .00$, $R^2 = .23$ (see Table 40). However, the main effects of interactivity and stereotypic perceptions were not significant, $F(1, 98) = .03$, $p > .43$ and $F(1, 98) = .92$, $p > .20$, respectively. The interactive effect was marginally significant, $F(2, 97) = 2.04$, $p < .07$. A post-hoc Tukey test showed that when interactivity was low, the three groups of stereotypic perceptions differed significantly ($F(2, 97) = 3.11$, $p < .03$) (see Table 41). Specifically, the incorrect perceptions group ($M = 5.57$, $SD = 1.54$) was significantly less willing to interact with people with schizophrenia than the correct ($M = 6.87$, $SD = 1.37$, $p < .01$) and the mixed perceptions groups ($M = 6.36$, $SD = 1.01$, $p < .05$). When interactivity was high, the three groups of stereotypic perceptions did not differ significantly ($F(2, 97) = .26$, $p > .34$). Hypothesis 5b was not supported.

Table 40. Effects on Social Distance to People with Schizophrenia

		Mean (SD)	F(df)	p
Interactivity	High	6.30 (1.64)	.03 (1, 98)	.43
	Low	6.22 (1.44)		
Stereotypic Perceptions	Correct	6.58 (1.56)	.92 (2, 97)	.20
	Mixed	6.29 (1.46)		
	Incorrect	5.91 (1.55)		
Interactivity X Stereotypic Perceptions			2.04 (2, 97)	.07
Covariates				
Previous Contact with People with Schizophrenia			19.38 (1, 98)	.00
$F(6, 93) = 4.66$, $p < .00$, $R^2 = .23$				

Table 41. Post-Hoc Tukey Test on Social Distance to People with Schizophrenia

Interactivity	Stereotypic Perceptions	Mean (SD)	F(df)	p
High	Correct	6.26 (1.74)	.26(2, 97)	.34
	Mixed	6.25 (1.77)		
	Incorrect	6.44 (1.45)		
Low	Correct	6.87 (1.37)	3.11(2, 97)	.03
	Mixed	6.36 (1.01)		
	Incorrect	5.57 (1.54)		

Research Questions

The first research question explores the role of interactivity in changing attitudes and behavior intentions related to a different stereotyped group, which is not targeted in the communication. The second research question concerns the effects of interactivity on intentions to seek additional information. To address the first research question, effects on attitude and behavior intentions related to homeless people were examined. The second research question was addressed by examining the effects on the three measures of information seeking intentions, namely, intentions to seeking information about people with schizophrenia, people with mental illness, and homeless people.

Effects on Attitude toward Homeless People

Similar to attitude toward people with schizophrenia, attitude toward homeless people were operationalized as perceived dangerousness of homeless people. The effects on perceived dangerousness of homeless people were examined with an ANCOVA model, in which stereotypic perceptions of homeless people, $F(1, 67) = 8.75$, $p < .00$, and exposure to movies, $F(1, 67) = 7.66$, $p < .00$, were used as covariates. The overall ANCOVA model was significant, $F(7, 61) = 3.42$, $p < .00$, $R^2 = .28$ (see Table 42). The main effects of interactivity and stereotypic perceptions were not significant, $F(1, 67) = .19$, $p > .33$ and $F(2, 66) = .98$, $p > .29$, respectively. However, the interaction of the

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two variables was significant, $F(2, 66) = 2.39$, $p < .05$. A post-hoc Tukey test showed that when interactivity was low, the three stereotypic perceptions groups differed significantly, $F(2, 67) = 2.91$, $p < .03$ (see Table 43). Specifically, the correct perceptions group ($M = 5.47$, $SD = 1.10$) perceived homeless people to be significantly more dangerous than the incorrect ($M = 5.47$, $SD = 1.10$, $p < .04$) and the mixed perceptions groups ($M = 5.47$, $SD = 1.10$, $p < .01$), while the latter two groups did not differ ($p > .19$). When interactivity was high, however, the correct ($M = 5.05$, $SD = 1.49$), mixed ($M = 5.10$, $SD = 1.09$), and incorrect perceptions groups ($M = 4.72$, $SD = 1.38$) perceived homeless people similarly, $F(2, 67) = .20$, $p > .41$.

Table 42. Effects on Perceived Dangerousness of Homeless People

		Mean (*SD*)	*F(df)*	*p*
Interactivity	High	4.98 (1.28)	.19 (1, 67)	.33
	Low	4.94 (1.23)		
Stereotypic Perceptions	Correct	5.24 (1.31)	.98 (2, 66)	.29
	Mixed	4.84 (1.18)		
	Incorrect	4.85 (1.27)		
Interactivity X Stereotypic Perceptions			2.39 (2, 66)	.05
Covariates				
Stereotypes about Homeless People			8.75 (1, 67)	.00
Exposure to Movies			7.66 (1, 67)	.00
$F(7, 61) = 3.42$, $p < .00$, $R^2 = .28$				

Table 43. Post-Hoc Tukey Test on Perceived Dangerousness of Homeless People

Interactivity	Stereotypic Perceptions	Mean (*SD*)	*F(df)*	*p*
High	Correct	5.05 (1.49)	.20(2, 67)	.41
	Mixed	5.10 (1.09)		
	Incorrect	4.72 (1.38)		
Low	Correct	5.47 (1.10)	2.91(2, 67)	.03
	Mixed	4.53 (1.26)		
	Incorrect	4.93 (1.24)		

Effects on Behavior Intentions Related to Homeless People

Similar to behavior intentions related to people with schizophrenia, the effects of behavior intentions related to homeless people were examined with social distance to homeless people. The overall ANOVA model was not significant, $F(5, 93) = 1.10$, $p > .19$, $R^2 = .06$ (see Table 44).

Table 44. Effects on Social Distance to Homeless People

		Mean (*SD*)	*F*(*df*)	*p*
Interactivity	High	4.82 (1.88)	.41 (1, 97)	.26
	Low	4.59 (1.89)		
Stereotypic Perceptions	Correct	4.66 (2.01)	.03 (2, 96)	.48
	Mixed	4.71 (1.86)		
	Incorrect	4.74 (1.81)		
Interactivity X Stereotypic Perceptions			2.56 (2, 96)	.04
$F(5, 93) = 1.10$, $p > .19$, $R^2 = .06$				

Effects on Information Seeking Intentions

The effects on information seeking intentions were examined with intentions to seek additional information about people with schizophrenia, people with other mental illnesses, and homeless people. The effects on intentions to seek additional information about people with schizophrenia were tested with an ANOVA model. The overall ANOVA model was not significant, $F(5, 94) = 1.01$, $p > .21$, $R^2 = .053$ (see Table 45). The main effects of interactivity, $F(1, 98) = .05$, $p > .41$ and stereotypic perceptions, $F(2, 97) = 1.56$, $p > .11$, and the interactive effective, $F(2, 97) = .94$, $p > .20$, were not significant either.

Table 45. Effects on Intention to Seek Information about People with Schizophrenia

		Mean (*SD*)	*F*(*df*)	*p*
Interactivity	High	.17 (.38)	.05(1, 98)	.41
	Low	.13 (.35)		
Stereotypic Perceptions	Correct	.18 (.39)	1.56(2, 97)	.11
	Mixed	.21 (.41)		
	Incorrect	.06 (.24)		
Interactivity X Stereotypic Perceptions			.94(2, 97)	.20
$F(5, 94) = 1.01, p > .21, R^2 = .05$				

The effects on intentions to seek additional information about people with other mental illnesses were tested with an ANCOVA model, in which previous contact with homeless people, $F(1, 75) = 6.92$, $p < .01$, and exposure to movies, $F(1, 75) = 4.21$, $p < .02$, were used as covariates. The overall ANCOVA model was significant, $F(7, 69) = 2.01$, $p < .03$, $R^2 = .17$ (see Table 46). The main effect of interactivity was also significant, $F(1, 75) = 4.21$, $p < .02$, while the main effect of stereotypic perceptions, $F(2, 74) = .93$, $p > .20$, and the interactive effect, $F(2, 74) = .11$, $p > .45$, were not.

The effects on intentions to seek additional information about homeless people were examined with an ANOVA model. The overall ANOVA model was not significant, $F(1, 98) = .57$, $p > .36$, $R^2 = .03$ (see Table 47). The main effects of interactivity, $F(1, 98) = .03$, $p > .43$ and stereotypic perceptions, $F(2, 97) = .88$, $p > .21$, and the interactive effective, $F(2, 97) = .62$, $p > .27$, were not significant either.

Table 46. Effects on Intention to Seek Information about People with Other Mental Illnesses

		Mean (*SD*)	*F*(*df*)	*p*
Interactivity	High	.20 (.41)	4.21(1, 75)	.02
	Low	.07 (.26)		
Stereotypic Perceptions	Correct	.15 (.37)	.93(2, 74)	.20
	Mixed	.16 (.37)		
	Incorrect	.08 (.27)		
Interactivity X Stereotypic Perceptions			.11(2, 74)	.45
Covariates				
Previous Contact with Homeless People			6.92(1, 75)	.01
Exposure to Movies			4.21(1, 75)	.02
$F(7, 69) = 2.01, p < .03, R^2 = .17$				

Table 47. Effects on Intention to Seek Information about Homeless People

		Mean (*SD*)	*F*(*df*)	*p*
Interactivity	High	.10 (.31)	.03(1, 98)	.43
	Low	.10 (.30)		
Stereotypic Perceptions	Correct	.15 (.36)	.88(2, 97)	.21
	Mixed	.06 (.24)		
	Incorrect	.09 (.29)		
Interactivity X Stereotypic Perceptions			.62(2, 97)	.27
$F(1, 98) = .57, p > .36, R^2 = .03$				

Additional Analyses on Learning

The tests of hypotheses on deep (H1a and H4a) and surface (H1b and H4b) learning showed that interactivity did not have main effects or moderating effects on deep learning, whereas it had main effects on surface learning. However, the insignificant results on the effects on deep learning might have been attributed to the insensitivity of the aggregated overall comprehension measure and thus additional analyses were performed to examine if interactivity and stereotypic perceptions had any impact on individual measures of comprehension. A series of t-tests and one-way ANOVA tests

were performed with interactivity and stereotypic perceptions as an independent variable, respectively, and each of 16 comprehension measures as a dependent variable. The results showed that out of 16 comprehension questions, the two interactivity groups differed significantly on five questions: (1) "The way Mary was raised contributed to the development of her illness later"; (2) "Schizophrenia affected Mary's ability to socialize with others"; (3) "Due to her illness, Mary was not able to distinguish fantasy from reality"; (4) "Mary's attempts to live an independent life were discouraged by discriminating attitudes toward mental illness in the society"; and (5) "Therapies and rehabilitation programs helped Mary function like the majority of society." Responses to these five questions were then averaged to form an "interactivity comprehension index."

The three stereotypic perceptions groups also differed significantly on five questions: (1) "The way Mary was raised contributed to the development of her illness later"; (2) "Mary suffered from disordered speech"; (3) "Mary's unusual personality was one of the reasons for causing her illness"; (4) "Due to her illness, Mary was not able to distinguish fantasy from reality"; and (5) "After the treatment, Mary was able to socialize with other easily." Responses to these five questions were also averaged to form a "stereotypic perceptions comprehension index."

A t-test on the interactivity comprehension index by the interactivity manipulation showed that the high interactivity group ($M = -.38$, $SD = 1.33$) comprehended better than the low interactivity group ($M = -.90$, $SD = .71$), $t(1, 107) = 2.53$, $p < .01$. In other words, on the questions that the two groups differed, comprehension was greater when the interactivity was high versus low. A one-way ANOVA test on the stereotypic perceptions comprehension index by the stereotypic perceptions showed that the stereotypic perceptions were also significantly associated with comprehension, $F(2, 95) = 2.37$, $p < .05$. To examine any moderating effects of interactivity, a two-way ANOVA

test, with the interactivity manipulation, stereotypic perceptions, and the interaction term as independent variables, was performed on the stereotypic perceptions comprehension index (see Table 48). The results showed that while the main effect of interactivity was not significant, $F(1, 96) = .30$, $p > .29$, the interactive effect was marginally significant, $F(2, 95) = 1.98$, $p < .07$. A post-hoc Tukey test showed that when interactivity was low, three stereotypic perceptions groups did not differ in their comprehension, $F(2, 95) = .46$, $p > .32$ (see Table 49). When interactivity was high, however, the three groups differed significantly, $F(2, 95) = 2.14$, $p < .04$. Specifically, the incorrect perceptions group comprehended significantly more than the correct ($p < .03$) and the mixed perceptions ($p < .00$) groups, whereas the latter two groups did not differ from each other ($p > .23$).

Table 48. Effects on Stereotypic Perceptions Comprehension Index

		Mean (*SD*)	*F*(*df*)	*p*
Interactivity	High	.84 (.80)	.30(1, 96)	.29
	Low	.99 (.76)		
Stereotypic Perceptions	Correct	.95 (.88)	2.66(2, 95)	.04
	Mixed	.70 (.73)		
	Incorrect	1.11 (.68)		
Interactivity X Stereotypic Perceptions			1.98(2, 95)	.07
$F(5, 92) = 1.83$, $p < .06$, $R^2 = .09$				

Table 49. Post-Hoc Tukey Test on Stereotypic Perceptions Comprehension Index

Interactivity	Stereotypic Perceptions	Mean (*SD*)	*F*(*df*)	*p*
High	Correct	.77 (.90)	2.14(2, 95)	.04
	Mixed	.58 (.73)		
	Incorrect	1.34 (.54)		
Low	Correct	1.11 (.84)	.46(2, 95)	.32
	Mixed	.85 (.72)		
	Incorrect	.98 (.73)		

A similar analysis was conducted to examine the effects of stereotypic perception on individual measures of knowledge recall. However, the three groups of stereotypic perceptions did not differ on the 16 individual knowledge recall measures.

Discussion

The primary interests of the present research lied in the effects of interactivity on learning and the role of interactivity in changing attitudes and behavior intentions related to stereotyped social groups. In the main experiment, these relationships were examined by testing the hypotheses and addressing the research questions. Overall, the results of the main experiment showed that interactivity did not have significant effects on deep learning and negative effects on surface learning. However, the results also showed that interactivity played a significant role in changing attitudes and behavior intentions related to stereotyped group, although the pattern of the relationships between interactivity and these variables was different from the one predicted.

Effects of Interactivity on Learning

First, as for the effects of interactivity on deep and surface learning, the present research had predicted that interactivity would facilitate deep learning rather than surface learning. The tests of the hypotheses (1a, 1b, 4a and 4b) showed, however, that the high and the low interactivity groups did not significantly differ in their deep learning, although the mean of the high interactivity group was slightly higher than the mean of the low interactivity group. On the other hand, the two interactivity groups differed in their surface learning, but the low interactivity group had greater surface learning than the high interactivity group. A plausible explanation for these results may be that learning, especially deep learning, might have been negatively affected if the stories on the

stimulus Web site were not read in a chronological order. As described earlier, the stimulus Web pages contained stories about a person with schizophrenia, which described the person's childhood, high school and college years, development of symptoms of schizophrenia, treatment, and recovery of the symptoms. The stories might have been learned the best if they were read in a chronological order. However, participants in the high interactivity condition were able to choose an order of the stories to read, whereas participants in the low interactivity condition read the stories in a random order that was chosen for them. Therefore, both participants in the low interactivity condition and participants in the high interactivity condition who did not follow through the stimulus Web pages in a chronological order might not have comprehend the stories well.

The results that the low interactivity group had greater surface learning than the high interactivity group suggest that the user control in the high interactivity condition might have disoriented the participants in their learning. The negative effects of user control, as a result of disorientation of the user, were reviewed in Chapter III. As discussed above, reading stories out of order could have affected participants' surface learning in both interactivity conditions negatively. The results that one of the groups, which did not have user control, had significantly greater surface learning than the group without user control, suggest that by not having to control the sequence of the stories, participants in the low interactivity condition were able to focus more attention to the factual information in the stories, although the lack of control did not necessarily help their deep learning. Another possibility for the greater surface learning in the low interactivity group is that when they received stories that were not relevant to the questions asked previously and thus their expectation was violated, they paid more attention to the factual information in the story and had greater surface learning. This speculation is consistent with the prediction of the expectation violation theory (Burgoon

1978), although it still remains to be explained as to why the same effects did not occur for deep learning.

The above explanations for the results on deep and surface learning assume that deep learning did not occur and surface learning was negatively influenced by interactivity, while attributing these results to the issues of the design of the experiment stimulus and the interactivity manipulation. In addition to the above explanation, another account may be considered to explain the results on deep and surface learning. That is, it may be possible that interactivity did have effects on deep and surface learning, as predicted, but the measures of deep and surface learning were not sensitive enough to gauge its effects. The issues of the insensitivity of the learning measures were discussed in Chapter VI. Although the measures were revised in the main experiment to address the issues, they still might have had the same problems and did not measure what they were expected to measure.

The measurement issues may provide a more plausible explanation for the results on deep and surface learning for a few reasons. First, the results on self-assessed comprehension and task involvement imply that interactivity might have influenced deep learning. It was found that interactivity had main effects on both self-assessed comprehension and task involvement. In other words, when interactivity was high versus low, participants thought the stories on the Web site to be more comprehensible, while they felt that they were more engaged in the tasks of the experiment. As both self-assessed comprehension and task involvement are considered closely related with deep learning, the positive effects of interactivity on these variables indirectly suggest that interactivity facilitated deep learning.

Second, the results on attitudes and behavior intentions related to people with schizophrenia imply that interactivity had impact on learning. The present research

hypothesized that interactivity would play a role in changing attitudes and behavior intentions related to a stereotyped group through learning. The results of the main experiment showed that overall, the high interactivity group perceived people with schizophrenia to be significantly less dangerous than the low interactivity group. Interactivity also had moderating effects on social distance to people with schizophrenia. When interactivity was low, the incorrect perceptions group was significantly less willing to interact with people with schizophrenia. When interactivity was high, the incorrect, mixed, and correct perceptions group did not differ. The existing literature does not provide theoretical bases to explain a direct link between interactivity and attitudes and behavior intentions related to a stereotyped group. The most plausible theoretical explanation is that interactivity had impact on the attitudes and behavior intentions through learning.

Third, the additional analyses on learning showed that on the individual items of the deep learning measure in which the two interactivity conditions differed, the high interactivity resulted in greater deep learning. The results may indicate that the aggregated measure of deep learning consisted of many individual items that were not relevant for actual deep learning that did occur, and thus failed to gauge different levels of deep learning between the two groups of interactivity.

Finally, a comparison of means of deep and surface learning between the three groups of stereotypic perceptions reveals that the incorrect perceptions group had the greatest deep learning followed by the correct perceptions group and then by the mixed perceptions group. In terms of surface learning, the correct perceptions group performed the best, followed by the incorrect perceptions group and then by the mixed perceptions group. The measures of stereotypic perceptions, deep learning and surface learning were revised in the main experiment so that they would have relevance to each other. The

findings that, in the absence of moderating effects, the incorrect perceptions group had greatest deep learning among the three groups and greater surface learning than the mixed perceptions group are perplexing. It may indicate that the measures of deep and surface learning were not valid.

From the examination of other related variables, therefore, it appears more likely that interactivity had effects on learning, but its effects were not measured properly, than that interactivity did not have effects or negative effects on learning due to the issues of the design of the stimulus and the manipulation. However, both the measurement issue and the design issue need to be addressed in the future research to accurately assess the effects of interactivity on learning.

Effects on Attitudes and Behavior Intentions Related to People with Schizophrenia

The present research had predicted that interactivity would have moderating effects on attitudes and behavior intentions related to people with schizophrenia. Specifically, it was hypothesized that the correct perceptions group would have favorable attitudes and behavior intentions related to people with schizophrenia when interactivity was low, whereas the incorrect perceptions group would have favorable attitudes and behavior intentions similar to the correct perceptions group when interactivity was high. An assumption made in this hypothesis was that interactivity would moderate the effects on deep learning and, as a result, influence attitudes and behavior intentions.

The results showed that the prediction of the hypothesis was not supported. However, it was found that interactivity did have positive moderating effects on attitudes and behavior intentions related to people with schizophrenia, while the pattern of the effects was different for the three perceptions groups. Interactivity had the most significant moderating effects on the mixed perceptions group's attitudes and the

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incorrect perceptions' group's behavior intentions. The mixed perceptions group had significantly lower perceptions of dangerousness of people with schizophrenia than the other two groups when interactivity was high (versus low), whereas the incorrect perceptions group was significantly less willing to interact with people with schizophrenia than the other two groups when interactivity was low (versus high).

As discussed earlier, it is speculated that the above moderating effects of interactivity on attitudes and behavior intentions resulted from the effects of interactivity on deep learning. However, future research is warranted to find definitive evidence to support this speculation. In addition, future research needs to explore the role of individuals' strength of stereotypic beliefs in the effects of interactivity on attitudes and behavior intentions related to a stereotyped group. The three groups of stereotypic perceptions in the present research not only represented the correctness of their stereotypic perceptions, but also the strength of the stereotypic perceptions, since the stereotypic perceptions were measured in terms of the extent of agreement or disagreement. The correct (incorrect) perceptions group represented individuals who had strong stereotypic perceptions about people with schizophrenia that were correct (incorrect). The mixed perceptions group, on the other hand, represented individuals who had some correct and some incorrect perceptions about people with schizophrenia and also who were not sure about their perceptions. Perhaps due to their relatively uncertain perceptions of people with schizophrenia, interactivity played an interesting moderating role in influencing this group's attitude toward people with schizophrenia. Interactivity was also found to have significant moderating effects on this group's task involvement (new measure). The mixed perceptions group felt significantly more involved than the other two groups when interactivity was high (versus low). These results may suggest that interactivity facilitated deep learning among the individuals who were not certain

about their perceptions by engaging them in the interactive process of learning and positively influenced their attitudes toward a stereotyped group that they learned about. In the absence of supporting data, the present research can only provide a speculation as to how interactivity might have affected the mixed perceptions group's attitude. More research is necessary to examine the role of interactivity in influencing the "less certain" people and the mechanism of its influence. From a perspective of health communication campaigns, the less certain group may represent a group that is more amenable and receptive of health communication messages. Additional research on this group can inform on the effective targeting strategy for health communication campaigns.

Effects on Attitudes and Behavior Intentions Related to Homeless People & Information Seeking Intentions

The present research asked two research questions, one concerning the carry-over effects on attitudes and behavior intentions related to homeless people and the other concerning information seeking intentions. With regards to the first research question, no effects were found for behavior intentions related to homeless people, whereas interactivity had the moderating effects on attitudes toward homeless people similar to the attitudes toward people with schizophrenia. Interestingly, the results showed that when interactivity was low, participants who had correct perceptions about people with schizophrenia perceived homeless people to be more dangerous than those who had either incorrect or mixed perceptions about people with schizophrenia. When interactivity was high, however, the three groups did not differ. These results showed that some extent of the carry-over effects did occur and that interactivity played a role in influencing attitudes toward the other stereotyped group that was not targeted in the communication, but was related to the targeted stereotyped group. The present research hypothesized that

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interactivity would have moderating effects on the individuals with incorrect perceptions rather than those with correct perceptions. The above results suggest that interactivity may have significant influence on the correct perceptions group as well, while (correct) perceptions about one stereotyped group are not necessarily associated with (favorable) attitudes toward the other, related stereotyped group

The results provide significant implications for health communication campaigns because it would mean that an effective interactive communication may impact attitudes toward multiple, related stereotyped groups. Future research is warranted to further examine these relationships. Future research is also necessary to examine if interactivity also has impact on attitudes toward a stereotyped group that is not related to or only remotely related to a targeted stereotyped group.

As for the second research question, the results showed that interactivity had significant main effects on intentions to seek information about other mental illnesses while no effects were found for intentions to seek information about people with schizophrenia or homeless people. Overall, the number of participants who were interested in getting additional information was low. Out of 113 total participants, 16 percent, 12 percent, and 10 percent wanted to get more information about people with schizophrenia, people with other mental illnesses, and homeless people, respectively. There may be a few explanations for these results. First, the study variable, namely, interactivity, was not effective for motivating the participants to seek more information. Second, as participants were asked to provide their email address if they were interested in getting additional information, they might not have felt comfortable giving out their private information such as email address. Third, the results on the information seeking intentions reflected the true extent of participants' interest in the study subject. Before they were asked about their interest in receiving additional information, participants were

told that the study had ended and the questions regarding additional information were optional. As information seeking intentions were measured as if they were not part of the study, participants might not have felt compelled to answer the questions unless they were truly interested in the study subject. This may suggest that a certain extent of response bias is likely to be introduced if participants' behavior intentions, such as information seeking intentions, are measured explicitly as part of the study. While behavior intentions are often measured as a proxy for actual behavior, a caution must be taken when interpreting participants' responses to the variable. Perhaps future research needs to examine participants' behavior intentions both directly and indirectly and compare the results to gauge the extent of response bias in the direct measure of behavior intentions.

In sum, the results of the main experiment suggest that interactivity may still be an important factor for facilitating learning, especially deep learning, but that issues of measurement, stimulus and interactivity manipulation need to be addressed in future research to accurately evaluate the effects of interactivity on learning. The results also suggest that attitudes and behavior intentions related to stereotyped social groups may be addressed effectively through interactive communication campaigns. Implications of the results are further discussed in Chapter VIII.

Chapter VIII. General Discussion

The goals of this dissertation were primarily three fold. First, it sought to provide a comprehensive view on interactivity by reviewing relevant literature across disciplines. Second, it aimed to develop a theoretical model that would bridge communication perspectives on interactivity and the constructivist view of learning. By revealing similarities between the two perspectives and views, the present research proposed that interactivity would enhance a constructivist model of learning. Third, the dissertation aimed to examine the role of interactivity in changing attitudes and behavior intentions related to stereotyped social groups. The theoretical model that was developed to test the relationships between interactivity and learning was applied on the topic of stereotyped social groups, and the effects on attitudes and behavior intentions related to a targeted (people with schizophrenia) and a non-targeted (homeless people) group were examined.

This chapter discusses some issues and limitations of the findings of the present research and suggestions for future research. Specifically, it discusses the manipulation of interactivity, research on learning, and the study sample. The chapter concludes with theoretical, methodological and practical implications of the dissertation, along with overall implications for future advertising research.

Manipulation of Interactivity

With a few exceptions (e.g., Johnson 2002; Tremayne 2002), research on interactivity tended to examine interactivity as a measured variable, using correlation data (see Cho and Leckenby 1999; Liu and Shrum 2002; McMillan 1999; McMillan and Hwang 2002). In an attempt to tease apart a causal link between interactivity and other variables, while controlling for other extraneous factors, the present research manipulated

interactivity and examined its effects in an experiment. As interactivity was conceptualized in terms of dimensions of user control and responsiveness, it was operationalized accordingly. The two dimensions of interactivity were originally manipulated in terms of presence or absence of each dimension in the pilot study. For instance, high interactivity was manipulated in terms of relevant stories to the questions that were asked previously (presence of responsiveness) and ability to choose an order of stories to read (presence of user control over sequence). Low interactivity was manipulated as absence of questions prior to reading a story (absence of responsiveness) and inability to choose an order of stories, but to follow stories in a chronological order (absence of user control over sequence). The results of the pilot study suggested, however, that the manipulation of interactivity, especially, the manipulation of the dimension of responsiveness, in terms of presence or absence led to incomparability of the two conditions, which also affected reliability of interactivity manipulation checks. As discussed in Chapter VI, participants in the two conditions evaluated responsiveness on difference bases, while perceiving the responsiveness of the stimulus Web site similarly. When the issue of incomparability was addressed in the main experiment, by giving irrelevant questions (i.e., questions about homeless people) to participants in the low interactivity condition, the perceptions of interactivity between the two conditions were differentiated significantly and the reliability of manipulation checks improve considerably. These findings suggest that the comparability of the interactivity manipulation conditions had critical impact on the success of the manipulation and the reliability of the measures. They also suggest that perhaps interactivity, especially, the dimension of responsiveness, is more effectively manipulated by varying degrees of relevance, rather than by presence or absence of relevance. This view is consistent with the conceptualization of interactivity as a continuum, which was discussed in Chapter II.

Issues of the Interactivity Manipulation

There are few issues to be considered with relative to the interactivity manipulation. First, although the manipulation of interactivity in general and the manipulation of responsiveness in particular were found to be effective after the issue of incomparability in the low interactivity condition was addressed, it compromised a certain extent of external validity of the study. In order to create strong perceptions of irrelevance, it was necessary to ask participants in the low interactivity condition the questions unrelated to the story that they would be reading on the next Web page. However, it also made the manipulation less realistic.

Second, also with regards to the manipulation of responsiveness, participants in the low interactivity condition might have experienced negative emotions such as frustration, hostility, and anger, as they received information irrelevant to the questions asked previously. The negative emotions then could have been projected to their responses to the other variables such as attitudes toward people with schizophrenia. Since participants' emotional experiences as a result of the responsiveness manipulation were not measured, the potential confounding effects of (negative) emotions on the dependent variables were not partialed out.

Third, the measure of stereotypic perceptions of people with schizophrenia was used to manipulate responsiveness as well as to create three groups of stereotypic perceptions of people with schizophrenia, namely, correct, mixed, and incorrect perceptions groups. As the results on the cross-over effects showed (see Table 28), the use of the same measure to manipulate responsiveness did not affect stereotypic perceptions of people with schizophrenia between the two interactivity conditions. However, the use of the same measure to achieve the two goals seems to have affected the perceptions of responsiveness between the three groups of stereotypic perceptions.

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The results on the cross-over effects showed that the correct perceptions group perceived the stimulus Web site to be significantly more responsive than the incorrect perceptions group (see Table 31).

Fourth, the manipulation of user control over sequence might have confounded its effects on learning, due to the design of the experiment stimulus. As discussed in Chapter VII, the stories on the stimulus Web site could have been read most easily in a chronological order. When participants in the high interactivity condition had freedom to choose an order of stories to read and thus read the storied out of order, it might have been more difficult for them to achieve a greater level of learning.

Fifth, while participants in the high interactivity condition were able to choose the story to read next, the number of choices available diminished as they viewed more Web pages. Among nine stimulus Web pages, the participants were only able to choose Web pages that have not been chosen previously, whereas they were required to view all of the nine Web pages. User control was manipulated such as a way in order to expose the stimulus equally to all participants in no matter what order they viewed the Web pages and thus to minimize the potential confounding effects attributable to different amount of stimulus exposure (i.e., different numbers of Web pages viewed). However, participants' perceptions of user control might have been affected as the controllability of the sequence decreased as they viewed more Web pages.

Finally, participants in the low interactivity condition read the stories in a random order that was chosen for them, in order to prevent potential confounding effects that might arise from reading the stories in a specific order (e.g., chronological order). However, a true control for a high user control manipulation might have been a yoked control, in which participants in the two conditions of interactivity are paired with one another and the participants in the low interactivity condition follow the order of the

stories that participants in the high interactivity condition, whom they are paired with, choose (Ariely 2000).

Suggestions for Future Research

The above issues concerning the manipulation of interactivity need to be addressed and further examined in the future research. First, the future research should seek to find a way to design an effective manipulation of responsiveness that is also externally valid. As it is often the case with an experimental design, it is a challenge to balance between external validity and strength of manipulations. However, the two goals may be achieved by varying the *degrees* of relevance between previous interactions (e.g., answering questions) and later communications (e.g., receiving information). For instance, instead of asking questions that are *unrelated* to the content of information to be received later (e.g., questions about homeless people and information about people with schizophrenia), future research may ask questions that are *less related* to the content of information to be received later (e.g., questions about epidemiology of schizophrenia and information about symptoms of schizophrenia). Different degrees of relevance will need to be pretested to determine the degrees of relevance that create distinct perceptions of responsiveness between manipulation conditions. The issue of negative emotions in the low responsiveness manipulation, which was discussed previously, also needs to be addressed in the future research. Future research may measure participants' emotional experiences during the study and control their effects on dependent variables or design a low responsiveness manipulation that does not result in significantly different emotional experiences as in a high responsiveness manipulation.

Second, also with relative to the responsiveness manipulation, the future research needs to address the cross-over effects discussed above. In the present research, the

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measure of stereotypic perceptions of people with schizophrenia was used to facilitate the responsiveness manipulation as well as to create three groups of stereotypic perceptions, in attempt to avoid the lengthening of the experiment and boredom among participants, which might have occurred with the use of the repeated measures. The future research needs to develop different techniques to manipulate responsiveness. For instance, it may ask questions that do not necessarily measure stereotypic perceptions. Or, instead of asking questions, it may present information that prompts participants to think about the topic that is discussed on the next Web page. The perceptions of whether the information presented on the next Web page is relevant to the information that prompted participants to think on the previous page will determine the manipulation of responsiveness.

Third, with regards to the manipulation of user control, the future research should consider both the type of user control that is manipulated (e.g., control over sequence, pace, and/or content) and the nature of information in the experiment stimulus. If control over sequence is to be manipulated, as in the present research, the experiment stimulus should be designed so that information on different Web page, although related, can be an independent piece and that reviewing of the information in any order does not affect learning or any other outcome variables. The present research did not use a yoked control for the low user control manipulation due to the time constraint and the complexity of the process involved in designing a yoked control. The future research, however, may compare the effectiveness of the yoked control versus absence of user control as a manipulation of low user control.

Finally, the present research conceptualized interactivity as a communication process and operationalized interactivity in terms of responsiveness and user control, which were considered to represent the conceptualization of interactivity as a communication process most well. Although the present research measured the

perceptions of responsiveness and user control and compared them between the two conditions of interactivity, it did not measure the extent to which participants perceived the manipulation of interactivity to be a communication process. The future research should thus consider measuring this perception and examine if the manipulation of interactivity, as designed in the present research, does represent the concept of interactivity as a communication process.

Research on Learning

The present research developed a theory that predicted the effects of interactivity on deep learning based on a thorough review of the interdisciplinary literature. However, the prediction of the theory was not supported by the data. A few explanations for the results were provided in Chapter VII. The most probable explanation identified in Chapter VII was the issue of measurement of deep learning. The results of the main experiment suggest that it requires special efforts to develop an accurate measure of deep learning, especially if the subject of deep learning is concerned with abstract knowledge, such as stereotypes. As discussed in Chapter VII, the more abstract level of learning the measure of deep learning seeks to assess, the higher the risk is to measure the currently held abstract knowledge rather than learning. The future research should address these measurement issues and further examine the relationships between interactivity and deep learning.

In addition to the measurement issue, there are a few other areas to be considered in the future research. The present research found that participants in the study sample had fairly correct perceptions about people with schizophrenia and that the difference in stereotypic perceptions between the correct, mixed and incorrect groups was marginal. The overall high level of correct perceptions yielded conservative tests for the effects of

interactivity, while rendering any significant differences found in dependent variables between the three groups more meaningful. However, it left little latitude for interactivity to improve learning, even for those that were categorized as the incorrect perceptions group. Future research that is interested in the effects on learning may choose a topic that people are little knowledge about or focus on a few incorrect stereotypic perceptions and address them in the stimulus.

Another consideration to give in the future research concerns the complexity of the topic to be learned. The present research attempted to change incorrect stereotypic perceptions via learning through interactive communication. However, the effects on learning might have been hard to obtain as stereotypes or stereotypic perceptions represent one's engrained abstract knowledge structure. Even though some extent of learning may occur, information that addresses incorrect stereotypic perceptions that reside at the core of the abstract knowledge structure would be hard to learn. Future research may test the theoretical model proposed in the present research on topics with varying levels of complexity and resilience to learning.

Finally, the future research may consider measuring a different type of deep learning. In the present research, deep learning was operationalized as comprehension. However, the constructivists also emphasize problem solving ability and critical thinking as true forms of learning. These forms of learning require learning beyond the retention of factual knowledge (surface learning), and internalization and application of the factual knowledge for new given problems. In the future research, a different form of deep learning can be operationalized and its relationship with interactivity may be examined.

Study Sample

There are a few issues to be considered in relation to the study sample. The participants of the dissertation research were recruited from undergraduate Advertising classes and mainly consisted of those majoring communication or related disciplines. Although the primary interest of the dissertation was in testing a theory and comparison of the two experimental conditions, a caution must be taken when interpreting the findings of the research and generalizing them to a broader population given the nature of the study sample. The composition of the study sample may also explain the fairly correct stereotypic perceptions of people with schizophrenia as college students are likely to be more educated and informed about stereotypes of social groups than general population.

Another related issue concerns potential contamination in the study sample due to the fact that participants were recruited from a relatively narrowly defined pool and that the experiment was conducted in multiple sessions over a few days. Although participants were asked not to share their experience during the experiment with their classmates, it was potentially possible that they talked to their classmates about the experiment and affected responses of the participants in later sessions. Future research needs to take this issue into consideration in recruiting participants and designing the research.

Finally, it should be noted that the sample size for the main experiment was relatively small for the given design of the experiment. There were a total of 113 participants for the 2 (high versus low interactivity) by 3 (the correct, mixed, and incorrect perceptions groups) design of the main experiment, resulting in less than 20 participants in each of the six experimental conditions. The statistical power to find significant differences between the experiment conditions was thus reduced, although the

small sample size yielded conservative tests for the significant results found in the research.

Implications

The present research provides a few theoretical, methodological and practical implications. First, a theoretical implication can be made from the theory developed in this research, which hypothesizes the relationships between interactivity and learning. The dissertation aimed to address a gap in research of interactivity between disciplines and to find a theoretical link on the relationships between interactivity and learning by revealing similarities between the view of interactivity as a communication process and learning defined in the current popular models of education. Although the prediction of the theory was not supported in this research, the interdisciplinary approach to the development of the theory is expected to make important implications for both education and communication fields. In education, learning is commonly acknowledged as a process. Therefore, ways to engage learners in the process have been a key issue in education in general and designing of educational programs in particular. While interactive learning programs are considered to provide good opportunities to engage learners, little attention has been paid to the communication experience that learners have during learning with interactive programs. Often times, education research on interactive learning focuses on how specific interactive medium (e.g., the Web, CD-ROM) or features available on the medium can benefit learning. With an interdisciplinary approach, this dissertation attempted to provide a communication perspective on interactive learning and a parsimonious theoretical explanation on the effects of interactive learning. In communication research, learning has not been a frequent or primary outcome of interest and the relationship between a communication variable and

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learning was rarely examined. Although a few researchers attempted to explore the role of interactivity in learning recently (e.g., Johnson 2002; Liu 2002; Tremayne 2002), interactivity was neither conceptualized nor operationalized as a communication process, while a formal theory on the effects of interactivity on learning was not proposed. The theory developed in this dissertation is expected to provide future research with a framework to further examine the relationships between interactivity or interactive communication and learning.

Second, the dissertation makes a couple of methodological implications. The concept of interactivity as a communication process was developed a decade ago (e.g., Rafaeli 1988; Rogers 1986) and has recently regained attentions from researchers in communication and other related disciplines. Despite the frequent discussions of the construct in the literature, interactivity as a communication process was often theoretically explicated rather than empirically tested. This dissertation made one of the first attempts to operationalize interactivity and test it in an experiment. While additional research is warranted to design a more effective manipulation of interactivity as discussed above, the manipulation of interactivity designed in this research may serve as a starting point for future research that also seeks to manipulate interactivity as a communication process and to examine its causal effects.

Another methodological implication concerns new measures developed in the dissertation. The dissertation constructed the measure of stereotypic perceptions for people with schizophrenia and for homeless people and the additional measure of task involvement. The measure of stereotypic perceptions for the two stereotyped groups was developed due to a lack of an existing measure in the current literature, whereas the new measure of task involvement was intended to assess the concept of task involvement that was specific in the present research. Although the reliability of the measure of

stereotypic perceptions was found to be relatively low ($\alpha = .59 \sim .76$), the present research made an original attempt to construct a multi-item scale by identifying relevant key stereotypic perceptions. The items on the scale may serve as a pool for selecting closely related stereotypic perceptions in the future research, which then can be used to construct a more reliable measure that taps onto the same dimension of the stereotypic perceptions. With regards to the new measure of task involvement, it was found to have fairly good reliability ($\alpha = .87$). This measure may be adopted and tested in other research that conceptualizes task involvement similar to the present research.

Third, the dissertation provides practical implications for current educational efforts to change stereotypes of mental illness and schizophrenia. As reviewed by Corrigan and Penn (1999), educational and other intervention efforts to change the stereotypes of mental illness and schizophrenia have been mixed, while educational efforts tended to focus on providing factual and stereotype-contradicting information with little attention to how the information is communicated to the public. By applying the theoretical model of interactivity and learning on stereotypes of schizophrenia, the present research demonstrated that interactivity played a significant role in influencing attitudes toward both a targeted stereotyped group (people with schizophrenia) and a non-targeted stereotyped group (homeless people). It suggests that educational campaigns can address the public's stereotypic perceptions of mental illness and perhaps other related stereotypic perceptions effectively with interactive communication, in which participants actively participate in exchanging messages and interactions.

Finally, the dissertation makes a few implications for future advertising research. Researchers in advertising have sought to find ways to enhance consumers' involvement with advertising messages because high involvement tends to be associated with enhanced consumer processing of advertising messages and the long-term attitude change

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toward the brand advertised. While interactive advertising, or advertising on interactive media such as the Web, is considered to have the potential to increase consumer involvement with advertising messages, the dissertation provides a theoretical basis and empirical evidence on how consumer involvement may be enhanced by interactive advertising.

The dissertation also makes a theoretical implication for advertising research that is concerned with consumer comprehension or miscomprehension of product information and advertising messages, as comprehension was considered to be a form of deep learning in the dissertation. In general, researchers find that a significant number of consumers tend to miscomprehend the labels on foods and over-the-counter drugs (e.g., nutritional and dietary information) (e.g., Baltas 2001; Friedman and Romeo 1997; Miller and Russell 2004; Sansgiry, Cady, and Sansgiry 2001; Viswanathan and Hastak 2002) and advertising claims about products and services (e.g., Gerritsen, Korzilius, and van Meurs 2000; Jacoby and Hoyer 1989; Johar 1995; Mick 1992; Padgett and Allen 1997). Comprehension has been also identified as an important factor for the consumer's acceptance of diseases-related health messages and subsequent behavior changes (e.g., Blumberg 2000; Hausmann Muela, Muela Ribera, and Mushi 2002; MacKenzie, Halliday, and Holloway 1988; Rimer and Glassman 1984). Future research may examine the role of interactive advertising in facilitating consumer comprehension using the theory proposed in the dissertation.

While the present research examined social stereotypes to test the theoretical model, the implication of the present research may be extended to other stereotypes that are more relevant in the advertising context. For instance, advertising researchers have studied stereotypes associated with products' country-of-origin (e.g., Lotz and Hu 2001; Maheswaran 1994). Upon the global marketing era, business managers, country policy

makers and academic researchers paid close attention to the effects of country of origin and found that it biased consumers' product evaluations (e.g., Han 1989; Hong and Wyer 1989; Johansson 1989; Lotz and Hu 2001). Since the process in which country of origin guides consumers' assessments of products is similar to that of stereotyping of social groups, Samiee (1994) called it the "country stereotype effect" (Lotz and Hu 2001, p. 106). While the research on country of origin tends to focus on its effects (e.g., Ahmed and d'Astous 1996; Bilkey and Nes 1982; Ettenson, Wagner, and Gaeth 1988), a few researchers (e.g., Lotz and Hu 2001) have attempted to control the negative effects of country of origin by drawing on social stereotype change models. The findings of their research suggested that stereotype change models could be effective in revising country of origin stereotypes and that "suppositions of social stereotype change models are applicable to the context of marketing stereotypes" (Lotz and Hu 2001, p. 126). The empirical evidence from the present research may contribute to this line of research and suggest a role of interactive advertising in stereotype change.

Appendices

Appendix A: Stimulus Web Site (Pilot Study)

High Interactivity Condition

Problems often come up in life and people try to deal with them in their own ways. The following Web pages contain a story about Mary, whose life seemed to have changed after encountering some problems in her youth. We want you to read her story and tell us what you think about her story as well as the Web site after you finish reading it.

There are nine Web pages, each of which tells a different story about Mary in various times and places. While you can choose the order of the story to read, you may not go back to the story you once read. So please make your selection carefully.

Select one of the following stories you would like to read first

- Mary's Childhood
- Mary's High School Years
- Mary's College Years
- What Mary's Parents Learned About Mary's Problems
- When Mary's Parents Visited A Professional To Ask About Mary's Problems
- What Might Have Caused Mary's Problems
- How To Treat Mary's Problems
- Mary's Struggle With The Treatment
- How Is Mary Now

Before you read the next story, please let us know how likely you think the following factors contribute to causing someone to have schizophrenia.

	Highly Unlikely								Highly Likely
1) Complications during pregnancy or at birth	O	O	O	O	O	O	O	O	O
2) Poor parenting	O	O	O	O	O	O	O	O	O
3) Character flaws	O	O	O	O	O	O	O	O	O
4) God's will	O	O	O	O	O	O	O	O	O

Go To Mary's Childhood

Mary was born on a beautiful morning in May to a healthy family in a mid-western town, who welcomed Mary with joy. Mary had two sisters and a brother. Like most other parents, we hoped for a good environment for the nurture of our children and were confident that our situation provided that. Mary lived among happy, busy, lively siblings and with loving parents who spent time with their children and enjoyed doing so. On holidays, we often visited a small farm in the suburb and enjoyed time there, fishing, swimming, and learning to be gardeners.

In the neighborhood where we lived, there was a school that provided well-rounded education with much emphasis on creativity, the arts, and independence. It was here that Mary grew up, well liked by classmates and teachers a like – a gentle, intelligent, athletic girl with a ready smile, a special touch with animals and a wonderful sense of humor.

Mary was quite gifted academically. She started to read (without prompting) at age four and her verbal skills were unusual. But her particular aptitude was in mathematics. As Mary grew up, she enjoyed soccer, playing the violin, creative writing and especially mountain-biking, for which she won an impressive array of ribbons in local competitions.

She was dependable and honest. It was a comfort to us to know that we would never need to worry about the future of the family. Mary could and would take care of things if there were ever problems.

However, somewhere along the way, things began to change.

- Mary's Childhood
- Mary's High School Years
- Mary's College Years
- What Mary's Parents Learned About Mary's Problems
- When Mary's Parents Visited A Professional To Ask About Mary's Problems
- What Might Have Caused Mary's Problems
- How To Treat Mary's Problems
- Mary's Struggle With The Treatment
- How Is Mary Now

Before you read the next story, please let us know to what extent you agree or disagree with the following statements about people with schizophrenia.

	Strongly Disagree	Strongly Agree
1) People with schizophrenia often see things that other people do not.	O O O O O O O O O	
2) People with schizophrenia are typically geniuses.	O O O O O O O O O	
3) People with schizophrenia tend to avoid interacting with other people.	O O O O O O O O O	

Go To Mary's High School Years

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Mary's High School Years

It was during Mary's last two years of high school. One day Mary came home, saying that other students around her were making disapproving comments about her in class for no apparent reasons. We didn't pay much attention to Mary's complaints then, but Mary continued to tell us that other students were talking behind her back. After a couple of weeks, Mary was convinced that other students were spying on her and that they could hear what she was thinking. She no longer felt like talking with anyone and often retreated to her room. She was sometimes so preoccupied with what she was thinking that she skipped meals.

We assumed that Mary was going through a phase in adolescence and it would pass. Although Mary seemed to have gradually lost interest in her study and her ambition to succeed, it didn't affect her academic work much. She qualified for a four-year all-tuition scholarship to one of the toughest universities in the country. We were very happy about Mary's achievement. But she seemed to be so disconnected that she was unaware of the fact until somebody congratulated her.

- Mary's Childhood
- Mary's High School Years
- Mary's College Years
- What Mary's Parents Learned About Mary's Problems
- When Mary's Parents Visited A Professional To Ask About Mary's Problems
- What Might Have Caused Mary's Problems
- How To Treat Mary's Problems
- Mary's Struggle With The Treatment
- How Is Mary Now

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Before you read the next story, please let us know to what extent you agree or disagree with the following statements about people with schizophrenia?

	Strongly Disagree	Strongly Agree
1) People with schizophrenia tend to lose touch with reality.	O O O O O O O O O	
2) People with schizophrenia often hear voices that other people do not.	O O O O O O O O O	
3) People with schizophrenia are not as smart as other people their age.	O O O O O O O O O	
4) People with schizophrenia tend to have problems communicating.	O O O O O O O O O	

Go To Mary's College Years

Mary's College Years

Problems Mary had at high school seemed to continue at college. Although Mary managed to finish her first semester, she started skipping classes a lot more often after the first semester.

She often heard voices coming from behind her back, but when she turned around to see who was talking to her, she found no one. Sometimes she thought students in her class looked at her with angry eyes.

When Mary failed a class, it didn't bother her at all. She got irritated or upset by something, but couldn't express her emotions and explain what it was that upset her. So Mary kept all to herself, which made it difficult for her to handle her problems.

Now we could see clearly that something was different about Mary. She burst into laughter in the middle of quiet conversations and wore strange clothes. She stopped bathing regularly. Sometimes, she talked on and on about a religious group that no one heard of or Martians controlling her thoughts. She used peculiar words and sentences that didn't make sense. One night, she disappeared without telling anyone. She came back at 3 o'clock in the morning, saying that she went out for a walk to relieve the back pain.

We realized that Mary needed help. So we tried to find out what was going on with Mary.

- Mary's Childhood
- Mary's High School Years
- Mary's College Years
- What Mary's Parents Learned About Mary's Problems
- When Mary's Parents Visited A Professional To Ask About Mary's Problems
- What Might Have Caused Mary's Problems
- How To Treat Mary's Problems
- Mary's Struggle With The Treatment
- How Is Mary Now

Before you read the next story, please let us know to what extent you agree or disagree with the following statements about people with schizophrenia?

	Strongly Disagree								Strongly Agree
1) People with schizophrenia tend to be mentally retarded.	O	O	O	O	O	O	O	O	O
2) People with schizophrenia have split or multiple personality.	O	O	O	O	O	O	O	O	O
3) Schizophrenia is a relatively common illness.	O	O	O	O	O	O	O	O	O
4) Schizophrenia occurs more often in men than women.	O	O	O	O	O	O	O	O	O

Go To What Mary's Parents Learned About Mary's Problems

We first searched for information on the Web and at the local library. Based on Mary's symptoms, we suspected that Mary might have schizophrenia, a type of mental illness that impairs normal thoughts, speech, and behavior. We learned the following about schizophrenia.

Schizophrenia can make it difficult for a person to tell the difference between real and unreal experiences, to have appropriate emotional responses to others, and to behave appropriately in social situations. Although schizophrenia can cause problems with thinking clearly or concentrating, schizophrenia is very different from mental retardation. Schizophrenia does not affect someone's intelligence. It affects people of all levels of intelligence.

Like cancer, heart disease, diabetes or any other illnesses, schizophrenia is a complex, chronic medical condition that affects different people in different ways. Today about two million Americans are affected by this illness. While there is no group of people that are particularly more vulnerable to this illness, it most commonly appears between the ages 13 and 25 and often earlier in males than in females. It is uncommon that symptoms of schizophrenia appear before the age of 12. It is also uncommon that new symptoms of schizophrenia develop after the age of 40.

Schizophrenia is often confused with split or multiple personality disorder, but they are not the same thing. People with schizophrenia only have one personality. This confusion arose because schizophrenia comes from the Greek meaning "split mind." However, schizophrenia is a split from reality, not a split in personality.

It is commonly believed that people with schizophrenia are dangerous because they are violent and have a tendency to harm others as well as themselves. However, the belief is not true because people like Mary, who have schizophrenia, tend to withdraw into themselves rather than interact with others.

- Mary's Childhood
- Mary's High School Years
- Mary's College Years
- What Mary's Parents Learned About Mary's Problems
- When Mary's Parents Visited A Professional To Ask About Mary's Problems
- What Might Have Caused Mary's Problems
- How To Treat Mary's Problems
- Mary's Struggle With The Treatment
- How Is Mary Now

Before you read the next story, please let us know to what extent you agree or disagree with the following statements about people with schizophrenia.

	Strongly Disagree	Strongly Agree
1) Schizophrenia affects one's ability to concentrate.	O O O O O O O O O	
2) You can tell if someone has schizophrenia just by the way they look.	O O O O O O O O O	
3) People with schizophrenia tend to experience the same set of symptoms.	O O O O O O O O O	

After looking for information about Mary's illness on our own, we thought we needed to talk to a professional to get an accurate diagnosis for Mary's illness. We found out there were generally four groups of health professionals we could talk to about Mary's illness: psychiatrists, psychologists, social workers, and psychiatric nurses. Each state licenses these professionals—although criteria vary by state—and has certain requirements for maintaining and updating training and skills. Both psychiatrists and psychologists have advanced level of training and experience in treating complicated situations. But we decided to consult a psychiatrist because we thought Mary's symptoms were pretty severe and only psychiatrists could prescribe medications in case Mary needed them.

When we visited a psychiatrist, the doctor asked us about Mary's specific symptoms to rule out possibilities of other illnesses. According to the doctor, there is no single symptom that positively identifies schizophrenia and all of the symptoms of schizophrenia can also be found in other brain disorders. For example, not everyone who hears voices is schizophrenic. Some people with depression may hear voices. Hearing voices may also occur as a result of a serious medical illness or from the effects of medication. Besides, not everyone who acts paranoid or distrustful has schizophrenia. Some people have a paranoid personality disorder, a tendency to be suspicious or distrustful of others, without the other features of schizophrenia.

There is no lab test for schizophrenia. However, when a doctor sees the symptoms that have lasted continuously and progressively over six months or more, he or she can almost always diagnose schizophrenia correctly.

Mary's symptoms that the doctor asked us about included:

1. Positive symptoms, which are disturbances that are "added" to the person's personality, such as delusions, hallucinations, and disordered thinking and speech.

     o   Delusions: false beliefs or thoughts with no basis in reality— the person may believe that someone is spying on him or her, or that he or she is someone famous.

     o   Hallucination: disturbances of sensory perceptions—seeing, hearing, feeling, tasting, or smelling something that isn't present. The most common experience is hearing imaginary voices that give commands or comments to the individual.

     o   Disordered thinking and speech: changes in thought patterns and ways of speaking— The person may make up his or her own words or sounds or switch from one topic to another in a nonsensical fashion.

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2. Negative symptoms, which are capabilities that are "lost" from the person's personality, such as social withdrawal, extreme loss of interest in things, lack of drive or initiative, and emotional unresponsiveness.

- Mary's Childhood
- Mary's High School Years
- Mary's College Years
- What Mary's Parents Learned About Mary's Problems
- When Mary's Parents Visited A Professional To Ask About Mary's Problems
- What Might Have Caused Mary's Problems
- How To Treat Mary's Problems
- Mary's Struggle With The Treatment
- How Is Mary Now

Before you read the next story, please let us how likely you think the following factors contribute to causing someone to have schizophrenia.

	Highly Unlikely								Highly Likely
1) Bad luck	O	O	O	O	O	O	O	O	O
2) Genetic factors	O	O	O	O	O	O	O	O	O
3) Family history of schizophrenia	O	O	O	O	O	O	O	O	O
4) Weak will power	O	O	O	O	O	O	O	O	O
5) Stressful circumstances in life	O	O	O	O	O	O	O	O	O
6) Chemical imbalance in the brain	O	O	O	O	O	O	O	O	O

Go To What Might Have Caused Mary's Problems

What Might Have Caused Mary's Problems

We wondered why Mary got schizophrenia. We thought that schizophrenia was a kind of illness that runs in the family, but no one in our family had schizophrenia. When we asked the doctor about the cause of Mary's illness, the doctor said that genetics or heredity was only one of the factors that might cause schizophrenia and that the exact cause or causes of schizophrenia were not known yet. What is known, however, is that the brains of people with schizophrenia are different, as a group, from the brains of those without schizophrenia. Research suggests that schizophrenia has something to do with problems with brain chemistry and brain structure. It is as much an organic brain disease as is multiple sclerosis, Parkinson's disease, or Alzheimer's disease.

Increasingly, scientists believe that schizophrenia, like many other medical illnesses such as cancer, heart disease, and diabetes, is caused by a combination of problems. While some are inherited, others may be caused by biological factors such as the imbalance in the brain's chemistry and environmental factors such as viral infections affecting the brain very early in life and complications during birth.

- Mary's Childhood
- Mary's High School Years
- Mary's College Years
- What Mary's Parents Learned About Mary's Problems
- When Mary's Parents Visited A Professional To Ask About Mary's Problems
- What Might Have Caused Mary's Problems
- How To Treat Mary's Problems
- Mary's Struggle With The Treatment
- How Is Mary Now

Before you read the next story, please let us to what extent you agree or disagree with the following statements about people with schizophrenia.

	Strongly Disagree	Strongly Agree
1) There are no effective treatments for schizophrenia.	O O O O O O O O O	
2) People with schizophrenia may be unaware that they are ill.	O O O O O O O O O	

Go To How to Treat Mary's Problems

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How to Treat Mary's Problems

Now that we learned a lot about Mary's illness, we wondered how it could be treated. We were devastated when the doctor told us that a cure for schizophrenia was not found yet. However, the doctor also told us that, like other illnesses such as diabetes, symptoms of schizophrenia could be controlled with medication. Since treatment is most effective when begun early in the course of the illness, the doctor advised that Mary should start antipsychotic medications as soon as possible.

When we came home from the hospital that day, it wasn't easy to convince Mary that she needed treatment because she didn't think she was sick. After a long discussion, however, Mary agreed to see the doctor. She probably agreed to please us more than anything else.

Although Mary was hospitalized a few times, she lived at home most of the time. It was most painful to watch her suffer from side effects of the medications. She sometimes suffered from an inner sensation of restlessness and an irresistible urge to move various parts of her body, while other times she had temporary paralysis and extreme slowness of movement. When we thought that the medications finally took care of most of her symptoms, they came back and hit her hard if she stopped taking the medications. We felt powerless seeing her go through phases of the treatment.

- Mary's Childhood
- Mary's High School Years
- Mary's College Years
- What Mary's Parents Learned About Mary's Problems
- When Mary's Parents Visited A Professional To Ask About Mary's Problems
- What Might Have Caused Mary's Problems
- How To Treat Mary's Problems
- Mary's Struggle With The Treatment
- How Is Mary Now

Mary's Struggle With The Treatment

After a few years of continuous treatment and endurance, Mary's condition improved significantly. We remember the day when she came out of her room in the morning and said, "The voices are gone." We couldn't say a word for a while. We just held her. We were never more proud of her.

She still experienced side effects of medications, but she knew that the only way to control her symptoms was to keep taking the medications. She accepted the fact that schizophrenia was a life-long disease, like diabetes or high blood pressure, and that medications and their side effects were a part of her life.

While medications were the mainstay of treatment to reduce signs and symptoms, Mary also benefited from non-drug therapies. She worked with a cognitive behavioral therapist who helped her learn ways to cope with stressful thoughts and situations to reduce her risk of a relapse. She learned to change negative patterns of thought and behavior into ways that put her in control of her thoughts and feelings. The therapist also helped her comply with her schedule of medications.

While Mary was fighting bravely with her illness, we did everything we could to understand her illness and help her with the treatment. Although it was nothing compared to what Mary went through, it required a significant commitment of time and efforts on our part as well. We were dismayed at times when we felt the discrimination and pity of others who perceived Mary's illness as a failure of parenting. When Mary's sisters and brother told us that their friends joked about Mary's illness and told them to check their mental status as well, we didn't know how to teach them to deal with hurtful comments from others.

Having family therapy and joining in support groups helped us learn more about Mary's illness and treatment and to cope with various situations. It was a comfort to know that we were not alone and others had similar experiences and problems.

- Mary's Childhood
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- How Is Mary Now

Before you read the next story, please let us to what extent you agree or disagree with the following statements about people with schizophrenia.

	Strongly Disagree								Strongly Agree
1) With treatment, People with schizophrenia are able to carry out day-to-day tasks.	O	O	O	O	O	O	O	O	O
2) People with schizophrenia tend to have difficulty with relationships.	O	O	O	O	O	O	O	O	O
3) Medications and therapies can help people with schizophrenia to function like the majority of society.	O	O	O	O	O	O	O	O	O

[Go To How Is Mary Now](#)

We know that Mary's life and our life as a family will never be the same as before she got schizophrenia. But we all adapted to the new way of life and it has been okay. Mary didn't go back to college to finish her degree. We wanted her to avoid any stressful situations to reduce her risk of a relapse.

While Mary knew that she might not be able to live like other "normal" people, she made every effort to live a life of her own. Supportive, reality-oriented counseling and rehabilitation therapy helped her rebuild the functional and social skills necessary to live independently. She learned about such things as good hygiene, cooking, money management, social interaction, and traveling. Rehabilitation programs also helped her prepared for a job.

When Mary told us that she wanted to have a job, we weren't entirely sure whether she would be able to find and keep a job. When people found out about Mary's mental illness, they didn't want to hire her for a job or to rent her an apartment. It was a very difficult time for Mary. She felt that she finally managed her symptoms and was ready to move on, but society wasn't ready to accept her as who she was due to the discriminating attitudes toward mental illness.

Mary did not give up, however. After persistent pursuit and patient waiting, she finally got a job at a local public library. She started working part time, but she has been working full-time about a year now. She also got a place of her own, while she spends some weekends with us. Making friends is still a challenge for her because she is afraid of rejection from people when they find out about her illness. But she does go out with people at her work some Friday nights. We believe that's a start. After all that had happened, we are still glad that we didn't lose Mary to the illness. We are pleased with the progress Mary is making with her treatment and her life. We can't say her life has been easy, but it is a unique and special one.

- Mary's Childhood
- Mary's High School Years
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- How Is Mary Now

You have completed reading Mary's story. Click below to go to the survey.

Go to Survey

Low Interactivity Condition

Problems often come up in life and people try to deal with them in their own ways. The following Web pages contain a story about Mary, whose life seemed to have changed after encountering some problems in her youth. We want you to read her story and tell us what you think about her story as well as the Web site after you finish reading it.

There are nine Web pages, each of which tells a different story about Mary in various times and places. You are asked to read the stories in the order shown below.

Please start reading Mary's story by clicking on Mary's Childhood below.

- Mary's Childhood
- Mary's High School Years
- Mary's College Years
- What Mary's Parents Learned About Mary's Problems
- When Mary's Parents Visited A Professional To Ask About Mary's Problems
- What Might Have Caused Mary's Problems
- How To Treat Mary's Problems
- Mary's Struggle With The Treatment
- How Is Mary Now

Mary was born on a beautiful morning in May to a healthy family in a mid-western town, who welcomed Mary with joy. Mary had two sisters and a brother. Like most other parents, we hoped for a good environment for the nurture of our children and were confident that our situation provided that. Mary lived among happy, busy, lively siblings and with loving parents who spent time with their children and enjoyed doing so. On holidays, we often visited a small farm in the suburb and enjoyed time there, fishing, swimming, and learning to be gardeners.

In the neighborhood where we lived, there was a school that provided well-rounded education with much emphasis on creativity, the arts, and independence. It was here that Mary grew up, well liked by classmates and teachers a like – a gentle, intelligent, athletic girl with a ready smile, a special touch with animals and a wonderful sense of humor.

Mary was quite gifted academically. She started to read (without prompting) at age four and her verbal skills were unusual. But her particular aptitude was in mathematics. As Mary grew up, she enjoyed soccer, playing the violin, creative writing and especially mountain-biking, for which she won an impressive array of ribbons in local competitions.

She was dependable and honest. It was a comfort to us to know that we would never need to worry about the future of the family. Mary could and would take care of things if there were ever problems.

However, somewhere along the way, things began to change.

Please click on Mary's High School Years below to read the next story.

- Mary's Childhood
- [Mary's High School Years](#)
- Mary's College Years
- What Mary's Parents Learned About Mary's Problems
- When Mary's Parents Visited A Professional To Ask About Mary's Problems
- What Might Have Caused Mary's Problems
- How To Treat Mary's Problems
- Mary's Struggle With The Treatment
- How Is Mary Now

It was during Mary's last two years of high school. One day Mary came home, saying that other students around her were making disapproving comments about her in class for no apparent reasons. We didn't pay much attention to Mary's complaints then, but Mary continued to tell us that other students were talking behind her back. After a couple of weeks, Mary was convinced that other students were spying on her and that they could hear what she was thinking. She no longer felt like talking with anyone and often retreated to her room. She was sometimes so preoccupied with what she was thinking that she skipped meals.

We assumed that Mary was going through a phase in adolescence and it would pass. Although Mary seemed to have gradually lost interest in her study and her ambition to succeed, it didn't affect her academic work much. She qualified for a four-year all-tuition scholarship to one of the toughest universities in the country. We were very happy about Mary's achievement. But she seemed to be so disconnected that she was unaware of the fact until somebody congratulated her.

Please click on Mary's College Years below to read the next story.

- Mary's Childhood
- Mary's High School Years
- Mary's College Years
- What Mary's Parents Learned About Mary's Problems
- When Mary's Parents Visited A Professional To Ask About Mary's Problems
- What Might Have Caused Mary's Problems
- How To Treat Mary's Problems
- Mary's Struggle With The Treatment
- How Is Mary Now

Problems Mary had at high school seemed to continue at college. Although Mary managed to finish her first semester, she started skipping classes a lot more often after the first semester.

She often heard voices coming from behind her back, but when she turned around to see who was talking to her, she found no one. Sometimes she thought students in her class looked at her with angry eyes.

When Mary failed a class, it didn't bother her at all. She got irritated or upset by something, but couldn't express her emotions and explain what it was that upset her. So Mary kept all to herself, which made it difficult for her to handle her problems.

Now we could see clearly that something was different about Mary. She burst into laughter in the middle of quiet conversations and wore strange clothes. She stopped bathing regularly. Sometimes, she talked on and on about a religious group that no one heard of or Martians controlling her thoughts. She used peculiar words and sentences that didn't make sense. One night, she disappeared without telling anyone. She came back at 3 o'clock in the morning, saying that she went out for a walk to relieve the back pain.

We realized that Mary needed help. So we tried to find out what was going on with Mary.

Please click on What Mary's Parents Learned About Mary's Problems below to read the next story.

- Mary's Childhood
- Mary's High School Years
- Mary's College Years
- What Mary's Parents Learned About Mary's Problems
- When Mary's Parents Visited A Professional To Ask About Mary's Problems
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- How To Treat Mary's Problems
- Mary's Struggle With The Treatment
- How Is Mary Now

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We first searched for information on the Web and at the local library. Based on Mary's symptoms, we suspected that Mary might have schizophrenia, a type of mental illness that impairs normal thoughts, speech, and behavior. We learned the following about schizophrenia.

Schizophrenia can make it difficult for a person to tell the difference between real and unreal experiences, to have appropriate emotional responses to others, and to behave appropriately in social situations. Although schizophrenia can cause problems with thinking clearly or concentrating, schizophrenia is very different from mental retardation. Schizophrenia does not affect someone's intelligence. It affects people of all levels of intelligence.

Like cancer, heart disease, diabetes or any other illnesses, schizophrenia is a complex, chronic medical condition that affects different people in different ways. Today about two million Americans are affected by this illness. While there is no group of people that are particularly more vulnerable to this illness, it most commonly appears between the ages 13 and 25 and often earlier in males than in females. It is uncommon that symptoms of schizophrenia appear before the age of 12. It is also uncommon that new symptoms of schizophrenia develop after the age of 40.

Schizophrenia is often confused with split or multiple personality disorder, but they are not the same thing. People with schizophrenia only have one personality. This confusion arose because schizophrenia comes from the Greek meaning "split mind." However, schizophrenia is a split from reality, not a split in personality.

It is commonly believed that people with schizophrenia are dangerous because they are violent and have a tendency to harm others as well as themselves. However, the belief is not true because people like Mary, who have schizophrenia, tend to withdraw into themselves rather than interact with others.

Please click on When Mary's Parents Visited A Professional To Ask About Mary's Problems below to read the next story.

- Mary's Childhood
- Mary's High School Years
- Mary's College Years
- What Mary's Parents Learned About Mary's Problems
- When Mary's Parents Visited A Professional To Ask About Mary's Problems
- What Might Have Caused Mary's Problems
- How To Treat Mary's Problems
- Mary's Struggle With The Treatment
- How Is Mary Now

After looking for information about Mary's illness on our own, we thought we needed to talk to a professional to get an accurate diagnosis for Mary's illness. We found out there were generally four groups of health professionals we could talk to about Mary's illness: psychiatrists, psychologists, social workers, and psychiatric nurses. Each state licenses these professionals—although criteria vary by state—and has certain requirements for maintaining and updating training and skills. Both psychiatrists and psychologists have advanced level of training and experience in treating complicated situations. But we decided to consult a psychiatrist because we thought Mary's symptoms were pretty severe and only psychiatrists could prescribe medications in case Mary needed them.

When we visited a psychiatrist, the doctor asked us about Mary's specific symptoms to rule out possibilities of other illnesses. According to the doctor, there is no single symptom that positively identifies schizophrenia and all of the symptoms of schizophrenia can also be found in other brain disorders. For example, not everyone who hears voices is schizophrenic. Some people with depression may hear voices. Hearing voices may also occur as a result of a serious medical illness or from the effects of medication. Besides, not everyone who acts paranoid or distrustful has schizophrenia. Some people have a paranoid personality disorder, a tendency to be suspicious or distrustful of others, without the other features of schizophrenia.

There is no lab test for schizophrenia. However, when a doctor sees the symptoms that have lasted continuously and progressively over six months or more, he or she can almost always diagnose schizophrenia correctly.

Mary's symptoms that the doctor asked us about included:

1. Positive symptoms, which are disturbances that are "added" to the person's personality, such as delusions, hallucinations, and disordered thinking and speech.

   o Delusions: false beliefs or thoughts with no basis in reality— the person may believe that someone is spying on him or her, or that he or she is someone famous.

   o Hallucination: disturbances of sensory perceptions—seeing, hearing, feeling, tasting, or smelling something that isn't present. The most common experience is hearing imaginary voices that give commands or comments to the individual.

   o Disordered thinking and speech: changes in thought patterns and ways of speaking— The person may make up his or her own words or sounds or switch from one topic to another in a nonsensical fashion.

2. Negative symptoms, which are capabilities that are "lost" from the person's personality, such as social withdrawal, extreme loss of interest in things, lack of drive or initiative, and emotional unresponsiveness.

Please click on What Might Have Caused Mary's Problems below to read the next story.

We wondered why Mary got schizophrenia. We thought that schizophrenia was a kind of illness that runs in the family, but no one in our family had schizophrenia. When we asked the doctor about the cause of Mary's illness, the doctor said that genetics or heredity was only one of the factors that might cause schizophrenia and that the exact cause or causes of schizophrenia were not known yet. What is known, however, is that the brains of people with schizophrenia are different, as a group, from the brains of those without schizophrenia. Research suggests that schizophrenia has something to do with problems with brain chemistry and brain structure. It is as much an organic brain disease as is multiple sclerosis, Parkinson's disease, or Alzheimer's disease.

Increasingly, scientists believe that schizophrenia, like many other medical illnesses such as cancer, heart disease, and diabetes, is caused by a combination of problems. While some are inherited, others may be caused by biological factors such as the imbalance in the brain's chemistry and environmental factors such as viral infections affecting the brain very early in life and complications during birth.

Please click on How To Treat Mary's Problems below to read the next story.

- Mary's Childhood
- Mary's High School Years
- Mary's College Years
- What Mary's Parents Learned About Mary's Problems
- When Mary's Parents Visited A Professional To Ask About Mary's Problems
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- How To Treat Mary's Problems
- Mary's Struggle With The Treatment
- How Is Mary Now

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How To Treat Mary's Problems

Now that we learned a lot about Mary's illness, we wondered how it could be treated. We were devastated when the doctor told us that a cure for schizophrenia was not found yet. However, the doctor also told us that, like other illnesses such as diabetes, symptoms of schizophrenia could be controlled with medication. Since treatment is most effective when begun early in the course of the illness, the doctor advised that Mary should start antipsychotic medications as soon as possible.

When we came home from the hospital that day, it wasn't easy to convince Mary that she needed treatment because she didn't think she was sick. After a long discussion, however, Mary agreed to see the doctor. She probably agreed to please us more than anything else.

Although Mary was hospitalized a few times, she lived at home most of the time. It was most painful to watch her suffer from side effects of the medications. She sometimes suffered from an inner sensation of restlessness and an irresistible urge to move various parts of her body, while other times she had temporary paralysis and extreme slowness of movement. When we thought that the medications finally took care of most of her symptoms, they came back and hit her hard if she stopped taking the medications. We felt powerless seeing her go through phases of the treatment.

Please click on Mary's Struggle With The Treatment below to read the next story.

- Mary's Childhood
- Mary's High School Years
- Mary's College Years
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- How To Treat Mary's Problems
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Mary's Struggle With The Treatment

After a few years of continuous treatment and endurance, Mary's condition improved significantly. We remember the day when she came out of her room in the morning and said, "The voices are gone." We couldn't say a word for a while. We just held her. We were never more proud of her.

She still experienced side effects of medications, but she knew that the only way to control her symptoms was to keep taking the medications. She accepted the fact that schizophrenia was a life-long disease, like diabetes or high blood pressure, and that medications and their side effects were a part of her life.

While medications were the mainstay of treatment to reduce signs and symptoms, Mary also benefited from non-drug therapies. She worked with a cognitive behavioral therapist who helped her learn ways to cope with stressful thoughts and situations to reduce her risk of a relapse. She learned to change negative patterns of thought and behavior into ways that put her in control of her thoughts and feelings. The therapist also helped her comply with her schedule of medications.

While Mary was fighting bravely with her illness, we did everything we could to understand her illness and help her with the treatment. Although it was nothing compared to what Mary went through, it required a significant commitment of time and efforts on our part as well. We were dismayed at times when we felt the discrimination and pity of others who perceived Mary's illness as a failure of parenting. When Mary's sisters and brother told us that their friends joked about Mary's illness and told them to check their mental status as well, we didn't know how to teach them to deal with hurtful comments from others.

Having family therapy and joining in support groups helped us learn more about Mary's illness and treatment and to cope with various situations. It was a comfort to know that we were not alone and others had similar experiences and problems.

Please click on How Is Mary Now below to read the next story.

- Mary's Childhood
- Mary's High School Years
- Mary's College Years
- What Mary's Parents Learned About Mary's Problems
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- How To Treat Mary's Problems
- Mary's Struggle With The Treatment
- How Is Mary Now

We know that Mary's life and our life as a family will never be the same as before she got schizophrenia. But we all adapted to the new way of life and it has been okay. Mary didn't go back to college to finish her degree. We wanted her to avoid any stressful situations to reduce her risk of a relapse.

While Mary knew that she might not be able to live like other "normal" people, she made every effort to live a life of her own. Supportive, reality-oriented counseling and rehabilitation therapy helped her rebuild the functional and social skills necessary to live independently. She learned about such things as good hygiene, cooking, money management, social interaction, and traveling. Rehabilitation programs also helped her prepared for a job.

When Mary told us that she wanted to have a job, we weren't entirely sure whether she would be able to find and keep a job. When people found out about Mary's mental illness, they didn't want to hire her for a job or to rent her an apartment. It was a very difficult time for Mary. She felt that she finally managed her symptoms and was ready to move on, but society wasn't ready to accept her as who she was due to the discriminating attitudes toward mental illness.

Mary did not give up, however. After persistent pursuit and patient waiting, she finally got a job at a local public library. She started working part time, but she has been working full-time about a year now. She also got a place of her own, while she spends some weekends with us. Making friends is still a challenge for her because she is afraid of rejection from people when they find out about her illness. But she does go out with people at her work some Friday nights. We believe that's a start. After all that had happened, we are still glad that we didn't lose Mary to the illness. We are pleased with the progress Mary is making with her treatment and her life. We can't say her life has been easy, but it is a unique and special one.

You have completed reading Mary's story. Please click on the following link to go to the survey.

Go To Survey

Appendix B: Measures of Learning (Pilot Study)

Comprehension Questions

The following questions are based on the story you just read in the Web site. Please answer the following questions to the best of your knowledge.

1) Mary's illness is likely to be due to her parents' neglect and lazy parenting in her childhood.

O True
O False
O Don't Know

2) The way Mary was raised contributed to the development of her illness later.

O True
O False
O Don't Know

3) Mary was born with schizophrenia.

O True
O False
O Don't Know

4) Schizophrenia affected Mary's intelligence.

O True
O False
O Don't Know

5) Schizophrenia affected Mary's ability to socialize with others.

O True
O False
O Don't Know

6) Before she received proper treatment, Schizophrenia affected Mary's ability to maintain daily routines.

O True
O False
O Don't Know

7) Mary's parents didn't realize that Mary was sick until she was in college.

O True
O False
O Don't Know

8) Before she received proper treatment,, Mary lost interest in succeeding in life.

O True
O False
O Don't Know

9) Before she received proper treatment, Mary lost interest in very important matters.

O True
O False
O Don't Know

10) After symptoms of schizophrenia were manifested, Mary became mentally retarded.

O True
O False
O Don't Know

11) Before she received proper treatment, Mary could not distinguish fantasy from reality.

O True
O False
O Don't Know

12) Before she received proper treatment, Mary was dangerous for others to be around.

O True
O False
O Don't Know

13) Some people have genetic disposition to develop schizophrenia.

O True
O False
O Don't Know

14) Doctors are typically able to diagnose schizophrenia correctly.

O True
O False
O Don't Know

15) Family history of schizophrenia contributed to causing Mary's illness.

O True
O False
O Don't Know

16) Before she received proper treatment, Mary realized that she was sick.

O True
O False
O Don't Know

17) Symptoms of schizophrenia did not relapse as long as Mary took medications

O True
O False
O Don't Know

18) Side effects of medications disappeared as Mary recovered from schizophrenia.

O True
O False
O Don't Know

19) Mary's illness was managed well after taking medications continuously.

O True
O False
O Don't Know

20) Therapies and rehabilitation programs helped Mary function like the majority of society.

O True
O False
O Don't Know

21) Mary's brother and sisters felt discriminated because of Mary's illness.

O True
O False
O Don't Know

22) Discriminating attitudes toward mental illness did not affect Mary's attempt to live an independent life.

O True
O False
O Don't Know

23) After Mary's symptoms were managed, Mary and her family were able to live like they used to before Mary got schizophrenia.

O True
O False
O Don't Know

24) After Mary's symptoms were managed, Mary was able to socialize with others easily.

O True
O False
O Don't Know

Knowledge Recall Questions

26) Mary's parents were confident that they provided a good and nurturing environment for Mary and her brother and sisters.

O True
O False
O Don't Know

27) When Mary was a child, her verbal skills were abnormal.

O True
O False
O Don't Know

28) When Mary was a child, she was able to take care of things if there were ever problems.

O True
O False
O Don't Know

29) Mary started to develop symptoms of schizophrenia in the year she entered the high school.

O True
O False
O Don't Know

30) Which of the following is NOT what Mary believed about her classmates in high school?

O Her classmates made disapproving comments about her.
O Her classmates confronted with her about things Mary didn't do.
O Her classmates spied on her.
O Her classmates could hear what she was thinking.
O Don't know

31) Although Mary seemed to have gradually lost interest in her study, it didn't affect her academic work.

O True
O False
O Don't Know

32) Mary was unaware of the fact that she got a four-year all-tuition scholarship in a university.

O True
O False
O Don't Know

33) From the first semester in the college, Mary skipped classes and failed a class.

O True
O False
O Don't Know

34) In college, Mary heard voices that didn't exist.

O True
O False
O Don't Know

35) Which of the following does NOT describe Mary's problems in college?

O She couldn't express her emotions and explain what upset her.
O She burst into laughter in the middle of quiet conversations.
O She never cleaned herself.
O She believed in a religious group that didn't exist.
O Don't know

36) The first thing Mary's parents did to learn about Mary's illness was to talk to a doctor.

O True
O False
O Don't Know

37) Mary's illness impairs normal thoughts, speech and behavior.

O True
O False
O Don't Know

38) Schizophrenia affects people in the exact same way.

O True
O False
O Don't Know

39) People with schizophrenia have a split personality.

O True
O False
O Don't Know

40) Symptoms of schizophrenia usually develop later in females than in males.

O True
O False
O Don't Know

41) People with schizophrenia have tendency to harm others and themselves.

O True
O False
O Don't Know

42) All of the symptoms of schizophrenia can also be found in other brain disorders.

O True
O False
O Don't Know

43) Which one in the following is a unique symptom of schizophrenia?

O Hearing voices
O Acting paranoid
O Acting distrustful of others
O Acting suspicious of others
O None of the above
O Don't know

44) Which of the following is not a "positive" symptom of schizophrenia?

O Delusion
O Hallucination
O Disordered thinking and speech
O Emotional responsiveness
O None of the above
O Don't know

45) No one in Mary's family had schizophrenia.

O True
O False
O Don't Know

46) Which of the following is the most likely cause of schizophrenia?

O Genetics
O Chemical imbalance in the brain
O Viral infection affecting the brain
O Birth complications
O Some combination of the above
O Don't know

47) Signs and symptoms of schizophrenia can be controlled with medications.

O True
O False
O Don't Know

48) Once treatment started, Mary needed to stay in the hospital most of the time.

O True
O False
O Don't Know

49) Mary's parents taught Mary's brother and sisters how to deal with hurtful comments from others.

O True
O False
O Don't Know

50) Cognitive behavior therapy helped Mary to rebuild the functional and social skills to live independently.

O True
O False
O Don't Know

51) Mary's parents were initially confident that Mary would find a job after the rehabilitation programs.

O True
O False
O Don't Know

Appendix C: Stimulus Web Site (Main Experiment)

High Interactivity Condition

Problems often come up in life and people try to deal with them in their own ways. The following Web pages contain a story about Mary, whose life seemed to have changed after encountering some problems in her youth. We want you to read her story and tell us what you think about her story as well as the Web site after you finish reading it.

There are nine Web pages, each of which tells a different story about Mary in various times and places. You may spend as much or little time as you want in reading the story. While you can choose the order of the story to read, you may not go back to the story you once read. So please make your selection carefully.

Select one of the following stories you would like to read first.

- Mary's Childhood
- Mary's High School Years
- Mary's College Years
- What Mary's Parents Learned About Mary's Problems
- When Mary's Parents Visited A Professional To Ask About Mary's Problems
- What Might Have Caused Mary's Problems
- How To Treat Mary's Problems
- Mary's Struggle With The Treatment
- How Is Mary Now

Refer to Appendix A for the rest of stimulus Web pages for the high interactivity condition.

Low Interactivity Condition

Problems often come up in life and people try to deal with them in their own ways. The following Web pages contain a story about Mary, whose life seemed to have changed after encountering some problems in her youth. We want you to read her story and tell us what you think about her story as well as the Web site after you finish reading it.

There are nine Web pages, each of which tells a different story about Mary in various times and places. The order of the story is randonly selected for you. You may spend as much or little time as you want in reading the story.

Please start reading Mary's story by clicking on the link below.

- [Mary's Childhood](#)
- Mary's High School Years
- Mary's College Years
- What Mary's Parents Learned About Mary's Problems
- When Mary's Parents Visited A Professional To Ask About Mary's Problems
- What Might Have Caused Mary's Problems
- How To Treat Mary's Problems
- Mary's Struggle With The Treatment
- How Is Mary Now

Before you read the next story, please let us know how likely you think the following factors contribute to causing someone to become homeless.

	Highly Unlikely								Highly Likely
1) Bad luck	O	O	O	O	O	O	O	O	O
2) God's will	O	O	O	O	O	O	O	O	O
3) Lack of thrift and proper money management	O	O	O	O	O	O	O	O	O
4) Lack of effort	O	O	O	O	O	O	O	O	O
5) Lack of ability and talent	O	O	O	O	O	O	O	O	O
6) Loose morals	O	O	O	O	O	O	O	O	O
7) Low wages	O	O	O	O	O	O	O	O	O

Go To Mary's Childhood

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Mary was born on a beautiful morning in May to a healthy family in a mid-western town, who welcomed Mary with joy. Mary had two sisters and a brother. Like most other parents, we hoped for a good environment for the nurture of our children and were confident that our situation provided that. Mary lived among happy, busy, lively siblings and with loving parents who spent time with their children and enjoyed doing so. On holidays, we often visited a small farm in the suburb and enjoyed time there, fishing, swimming, and learning to be gardeners.

In the neighborhood where we lived, there was a school that provided well-rounded education with much emphasis on creativity, the arts, and independence. It was here that Mary grew up, well liked by classmates and teachers a like – a gentle, intelligent, athletic girl with a ready smile, a special touch with animals and a wonderful sense of humor.

Mary was quite gifted academically. She started to read (without prompting) at age four and her verbal skills were unusual. But her particular aptitude was in mathematics. As Mary grew up, she enjoyed soccer, playing the violin, creative writing and especially mountain-biking, for which she won an impressive array of ribbons in local competitions.

She was dependable and honest. It was a comfort to us to know that we would never need to worry about the future of the family. Mary could and would take care of things if there were ever problems.

However, somewhere along the way, things began to change.

Please click on the link below to read the next story.

- Mary's Childhood
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- What Might Have Caused Mary's Problems
- How To Treat Mary's Problems
- Mary's Struggle with The Treatment
- How Is Mary Now

Before you read the next story, please let us know to what extent you agree or diagree with the following statements about homeless people.

	Strongly Disagree								Strongly Agree
1) A majority of homeless people are married.	O	O	O	O	O	O	O	O	O
2) Homeless people do not have contact with their family.	O	O	O	O	O	O	O	O	O

Go To Mary's High School Years

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It was during Mary's last two years of high school. One day Mary came home, saying that other students around her were making disapproving comments about her in class for no apparent reasons. We didn't pay much attention to Mary's complaints then, but Mary continued to tell us that other students were talking behind her back. After a couple of weeks, Mary was convinced that other students were spying on her and that they could hear what she was thinking. She no longer felt like talking with anyone and often retreated to her room. She was sometimes so preoccupied with what she was thinking that she skipped meals.

We assumed that Mary was going through a phase in adolescence and it would pass. Although Mary seemed to have gradually lost interest in her study and her ambition to succeed, it didn't affect her academic work much. She qualified for a four-year all-tuition scholarship to one of the toughest universities in the country. We were very happy about Mary's achievement. But she seemed to be so disconnected that she was unaware of the fact until somebody congratulated her.

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- Mary's Struggle With The Treatment
- How Is Mary Now

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Before you read the next story, please let us know to what extent you agree or disagree with the following statements about homeless people.

	Strongly Disagree	Strongly Agree
1) Laziness contributes to homelessness.	O O O O O O O O O	
2) Homeless people do not want to work.	O O O O O O O O O	

Go To Mary's College Years

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Problems Mary had at high school seemed to continue at college. Although Mary managed to finish her first semester, she started skipping classes a lot more often after the first semester.

She often heard voices coming from behind her back, but when she turned around to see who was talking to her, she found no one. Sometimes she thought students in her class looked at her with angry eyes.

When Mary failed a class, it didn't bother her at all. She got irritated or upset by something, but couldn't express her emotions and explain what it was that upset her. So Mary kept all to herself, which made it difficult for her to handle her problems.

Now we could see clearly that something was different about Mary. She burst into laughter in the middle of quiet conversations and wore strange clothes. She stopped bathing regularly. Sometimes, she talked on and on about a religious group that no one heard of or Martians controlling her thoughts. She used peculiar words and sentences that didn't make sense. One night, she disappeared without telling anyone. She came back at 3 o'clock in the morning, saying that she went out for a walk to relieve the back pain.

We realized that Mary needed help. So we tried to find out what was going on with Mary.

Please click on the link below to read the next story.

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- How Is Mary Now

Before you read the next story, please let us know to what extent you agree or disagree with the following statements about homeless people.

	Strongly Disagree	Strongly Agree
1) There are more female homeless people than male homeless people.	O O O O O O O O O	
2) A significant percentage of homeless people are African American.	O O O O O O O O O	

Go To What Mary's Parents Learned About Mary's Problems

What Mary's Parents Learned About Mary's Problems

We first searched for information on the Web and at the local library. Based on Mary's symptoms, we suspected that Mary might have schizophrenia, a type of mental illness that impairs normal thoughts, speech, and behavior. We learned the following about schizophrenia.

Schizophrenia can make it difficult for a person to tell the difference between real and unreal experiences, to have appropriate emotional responses to others, and to behave appropriately in social situations. Although schizophrenia can cause problems with thinking clearly or concentrating, schizophrenia is very different from mental retardation. Schizophrenia does not affect someone's intelligence. It affects people of all levels of intelligence.

Schizophrenia is often confused with split or multiple personality disorder, but they are not the same thing. People with schizophrenia only have one personality. This confusion arose because schizophrenia comes from the Greek meaning "split mind." However, schizophrenia is a split from reality, not a split in personality.

It is commonly believed that people with schizophrenia are dangerous because they are violent and have a tendency to harm others as well as themselves. However, the belief is not true because people like Mary, who have schizophrenia, tend to withdraw into themselves rather than interact with others.

- Mary's Childhood
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- Mary's Struggle With The Treatment
- How Is Mary Now

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Before you read the next story, please let us know to what extent you agree or disagree with the following statements about homeless people.

	Strongly Disagree	Strongly Agree
1) A person can choose not to be homeless.	O O O O O O O O O	
2) Homeless people can take responsibility for important matters in their lives.	O O O O O O O O O	

Go To When Mary's Parents Visited a Professional to Ask About Mary's Problems

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When Mary's Parents Visited A Professional To Ask About Mary's Problems

After looking for information about Mary's illness on our own, we thought we needed to talk to a professional to get an accurate diagnosis for Mary's illness. We found out there were generally four groups of health professionals we could talk to about Mary's illness: psychiatrists, psychologists, social workers, and psychiatric nurses. Each state licenses these professionals—although criteria vary by state—and has certain requirements for maintaining and updating training and skills. Both psychiatrists and psychologists have advanced level of training and experience in treating complicated situations. But we decided to consult a psychiatrist because we thought Mary's symptoms were pretty severe and only psychiatrists could prescribe medications in case Mary needed them.

When we visited a psychiatrist, the doctor asked us about Mary's specific symptoms to rule out possibilities of other illnesses. According to the doctor, there is no single symptom that positively identifies schizophrenia and all of the symptoms of schizophrenia can also be found in other brain disorders.

Mary's Symptoms that the doctor asked us about included:

1. Positive symptoms, which are disturbances that are "added" to the person's personality, such as delusions, hallucinations, and disordered thinking and speech.

    o   Delusions: false beliefs or thoughts with no basis in reality— the person may believe that someone is spying on him or her, or that he or she is someone famous.
    o   Hallucination: disturbances of sensory perceptions—seeing, hearing, feeling, tasting, or smelling something that isn't present. The most common experience is hearing imaginary voices that give commands or comments to the individual.
    o   Disordered thinking and speech: changes in thought patterns and ways of speaking— The person may make up his or her own words or sounds or switch from one topic to another in a nonsensical fashion.

2. Negative symptoms, which are capabilities that are "lost" from the person's personality, such as social withdrawal, extreme loss of interest in things, lack of drive or initiative, and emotional unresponsiveness.

Please click on the link below to read the next story.

Before you read the next story, please let us how likely you think the following factors contribute to causing someone to become homeless.

	Highly Unlikely								Highly Likely
1) Scarcity of jobs	O	O	O	O	O	O	O	O	O
2) Poor schools	O	O	O	O	O	O	O	O	O
3) Racial discrimination	O	O	O	O	O	O	O	O	O
4) Economic downturn	O	O	O	O	O	O	O	O	O
5) Shortage of affordable housing	O	O	O	O	O	O	O	O	O
6) Government aid	O	O	O	O	O	O	O	O	O
7) Economic system that favors the rich over the poor	O	O	O	O	O	O	O	O	O

Go To What Might Have Cause Mary's Problems

We wondered why Mary developed schizophrenia. We thought that schizophrenia was a kind of illness that runs in the family, but no one in our family had schizophrenia. When we asked the doctor about the cause of Mary's illness, the doctor said that genetics or heredity was only one of the factors that might cause schizophrenia and that the exact cause or causes of schizophrenia were not known yet. What is known, however, is that the brains of people with schizophrenia are different, as a group, from the brains of those without schizophrenia. Research suggests that schizophrenia has something to do with problems with brain chemistry and brain structure. It is as much an organic brain disease as is multiple sclerosis, Parkinson's disease, or Alzheimer's disease.

Increasingly, scientists believe that schizophrenia, like many other medical illnesses such as cancer, heart disease, and diabetes, is caused by a combination of problems. While some are inherited, others may be caused by biological factors such as the imbalance in the brain's chemistry and environmental factors such as viral infections affecting the brain very early in life and complications during birth.

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Before you read the next story, please let us know to what extent you agree or disagree with the following statements about homeless people.

	Strongly Disagree	Strongly Agree
1) Homeless people are not educated.	O O O O O O O O O	
2) A majority of homeless people are over 40 years of age.	O O O O O O O O O	

Go To How to Treat Mary's Problem

Now that we learned a lot about Mary's illness, we wondered how it could be treated. We were devastated when the doctor told us that a cure for schizophrenia was not found yet. However, the doctor also told us that, like other illnesses such as diabetes, symptoms of schizophrenia could be controlled with medication. Since treatment is most effective when begun early in the course of the illness, the doctor advised that Mary should start antipsychotic medications as soon as possible.

When we came home from the hospital that day, it wasn't easy to convince Mary that she needed treatment because she didn't think she was sick. After a long discussion, however, Mary agreed to see the doctor. She probably agreed to please us more than anything else.

Although Mary was hospitalized a few times, she lived at home most of the time. It was most painful to watch her suffer from side effects of the medications. She sometimes suffered from an inner sensation of restlessness and an irresistible urge to move various parts of her body, while other times she had temporary paralysis and extreme slowness of movement. When we thought that the medications finally took care of most of her symptoms, they came back and hit her hard if she stopped taking the medications. We felt powerless seeing her go through phases of the treatment.

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Before you read the next story, please let us know to what extent you agree or disagree with the following statements about homeless people.

	Strongly Disagree							Strongly Agree
1) Homeless people tend to have a mental problem.	O	O	O	O	O	O	O	O	O
1) Homeless people tend to have a mental problem.	O	O	O	O	O	O	O	O	O

Go To Mary's Struggle With The Treatment

Mary's Struggle With The Treatment

After a few years of continuous treatment and endurance, Mary's condition improved significantly. We remember the day when she came out of her room in the morning and said, "The voices are gone." We couldn't say a word for a while. We just held her. We were never more proud of her.

She still experienced side effects of medications, but she knew that the only way to control her symptoms was to keep taking the medications. She accepted the fact that schizophrenia was a life-long disease, like diabetes or high blood pressure, and that medications and their side effects were a part of her life.

While medications were the mainstay of treatment to reduce signs and symptoms, Mary also benefited from non-drug therapies. She worked with a cognitive behavioral therapist who helped her learn ways to cope with stressful thoughts and situations to reduce her risk of a relapse. She learned to change negative patterns of thought and behavior into ways that put her in control of her thoughts and feelings. The therapist also helped her comply with her schedule of medications.

While Mary was fighting bravely with her illness, we did everything we could to understand her illness and help her with the treatment. Although it was nothing compared to what Mary went through, it required a significant commitment of time and efforts on our part as well. We were dismayed at times when we felt the discrimination and pity of others who perceived Mary's illness as a failure of parenting. When Mary's sisters and brother told us that their friends joked about Mary's illness and told them to check their mental status as well, we didn't know how to teach them to deal with hurtful comments from others.

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Before you read the next story, please let us know to what extent you agree or disagree with the following statements about homeless people.

	Strongly Disagree	Strongly Agree
1) Homeless people tend to be addicted to drugs.	O O O O O O O O O	
2) Homeless people tend to be alcoholics.	O O O O O O O O O	

We know that Mary's life and our life as a family will never be the same as before she got schizophrenia. But we all adapted to the new way of life and it has been okay. Mary didn't go back to college to finish her degree. We wanted her to avoid any stressful situations to reduce her risk of a relapse.

While Mary knew that she might not be able to live like other "normal" people, she made every effort to live a life of her own. Supportive, reality-oriented counseling and rehabilitation therapy helped her rebuild the functional and social skills necessary to live independently. She learned about such things as good hygiene, cooking, money management, social interaction, and traveling. Rehabilitation programs also helped her prepared for a job.

When Mary told us that she wanted to have a job, we weren't entirely sure whether she would be able to find and keep a job. When people found out about Mary's mental illness, they didn't want to hire her for a job or to rent her an apartment. It was a very difficult time for Mary. She felt that she finally managed her symptoms and was ready to move on, but society wasn't ready to accept her as who she was due to the discriminating attitudes toward mental illness.

Mary did not give up, however. After persistent pursuit and patient waiting, she finally got a job at a local public library. She started working part time, but she has been working full-time about a year now. She also got a place of her own, while she spends some weekends with us. Making friends is still a challenge for her because she is afraid of rejection from people when they find out about her illness. But she does go out with people at her work some Friday nights. We believe that's a start. After all that had happened, we are still glad that we didn't lose Mary to the illness. We are pleased with the progress Mary is making with her treatment and her life. We can't say her life has been easy, but it is a unique and special one.

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You have completed reading Mary's story. Please click on the following link to go to the survey.

GO TO SURVEY

Appendix D: Measures of Learning (Main Experiment)

Comprehension Questions

The following questions are based on the story you just read in the Web site. Please answer the following questions to the best of your knowledge.

1) The way Mary was raised contributed to the development of her illness later.

O True
O False
O Don't Know

2) Mary had disturbances of sensory perceptions.

O True
O False
O Don't Know

3) Mary suffered from two or more distinct personality states.

O True
O False
O Don't Know

4) Mary suffered from disordered speech.

O True
O False
O Don't Know

5) Schizophrenia affected Mary's ability to socialize with others.

O True
O False
O Don't Know

6) As symptoms of her illness became manifested, Mary was extra careful about keeping up with daily routines.

O True
O False
O Don't Know

7) Mary's unusual personality was one of the reasons for causing her illness.

O True
O False
O Don't Know

8) Due to her illness, Mary was not able to distinguish fantasy from reality.

O True
O False
O Don't Know

9) People with schizophrenia cannot concentrate on one thought continuously.

O True
O False
O Don't Know

10) People with schizophrenia can be as smart as other people.

O True
O False
O Don't Know

11) Which of the following is the most likely cause of Mary's illness?

O Genetic factors
O Chemical imbalance in the brain
O Viral infection affecting the brain
O Birth complications
O All of the above
O Don't Know

12) Symptoms of schizophrenia can be controlled by taking medications.

O True
O False
O Don't Know

13) Staying in the hospital is the best way to treat schizophrenia.

O True
O False
O Don't Know

14) Mary's attempts to live an independent life were discouraged by discriminating attitudes toward mental illness in the society.

O True
O False
O Don't Know

15) Therapies and rehabilitation problems helped Mary function like the majority of society.

O True
O False
O Don't Know

16) After the treatment, Mary was able to socialize with others easily.

O True
O False
O Don't Know

Knowledge Recall Questions

17) Mary's parents provided a good and nurturing environment for Mary and her siblings.

O True
O False
O Don't Know

18) Mary was well liked by her class mates and teachers.

O True
O False
O Don't Know

19) Which of the following is NOT what Mary believed about her classmates in high school?

O Her classmates made disapproving comments about her.
O Her classmates confronted with her about things Mary didn't do.
O Her classmates spied on her.
O Her classmates could hear what she was thinking.
O Don't know

20) In high school, Mary wanted to talk with someone about her problems.

O True
O False
O Don't Know

21) Schizophrenia affects a person's intelligence.

O True
O False
O Don't Know

22) As Mary gradually lost interest in her study, her academic performance declined accordingly in high school.

O True
O False
O Don't Know

23) Mary was so disconnected that she wasn't aware at all that she got a full scholarship for a university.

O True
O False

O Don't Know

24) Schizophrenia is a split in personality.

O True
O False
O Don't Know

25) Chemical imbalance in the brain was the key cause for Mary's illness.

O True
O False
O Don't Know

26) There is no cure for schizophrenia.

O True
O False
O Don't Know

27) Mary had to stay in the hospital most of the time during treatment.

O True
O False
O Don't Know

28) Despite the therapies and rehabilitation programs, Mary wasn't able to rebuild skills necessary to live independently.

O True
O False
O Don't Know

29) When Mary finally managed the symptoms of her illness, people were willing to hire her for a job.

O True
O False
O Don't Know

30) Which of the following health professional(s) is(are) licensed by all states in the U. S.?

O Psychiatrist
O Psychologist
O Social workers
O Psychiatric nurse
O All of the above
O Don't Know

31) Which of the following health professional(s) can prescribe medications?

O Psychiatrist
O Psychologist
O Social workers
O Psychiatric nurse
O All of the above
O Don't Know

32) Which of the following is not a "positive" symptom of schizophrenia?

O Delusion
O Hallucination
O Disordered thinking and speech
O Emotional responsiveness
O None of the above
O Don't Know

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Vita

Hyojin Kim was born in Seoul, Korea on February 6th, 1971 to Youngse and Kwanghee Kim. She entered Ewha Womans University in Seoul, Korea, in March 1989 and received the degree of Bachelor of Arts in English Language and Literature in February 1993. From January 1993 to June 1994, she worked as a software programmer at Fujitsu Korea Limited in Seoul.

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In summer of 1995, she worked as an intern at UNICEF Manila in the Philippines and assisted with the follow-up communication campaigns for the promotion of Oral Rehydration Therapy among under-five children. After she graduated from Johns Hopkins, she worked as a researcher at COMSORT from February to June 1996 and at Korean Institute of Health and Social Affairs in Seoul, Korea from November 1996 to November 1997.

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