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A Study of the Relationship between Different Types of Autonomy Support and Student Interest

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A Study of the Relationship between Different Types of Autonomy Support and Student Interest

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Abstract

A Study of the Relationship between Different Types of Autonomy Support and Student Interest

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Representing one of the influential motivational variables on learning, interest includes both cognitive and affective components, arising from the interplay between an individual and a particular content and environment (Dewey, 1913; Hidi, Renninger, and Krapp, 2004). According to Hidi & Renninger (2004), interest can develop from situational to individual interest and be strengthened along with external support. On the basis of their propositions, this report explores how student interest may be intensified by enhancing cognitive facets of interest through the teacher's instructional support.

From the perspective of self-determination theory (SDT), support for autonomy as a contextual factor has been reported as a catalyst for student interest and engagement. In particular, Stefanou, Perencevich, DiCintio, and Turner (2004) stressed the importance of ***cognitive autonomy support*** as an instructional support in terms of deep-level thinking and cognitive engagement in comparison to other types of autonomy support such as by providing students choice in class.

This report explores how different levels and types of student interest are associated with different types of autonomy support in an educational setting, focusing on cognitive aspects. Using a path analysis, this paper presents a full model to undergird a study of the direct and indirect relationships between student interest, different types of autonomy support, and cognitive engagement.

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CHAPTER 1: INTRODUCTION

Interest is one of the influential motivational variables in learning and academic achievement (Dewey, 1913; Hidi & Renninger, 2006; Schraw, Flowerday, & Lehman, 2001). Moreover, students' interest has been found to influence and be influenced by attention, cognitive performance, engagement, and levels of learning (Ainley, Hidi, & Berndorff, 2002; Krapp, 2002). Most educators have recognized the significance of interest in learning, but they still have problems dealing with academically unmotivated students. Concerning this issue, Hidi and Renninger (2006) contend that educators should recognize their potential roles in helping students develop interest, and they propose a four-phase model of interest development. The phases include: triggered situational interest, maintained situational interest, emerging individual interest, and well-developed individual interest.

According to Hidi and Renninger's (2006) model, the two early phases of interest development consist of more affect or liking (positive feelings) and relatively less cognitive processing (attention). These phases refer to "an actualized state that is elicited by interesting features in the environment" (Hidi, Renninger, & Krapp, 1992, p. 435). In contrast, the later phases of the model are comprised of not only affective functioning of positive emotions but also increased cognitive functioning such as more attention, memory, increased understanding, self-regulation, and deeper levels of strategies for learning along with stored knowledge or value. The model posits that individuals with emerging or well-developed individual interest level tend to have an "enduring predisposition to seek repeated reengagement with particular classes of content over time" (Hidi & Renninger, 2006, p. 114).

Accordingly, Hidi and Renninger (2006) maintain that "continued engagement and support sustain and deepen interest for content" (p. 117), and that interest develops according to the enhancement of cognitive functioning over time with pertinent external support. Here, external support refers to teachers' instructional strategies and the learning environment (Hidi, Renninger, & Krapp, 2004). And engagement subsumes cognitive as well as affective or behavioral engagement. The question then becomes what kinds of external support by teachers will be required to develop interest over time, supporting engagement and cognitive function.

From the perspective of Deci and Ryan's (2002) self-determination theory (SDT), three basic psychological needs have been associated with interest. Some researchers posit that feelings of autonomy, competence, and relatedness are essential to interest development (Hidi & Renninger, 2006; Renninger & Shumar, 2002). In particular, support for autonomy has been considered a catalyst to "create an optimal person-activity match," by providing an optimal environment and enhancing interest (Deci, 1992, p. 61).

Within SDT, some studies have investigated the effect of autonomy support as an external support for interest or interest development (Krapp, 2005). According to this theory, the provision of choice has been discussed as one of the most efficient ways to support students' perception of autonomy. As a result, the impact of choice, one type of autonomy support, on interest and learning outcomes has been studied by some researchers (Black & Deci, 2000; Ryan & Deci, 2000b; Schraw, Flowerday, & Lehman, 2001).

Meanwhile, other researchers have argued that different types of choices might affect interest, engagement, and performance differently; they assert that meaningful

choices are required (Stefanou, Perencevich, DiCintio, & Turner, 2004; Williams, 1998). By observing classroom practices directly, Stefanou, Perencevich, DiCintio, and Turner (2004) particularly proposed three types of autonomy support by teachers: organizational autonomy support (e.g., choosing group members); procedural autonomy support (e.g., choosing materials to use in class projects); and cognitive autonomy support (e.g., discussing multiple approaches and strategies). And they contended that it is *cognitive autonomy support* (CAS) that fosters a more enduring psychological investment in deep-level thinking and cognitive engagement, whereas the other two types of autonomy support, called *simple choice* by the authors, foster well-being and initial engagement in learning. Their work on cognitive autonomy support provides a good example of meaningful choices in developing interest, in that it may better facilitate cognitive functioning and engagement.

This paper stems from some confusion and limitations in the literature. First, most researchers and educators believe that any provision of choice as an autonomy-supportive variable enhances students' interest, engagement, and learning. Others postulate that *different types of autonomy support* are *also* required to boost students' interest and engagement in different ways. However, there are few studies about what these types can be and about what other kinds of choice can have influential impact on interest development and engagement for the purpose of in-depth learning over time.

Second, Stefanou et al. (2004) propose three distinctive strategies for autonomy support in the classroom, and they stressed the importance of CAS in deep-level thinking and cognitive engagement over simple choice. However, they did not provide an empirical study to support their propositions. Also, their naturalistic observational data of

classroom teachers and teaching practices were collected in an elementary classroom. Thus, the effect of cognitive autonomy support has not been examined at the college level.

Third, both motivational and cognitive components of learning need to be simultaneously considered for more effective teaching and learning (Nenniger, 1992). In this sense, it would be critical to look into how the effect of cognitive autonomy support on students' different phases of *interest* will be mediated by students' cognitive engagement. For example, the impact of CAS on cognitive engagement may represent the influence of CAS on a cognitive component that may facilitate interest development: (a) CAS as a different kind of autonomy support, (b) interest as a motivational factor, and (c) cognitive engagement as a cognitive variable, demonstrating the importance of support for cognitive facets in an autonomy-supportive environment. Therefore, the purpose of this paper is to discuss the impact of CAS on students' enhancement of cognitive engagement and interest, comparing it with the effect of only having choice.

CHAPTER 2: INTEGRATIVE ANALYSIS AND THEORETICAL FRAMEWORK

In this section, the major theoretical literature concerning autonomy support, interest as a motivational variable and its development, and cognitive engagement will be discussed. Thus, I present an overview of self-determination theory, focusing on a feeling of autonomy among the three innate psychological needs and on autonomy-supportive social contexts. Next, I discuss the importance of autonomy support for motivation and learning. And then, most importantly, I examine different types of autonomy support, emphasizing the effects of providing cognitive autonomy support, rather than providing organizational or procedural choice. Finally, I argue that cognitive autonomy support may help to boost cognitive engagement and build feelings of interest.

Self-determination Theory: The Importance of Autonomy and Autonomy-supportive Social Contexts

Self-determination theory (SDT) provides a route to understanding the relationships among basic human needs, motivation, and learning. According to SDT, people have "natural, innate, and constructive tendencies to develop an ever more elaborated and unified sense of self" (Ryan & Deci, 2002, p. 5). And, human beings can be inherently proactive and engaged according to their social-contextual conditions (Deci & Ryan, 1985; Ryan & Deci, 2002b). Accordingly, from this perspective, a feeling of autonomy and the support of social contexts have been considered crucial for human motivation. Moreover, the innate human predisposition toward autonomy can be

influenced by social contexts, which facilitate or impede psychological growth and integration.

Based on plenty of empirical data, SDT proposes that there are three innate psychological needs that are essential for integrated human functioning: competence, relatedness, and autonomy. *Competence* refers to "feeling effective in one's ongoing interactions with the social environment and experiencing opportunities to exercise and express one's capacities" (Ryan & Deci, 2002b, p. 7). The feeling of competence triggers individuals to accept the challenge of more difficult tasks or situations and to build more skills or capacities. *Relatedness* refers to feeling connected to others, a sense of belongingness to other individuals or a community. *Autonomy* is the feeling of "being the perceived origin or source of one's own behavior" (Ryan & Deci, 2002b, p. 7). These basic needs have been further explored in mini-theories within SDT.

According to Ryan and Deci (2002), SDT is comprised of four mini-theories that share common characteristics in terms of organismic assumptions and basic psychological needs: cognitive evaluation theory (Deci, 1975), organismic integration theory (Deci & Ryan, 1985), causality orientation theory (Deci & Ryan, 1985), and basic needs theory (Ryan & Deci, 2000b). Among them, cognitive evaluation theory and organismic integration theory are regarded as more important than the other two, given a concern with autonomy and social contexts. Cognitive Evaluation Theory explicates the relationship between autonomy-supportive social contexts and intrinsic motivation. Organismic Integration Theory describes the process of internalization and integration of values, regulation, and extrinsically motivated behaviors related to uninteresting activities with the help of significant others such as teachers, parents, and close friends.

Cognitive Evaluation Theory. Cognitive evaluation theory (CET), presented by Deci and Ryan (1985), posits that the needs for competence and autonomy are related to intrinsic motivation, and that contextual elements such as social contexts are connected to human motivation (Deci & Ryan, 1980; Ryan & Deci, 2002). Most importantly, CET indicates that individuals are motivated differently according to whether the social contexts are perceived as autonomy-supportive or controlling. For instance, even though tangible rewards have been described as controlling in social contexts, they are not likely to undermine intrinsic motivation if they are given in a non-evaluative situation in an autonomy-supportive way (Ryan, Mims, & Koestner, 1983).

Organismic Integration Theory. Organismic integration theory (OIT) suggests that people have a propensity for integration and unity. According to this theory, internalization or integration occurs on a continuum, not as a dichotomous process. Extrinsically motivated behaviors can be self-determined or autonomous if they accompany integrated internal regulation. This means that students who do not feel interested in a task can behave in self-determined ways according to the different degrees to which their regulation has been internalized. In OIT, competence, relatedness, and perception of autonomy play important roles in the process of internalization. That is, in order to promote integrated regulation, supports for these three elements are essential in a social context.

Ryan and Deci (2002) asserted that perceptions of autonomy play the most significant role in the process by transforming an external regulation into an individual's own self-determined one. That is, support for autonomy can be the most influential catalyst for the process of internalization (Williams & Deci, 1996). Depending on the

degree of autonomy support, internalization can be partial (as in introjections, not fully integrated yet) or much fuller (as in integration). According to this view, individuals are more likely to get involved in an activity and the internalization process, when they "experience a choice, volition, and freedom from external demands" (Ryan & Deci, 2002, p. 20). Accordingly, OIT sheds light on the effect of autonomy support by significant others such as teachers in school settings.

Autonomy-supportive teachers and the environment can be regarded as supportive social contexts. To create this kind of social context, teachers should think about what they do and say in class. It has been already recognized that "what teachers do and say can have powerful effects on students' intentions for learning, subsequent learning behaviors, and academic engagement" (Stefanou et al., 2004, p. 97). Thus, teachers' instructional strategies, motivational styles, and teaching practices have been shown to play a critical role in creating a safe and sound classroom environment. That is, classroom contexts can either facilitate or frustrate students' fundamental needs and well-being, depending on teachers' role in creating positive learning situations.

Autonomy Support and the Provision of Choice

Deci and Ryan (1987) defined autonomy as "action that is chosen; action for which one is responsible" (p. 1025). Autonomy is the experience of being the origin of one's behavior. In addition, the concept of autonomy support indicates that "an individual in a position of authority (e.g., an instructor) takes the other's (e.g., a student's) perspective, acknowledges the other's feelings, and provides the other with pertinent information and opportunities for choice, while minimizing the use of pressures and demands" (Black & Deci, 2000, p. 742).

After conducting empirical studies, some researchers have reported that controlling teacher behaviors are predictors of poor motivation and engagement regardless of gender. For instance, Assor, Kaplan, Maymon, and Roth (2005) examined the relationship among (a) controlling teacher behaviors, (b) student motivation, (c) student emotion, and (d) their engagement. They demonstrated that directly controlling teacher behaviors (DCTB) such as "giving frequent directives, interfering with children's preferred pace of learning, and not allowing critical and independent opinions" arouse anger and anxiety in children, and that these negative emotions elicit a-motivation and extrinsic motivation, which finally result in restricted engagement rather than intensive academic engagement (p. 397, see Figure 1).

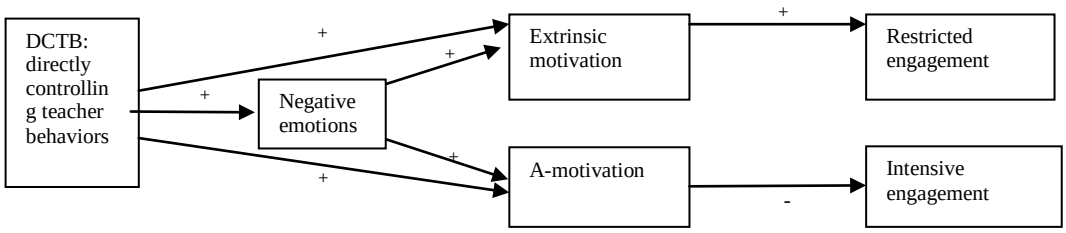

Figure 1. Emotions and motivational orientations as mediators of the effects of directly controlling teacher behaviors on students' academic engagement (Assor et al., 2005, p. 406).

This finding strongly implies that teachers' autonomy supportive teaching behaviors can enhance positive outcomes in terms of students' emotion, motivation, and achievement. Black and Deci (2000) described the concept of autonomy support, indicating that it happens when an instructor takes a student's perspective, acknowledges their feelings, and provides them with choices, while minimizing pressures or demands.

Then, on the basis of the concept of autonomy support and the benefits, how can teachers best support autonomy in reality? What kinds of autonomy-supportive instructional strategies or behaviors have been implemented among teachers? One effective autonomy-supportive teacher behavior is to give their students choices and proper information in autonomous classroom settings in accordance with the students' needs and emotions. This is commonly accomplished through as a way to support students' autonomy in the classroom. For example, students have been encouraged to choose reading materials in relation to classroom activities, methods of assessment, or the topic to study (Flower & Schraw, 2000).

Both positive and negative effects of choice have been detected in many empirical studies. Reynolds and Symons (2002) reported that students are more likely to choose topics and classroom activities according to their own individual interest and background knowledge when they are allowed to choose something. Accordingly, they feel more enhanced responsibility for the task they choose, while behaviorally engaging in the activity. Also, Deci (1992) asserted that there is the positive effect of choice on interest within self-determination theory. In line with this belief, Schraw, Flowerday, and Lehman (2001) suggested that "choice increases feelings of self-determination by satisfying the need for autonomy. In turn, increased self-determination leads to increased intrinsic motivation, interest, and engagement" (p. 215).

On the other hand, some researchers have proposed that choice might have no effects or even negative effects on learning outcomes (Flowerday & Schraw, 2003; Mayer, 2004). For instance, Iyengar and Lepper (2000) suggested that too many unlimited choices are not necessarily more intrinsically motivating than fewer choices.

According to their findings, participants reported that they were more satisfied with their choices and wrote better essays when the number of choices was limited. In addition, some researchers have criticized the role of choices without relevance. Also, some studies reported that having choice only minimally impacts cognitive facets whereas it has been positively associated with engagement and affective facets (Flowerday & Schraw, 2003; Schraw, Flowerday, & Reisetter, 1988). Likewise, Patall, Cooper, and Robinson (2008) demonstrated by means of a meta-analysis and moderator tests that the effect of choice can vary depending on some conditions (such as the number of choices, age differences, and experimental settings) although choice has a positive overall effect on intrinsic motivation and other related outcomes.

Putting these contrasting findings together, the provision of choice can definitely be one effective way to support autonomy, but its effect can vary in different situations. Thus, some researchers have contended that there are different types of autonomy support, which may elicit different impacts on students' motivation and learning. Then, other than the provision of choice in class, in which ways can teachers support their students' autonomy?

Types of Autonomy Support: The Importance of Cognitive Autonomy Support

The types of autonomy support students may experience in classroom activities can vary. Assor, Kaplan, and Roth (2002) demonstrated that both children and early adolescents can differentiate between three types of autonomy-enhancing teacher behaviors and three types of autonomy-suppressing teacher behaviors. Based on their analyses of students' answers to questionnaires, they emphasized the importance of the teachers' role and their behaviors in supporting students' autonomy. With respect to

autonomy-supportive behaviors, they suggested three types of autonomy-supportive teacher behaviors: (a) fostering personal relevance of schoolwork, (b) providing students with choices of tasks perceived as consistent with their goals and interest, and (c) allowing criticism and expression of dissatisfaction.

Assor et al. (2002) found that fostering relevance had more influential impacts on students' perception of autonomy and their cognitive engagement than the provision of choice. This study implies that the provision of choice as one way to support students' autonomy should not always be considered to be a major indicator of autonomy support. That is, simply providing students with choice does not result in students' perception of autonomy and a deep level of learning. Rather, teachers' autonomy-supportive behaviors to foster relevance are more important for both students' perceived autonomy and their behavioral and cognitive engagement in their study.

In line with this finding, Stefanou, Perencevich, Dicintio, and Turner (2004) have suggested that the meaning of *autonomy support* has often been falsely interpreted and implemented in teaching practices. They contended that the construct of autonomy support has been characterized by many researchers as the provision of (a) decision making, (b) rationales for the value of learning in an uncontrolled environment, (c) relevance of the learning, and (d) positive feedback about competence. However, from Stefanou et al.'s (2004) perspective, autonomy support has become synonymous with the provision of choice. Even worse, the provision of meaningless choices and only simple choices, sometimes irrelevant to students' interest or goals, has often been implemented by teachers in the name of providing students with autonomy. As a result, Stefanou et al. (2004) argued, "the dominant view of autonomy support as one of offering choice may be

too confining" (p. 100). Instead, they contended autonomy includes cognitive choices as well as organizational and procedural choices.

Stefanou et al. (2004) proposed three distinct ways to provide autonomy support as noted above through the observation of seven 5th- and 6th- grade math classes: organizational autonomy support, procedural autonomy support, and cognitive autonomy support. *Organizational autonomy support* encourages students' ownership of an environment; students can make choices over environmental procedures, such as developing classroom rules together, choosing the due dates of assignments, and choosing project group members. *Procedural autonomy support* encourages students' ownership of form and enables students to control the selection of media to present their ideas, such as making a graph or picture to illustrate a science concept. *Cognitive autonomy support* (CAS) encourages students' ownership of learning and allows them to have their own ways to justify and argue for their points, generating their own questions and solutions (see Table 1).

Organizational Autonomy Support	Procedural Autonomy Support	Cognitive Autonomy Support
Students are given opportunities to: Choose group members Choose evaluation procedure Take responsibility of due dates for assignments Participate in creating and implementing classroom rules Choose seating arrangement	*Students are given opportunities to:* Choose materials to use in class projects Choose the way competence will be demonstrated Display work in an individual manner Discuss their wants Handle materials	*Students are given opportunities to:* Discuss multiple approaches and strategies Find multiple solutions for the purpose of sharing expertise Have ample time for decision making Be independent problem solvers with scaffolding Re-evaluate errors Receive informational feedback Formulate personal goals or realign task to correspond with interest Debate ideas freely Have less teacher talk time; more teacher listening time Ask questions

Table 1. Strategies Associated with the Different Features of Autonomy Support (Stefanou et al., 2004, p. 101)

Stefanou et al. (2004) asserted that CAS may intensify students' psychological investment and cognitive engagement as well as a deep level of thinking and learning; organizational autonomy support may enable students to feel more comfortable in the social context and procedural autonomy support may promote students' initial engagement with learning activities. They concluded that classes with high organizational/ procedural and high cognitive autonomy support is the ideal situation, and they proposed four types of instructional strategies with student responses according to different features of autonomy support (see Table 2).

Low O and P/ Low Cognitive	High O and P/ Low Cognitive	Low O and P/ High Cognitive	High O and P/ High Cognitive
Instructional directive: Follow along as I read Write this on your study sheet Remember this for the quiz All you have to do is move the decimal Memorize the pattern	Look at my model Predict percentage Calculate percentages Convert percentages to decimals and fractions Choose objects to create your project	Think about what it means to switch back and forth between decimals and percents If you understand that there are many approaches, you will always find a strategy that works Think about this for a while	You have lots of time to think about this and justify your thoughts Compare and contrast your ideas Choose the best idea that fits with the mathematical theory Explain how you were thinking to your peers Give me a different way you would approach this problem
Potential student response: Memorization	Copy the model	Offer many different approaches Share ideas with classmates	Each group has a different method Share mathematical experience with classmates Use errors to learn

Table 2. Examples from Mathematics Instruction and Different Features of Autonomy Support (Stefanou et al., 2004, p. 108). Note. O=organizational; P=procedural.

According to Stefanou et al. (2004), organizational and procedural choices might be necessary but are insufficient for deep-level thinking and learning. In this sense, they posit that CAS may play a pivotal role in learning itself. Then, what distinguishes it from *autonomy support*?

Autonomy Support and Cognitive Autonomy Support. The term *cognitive autonomy* was introduced by Logan, DiCintio, Cox, and Turner (1995), who studied the relationship between teacher perceptions and observations of motivational practices in the classroom. They defined it as a "confidence in one's ability to think independently in ways that may or may not be consistent with one's classmates but nonetheless render the material meaningful in a personal fashion" (p. 6). They concluded, based on classroom observations, that autonomy exists "not only as student choice and decision making (task autonomy), but also as student ownership of ideas and student confidence and

independence in thinking (cognitive autonomy)" (Logan et al., 1995, p. 1). The following lesson they observed shows how the two types of autonomy support can coexist in the classroom:

> Ms. A: "You know it is pretty redundant to color in all of these scoops but if you would like to, you may. I have markers and colored pencils. Also, you may work with partners or alone. It is your choice. Again, if you truly want to color, that is fine, but can anyone give me a different way they might approach this problem?"

In this example, the teacher guides students through some procedures and she enables them to explore and find their own way to approach the problem while providing choice regarding task autonomy.

Logan et al. (1995) valued *cognitive autonomy support* as an essential avenue for deeper thinking over *task autonomy support*, in that the former entices students into experiencing "higher cognitive processes" (p. 25) while the latter may lead to a "superficial sense of autonomy" for the student if it is implemented carelessly (Logan et al., 1995, p. 6). Logan et al. (1995) observed Ms. A's math classroom where students explained their own process and products to their classmates using an overhead projector, and demonstrated their many approaches to solving problems such as coloring, diagrams, and algorithmic equations. Logan et al. (1995) also noted that students in the classroom were required to agree or disagree with their classmates' methods of approach, and to explore why one approach was better than another. According to the teacher's guiding questions and the students' various opinions, students were allowed to find some errors and solutions in the activities, either individually or collaboratively. Students' various creative ideas were not intimidated by others in a CAS condition; rather, their thoughts were respected by others. Students were allowed to create their own ideas. And their

thoughts might be shared with others freely and be elaborated and refined in the process of learning.

Thus, the support for cognitive autonomy may be differentiated from autonomy support even though they share many common features. For example, Tsai et al. (2008) posited that "whereas autonomy-supportive climate and controlling instruction focus on social interaction, cognitive autonomy support emphasizes the support provided for students' engagement in cognitive activities" (p. 462). Also, the differences may emerge in the items of the two distinctive scales Tsai et al. (2008) used in their research. For instance, there are some items measuring *perceived autonomy-supportive climate*, including having choice: "I felt that my teacher provided me choice and options," "I felt understood by my teacher," "My teacher conveyed confidence in my ability to do well in the course," "My teacher encouraged me to ask questions," and "My teacher tried to understand how I see things before suggesting a new approach" (p. 472). And, in terms of the items concerning *perceived cognitive autonomy support*, questions were mainly focused on cognitive functioning and process: "We worked through exercises that helped us understand the topic," "Different students presented their solutions to the same task," "Our teacher set tasks that required time to reflect," and "Our teacher emphasized the relations between the topics discussed" (p. 472).

Accordingly, autonomy support may consist of more comprehensive components, including both social interaction between teachers and students and the provision of choice. CAS, on the other hand, is more likely to focus on how students' ownership of ideas and decisiveness result in thoughtful justification of ideas and self-reliance, in accordance with their own cognitive processing. In this respect CAS, as another way of

autonomy support, might be an influential facilitator of deep-level thinking and learning with respect to cognitive-function booster.

The Effect of Cognitive Autonomy Support on Interest Development

Despite several controversies, it has been reported that the autonomy-supportive environment can influence the enhancement of students' interest (Deci, 1992; Flowerday, 2000; Schraw et al., 2001). Furthermore, some researchers have examined the effect of autonomy support on engagement (Shernoff, Csikszentmihalyi, Schneider, & Shernof, 2003). In the following section, the meaning and characteristics of interest and engagement will be described, and the effects of CAS on interest development and cognitive engagement will be discussed.

Interest

Deci and Ryan (1985) described interest as having "an important directive role in intrinsically motivated behavior in that people naturally approach activities that interest them" (p. 34). From this perspective, the construct of interest can be interpreted as a requisite for intrinsically motivated behaviors. Meanwhile, Hidi and Renninger (2006) defined interest as "a psychological state of engaging or the predisposition to reengage with particular classes of objects, events, or ideas over time," which are termed content (p. 112).

The Characteristics of Interest

Interest is domain-specific. As Schiefele (1991) has proposed, interest is a domain- or content-specific construct. Interest is regarded as a psychological state arising from the interaction between individuals and "a particular content" (Hidi & Renninger,

2006, p. 112). This indicates that feeling of interest in a subject pertains to a specific "content." Hidi and Renninger (2006) argued that interest is always content-specific and that it does not apply to all activities. This feature implies that teachers teaching specific domain knowledge should focus on enhancing students' interest in the specific *content*. This idea parallels Schiefele's (1991) suggestions that "subject-matter-specific interest is probably more amenable to instructional influence than are general motives or motivational orientations" (p. 301).

Interest has a cognitive aspect as well as an affective one. Interest has been reported to have both affective and cognitive facets; this idea is supported by theoretical and empirical research based on neuroscientific findings (Hidi, Renninger, & Krapp, 2004; Panksepp, 2003). The *affective facet* refers to "positive emotions accompanying engagement," while the *cognitive facet* stands for "perceptual and representational activities related to engagement" (Hidi & Renninger, 2006, p. 112). In their early studies Schank (1979) and Kintsch (1980) distinguished interest related to emotion and feeling from interest as an outcome of cognitive processing. Building on this differentiation, Harp and Mayer (1997) have demonstrated that two different sources of situational interest cause different types of processing. They found that seductive texts for increasing emotional interest did not affect the improvement of understanding, while coherent texts for increasing cognitive interest did increase comprehension and learning.

Affective and cognitive facets have also been viewed as interacting with each other, even though they have been considered as separable. Hidi, Renninger, and Krapp (2004) noted that interest is a motivational variable that combines affective and cognitive components. In their view, the two components are not contradictory. Rather, they may

vary as interest develops. For example, individuals may experience affect at the beginning of an activity; the affect can be gradually integrated with cognitive processing based on its value or relevance.

Thus, the first phase of interest development, a triggered situational interest which will be described in detail in the following section, may have only a small amount of cognitive evaluation along with more positive emotion (affect), while the last phase, a well-developed individual interest in a specific domain, subsumes "both stored knowledge and stored value, as well as positive affect" (Hidi et al., 2004, p, 95). By persistently building up these cognitive components, students might have a more developed interest level over time. This means that teachers should design and set up a learning environment to stimulate their students' cognitive process in learning and to guide students' cognitive performance.

Interest develops: A four-phase model of interest development. Interest can change over time through interaction with an environment and the external stimuli. From the developmental perspective on interest, Hidi and Renninger (2006) proposed a four-phase model of interest development from situational interest to individual interest that can guide educators in instructional interventions.

Hidi and Renninger's (2006) model of interest development posits four sequential phases: triggered situational interest, maintained situational interest, emerging individual interest, and well-developed individual interest. In other words, the model describes two representative phases of situational and individual interest with affective and cognitive components in each phase. To date, situational interest and individual interest have been identified in many studies (Hidi, 2000; Krapp, Hidi, & Renninger, 1992; Schraw,

Flowerday, & Lehman, 2001). Mitchell (1993) ascertained that the primary distinction of the interest construct originated in work on personal and situational interest by Hidi and Baird (1988) and Krapp (1989). Here, a *personal interest* refers to interest individuals bring to some environment regardless of the environmental stimuli in a certain situation, whereas *situational interest* refers to an interest individuals can obtain through interaction with environmental factors.

Building on previous studies, Hidi and Renninger (2006) defined situational interest as "focused attention and affective reaction" initiated by external stimuli, whereas individual interest refers to "a person's relatively enduring predisposition to reengage particular content over time as well as to the immediate psychological state when this predisposition has been activated" (p. 113). In other words, situational interest can be triggered either by something intriguing, such as text features of surprising new information, concreteness, or funny pictures in the environment at the moment, or by a situation in a context. And individual interest has a dispositional feature in a person across situations. For example, some students bring their extant interest in reading books to a class regardless of instructional stimuli in the situation (Linnenbrink-Garcia, Durik, Conley, Barron, Tauer, Karabenick, & Harakiewicz, 2010).

Situational interest (SI) is differentiated into two phases: "triggered situational interest" and "maintained situational interest." Individual interest (II) comprises "emerging individual interest" and "well-developed individual interest." According to Hidi and Renninger (2006), each phase of interest varies according to "amount of affect, knowledge, and value" (p. 112). Of course, other factors such as different levels of effort, self-efficacy, and goal setting also have been found to affect each phase of interest

development (Renninger & Hidi, 2002). In addition, each phase of feeling interested can be supported by external stimuli. Whether interest is supported by others, or maintained by students themselves through effort and challenge, it is believed to develop and become robust over time.

The first phase is *triggered situational interest*. Individuals may be fascinated by something such as group work on computers in a context. Or, course material might catch students' attention. In these situations, they might feel triggered situational interest, which occurs from "short-term changes in affective and cognitive processing" (Hidi & Renninger, 2006, p. 114). It can be triggered by situational or environmental stimuli in the moment and is commonly supported by external factors. Therefore, learning environments or tools can help prompt triggered situational interest. Many researchers have articulated that teachers' provision of choice in the classroom activities tends to trigger students' situational interest (Flowerday et al., 2004; Schraw et al., 2001). Schraw, Flowerday, and Reisetter (1998) demonstrated that students having choices about what to read reported more situational interest. This triggered situational interest by external environment might develop into maintained situational interest if the individuals try to reengage particular content over time with persistence and focused attention.

The second phase, *maintained situational interest*, refers to a psychological state of interest following a triggered one, sustained by task meaningfulness (value-related) and personal involvement as well as positive feelings (feeling-related) (Mitchell, 1993). It can be also supported externally. As Linnenbrink-Garcia et al. (2010) argued, learning contexts can promote maintained situational interest if they prompt students to feel empowered by the knowledge in the situation. For instance, learning environments that

foster meaningfulness and personal involvement through project-based group works can help students to maintain their situational interest.

These two phases of situational interests parallel Mitchell's (1993) model of catching and holding interest. Citing the works of Berlyne (1960) and Malone and Lepper (1987), Mitchell demonstrated that "catching interest" emerges through sensory stimulation by attention-attracting values of sensory environment and "cognitive stimulation" of so-called cognitive equilibrium or the cognitive drive to know. For instance, he suggested that group work, computers, and puzzles in a math class can elicit "catching interest" in that situation. On the other hand, "holding interest" can be characterized to be sustained by "meaningfulness" and "involvement." That is, if teachers can make learning material meaningful to help students achieve their own goals, the students can maintain their initial interest in the particular content. Moreover, he argued that although students can bring different personal interest to class, their personal interest levels also can be changed and supported by external support in a situation. These two phases of situational interest support the development of individual interest (Renninger, 2000; Schraw & Lehman, 2001). However, the transition from situational interest to individual interest does not occur naturally in every situation (Hidi & Renninger, 2006). The situational interest can fade away unless the environment continues to support it, or if the individual invests less effort and value in a particular domain.

The third phase is *emerging individual interest*, which refers to a "psychological state of interest as well as to the beginning phases of a relatively enduring predisposition" to reengage with particular content over time (Hidi & Renninger, 2006, p. 114). *Emerging individual interest* is distinguished from the two previously discussed facets of

situational interest in that it is characterized by “stored knowledge” and “stored value” as well as by positive feelings. In this phase, a relatively large amount of cognitive processing and evaluation seems to take place. In this stage, students have a tendency to generate their own questions out of their curiosity about a specific content. Although students in this phase are more likely to be self-regulated, they also can be influenced by external support of instructional conditions. Such support from teachers, peers, and experts helps them with in-depth understanding and learning (Krapp & Lewalter, 2001). Depending on the amount of value, knowledge, and affect, this phase of interest may or may not develop into the next phase of interest.

If individuals have a relatively enduring predisposition to reengage with a particular content for a long time, they might have *well-developed individual interest*, which is the fourth phase of interest development. This type of interest includes more stored knowledge and more stored value as well as positive affect. Based on their previous level of engagement, students value the specific task and reengage with it. Students in this phase are apt to generate and pursue answers to the questions they have and to sustain constructive and creative effort over time, along with more self-regulated learning strategies. Like other phases of interest, it also benefits from external support even if it is likely to be self-generated. Thus, learning environments facilitate the deepening of well-developed individual interest by providing more cognitively challenging situations.

Hidi and Renninger (2006) postulated that “the characteristics of each phase of interest may be considered mediators of subsequent development and the deepening of interest as well as outcomes of previous development” (p. 115). Given the characteristics

of the four phases of interest development, the model of interest development proposes several interesting and meaningful points that will be examined in this proposed study. First, situational interest can be maintained and developed into individual interest, a better-developed or integrated type of interest, by the increase of cognitive processing such as the accumulated value of the tasks, knowledge, self-regulation, and deeper understanding. Second, learning environments and instructional strategies serving as external support can facilitate interest development in each phase. Then, what kind of external support can better facilitate interest development?

The Effect of Cognitive Autonomy Support on Interest and its Development through Active Cognitive Function

When looking at the importance and also limitations of autonomy support, it is important to study which types of choice will yield academic learning outcomes. In fact, some researchers have asserted that not every type of autonomy-supportive methods will enhance interest, motivation, and learning in the same way. The question becomes what kind of autonomy support will more positively affect students' interest by promoting the developmental transition from situational interest to individual interest? For this purpose, what type of autonomy support can facilitate active cognitive processing?

According to Stefanou et al. (2004), CAS enables students to be more autonomous cognitively, to think in various ways, and to engage in in-depth learning, by facilitating cognitive processing, from memorizing to creating questions and thoughts as discussed before. The cognitive facets caused by CAS might strongly foster interest development from situational to individual interest, along with enhancing more

meaningful value and stored knowledge, and intensifying cognitive processing rather than affective processing (Hidi & Renninger, 2006).

At the same time, this deep level of cognitive functioning and process may result in more in-depth cognitive engagement and persistence. Most of all, interest as a motivational variable results in engagement for the purpose of in-depth learning. As Appleton, Christenson, Kim, and Reschly (2006) have indicated, "motivation and engagement are separate but not orthogonal" (p. 428). And interest may develop more strongly while students are cognitively engaged over time. Therefore, cognitive engagement and the effect of CAS on it will be briefly discussed in the following section.

Engagement

Engagement is also critical for learning. It is believed that "motivation and cognition are key determinants of student engagement" in academic fields (Stefanou et al., 2004, p. 97). Engagement provides relatively "observable manifestation of the quality of a student's motivation," while interest as a motivational variable is not observable (Reeve, 2002, p. 194). This can be interpreted to mean that engagement would be one of the indicators that represent students' feelings of interest in educational situations. Engagement has been described as having several dimensions. For example, in Finn's (1989) model, it comprises two dimensions: behavioral (participation in class and school), and affective (school identification, belonging, valuing learning). Some researchers have discussed three components of engagement: behavioral, cognitive, and emotional engagement (Jimerson, Campos, & Grief, 2003).

Cognitive Engagement

Learning includes the "active process of integrating and organizing new information, constructing meaning, and monitoring comprehension in order to develop a sound understanding of a subject matter" (Meece, Blumenfeld, & Hoyle, 1988). These characteristics of learning are associated with students' cognitive functioning. In this aspect, *cognitive engagement* has been recognized as one of the most significant factors in knowledge acquisition and in-depth learning, contributing to "constructing new understanding and knowledge" (Zhu, 2006). Cognitive engagement refers to "the extent to which students are attending to and expending mental effort in the learning tasks encountered (e.g., efforts to use knowledge and cognitive strategies to complete a task)" (Zhu et al. 2009, p. 222). It subsumes "students' willingness to invest and exert effort in learning, while employing the necessary cognitive, metacognitive, and volitional strategies that promote understanding" (Blumenfeld, Kempler, & Krajcik, 2006, p. 475). Cognitively engaged students tend to engage in deep cognitive processing thereby eliciting understanding of the materials. And they show motivated behaviors associated with their persistence over time, using cognitive strategies (Pintrich & Schrauen, 1992).

Commonly, cognitive engagement has been divided into two different levels, "meaningful cognitive engagement" and "shallow cognitive engagement" (Greene and Miller, 1996, p. 185). Meaningful cognitive engagement includes the use of self-regulated strategies such as using elaboration and organization strategies to connect new ideas to preexisting ones. By contrast, shallow cognitive engagement is commonly concerned with simple memory strategies. Taken together, cognitive engagement is believed to produce the best learning outcomes (Logan et al., 1995).

Cognitive engagement can be affected by environmental factors as well as individual differences. For instance, some theorists have reported that the controlling conditions may make it difficult for some students to feel safe and autonomous. In those situations, the students may become more competitive and performance-oriented and may not fully cognitively engage in learning (Meece et al., 1988). Thus, several researchers have discussed the positive effects of autonomy support on engagement. Some empirical studies have examined the provision of choice as a way to provide autonomy support for cognitive engagement (Flowerday, Schraw, & Stevens, 2004). There have also been contrasting findings, however. For example, Flowerday and Schraw (2003) demonstrated that choice had no positive effect on cognitive engagement. Then, what other kinds of autonomy-supportive behaviors can effectively facilitate students' cognitive engagement?

The Effect of Cognitive Autonomy Support on Cognitive Engagement

Reeve (2009) noted that teachers' autonomy support can provide students with educational benefits such as "conceptual understanding, deep processing, active information processing, and self-regulation strategies" (p. 162). What Reeve refers to here might be connected with what Stefanou et al. (2004) refer to as cognitive autonomy support, in that cognitive autonomy support enhances students' deep level of thinking, advanced learning strategies, and self-regulation.

Rotgans and Schmidt (2011) examined how different levels of autonomy in problem-based learning (PBL) elicit cognitive engagement with the topic at hand. Furthermore, they demonstrated how cognitive engagement as a function of the learning process may develop and how it determines subsequent levels of cognitive engagement. According to their perspective, being autonomous from the direct intervention of a

teacher and feeling in charge of one's own learning may lead to increased cognitive engagement with the topic, which encourages deeper understanding of it in the end. Even though they were not distinguishing different types of autonomy support in their study, they were focusing on a cognitive facet of autonomy support in that the experiment was conducted in the setting of self-directed, problem-based learning which requires active cognitive processing.

Logan et al. (1995) posited that "cognitive autonomy" induces cognitive engagement that produces the best learning outcomes, unlike "task autonomy" such as simple choice concerning tasks (p. 6). In line with this idea, Stefanou et al. (2004) asserted that, although choice and decision-making are fundamental to motivation and learning, more than simple choices about tasks are necessary in order to help students become more cognitively engaged in learning. That is, in cognitive autonomy-supportive classrooms, students are more likely to be cognitively engaged as their interest develops. Accordingly, the effect of CAS on cognitive engagement must be studied to better understand whether cognitive autonomy-supportive contexts or teacher behaviors influence advancement of cognitive performance and student interest.

CHAPTER 3: PURPOSE AND RESEARCH QEUSTIONS OF PROPOSED STUDY

The purpose of the proposed study is to examine how different types of autonomy support such as *perceived cognitive autonomy support* and *perceived choice* are associated with student *interest* (situational interest and individual interest). In addition I want to address the interplay between students' different perceptions of autonomy support and their feelings of interest, focusing on cognitive facets, *cognitive engagement* (shallow cognitive engagement and meaningful cognitive engagement), which may mediate the relationship between different types of autonomy support and student interest in a different way. To investigate the interrelationship among these variables in a course, a path analysis might be used (see Figure 2).

This proposal for a study is guided by the following main research questions:

1. The relationship between perceived cognitive autonomy support and other variables:

    1a) Does perceived cognitive autonomy support predict students' individual interest?

    1b) Is perceived cognitive autonomy support associated with students' individual interest, mediated by meaningful cognitive engagement?

2. The relationship between perceived choice and other variables:

    2a) Does perceived choice predict students' situational interest?

    2b) Is perceived choice associated with situational interest, mediated by shallow cognitive engagement?

3. The relationship between initial interest and other variables:

3a) Is students' initial interest associated with individual interest at the end of the semester through perceived cognitive autonomy support?

3b) Is students' initial interest associated with situational interest at the end of the semester through perceived choice?

4. The relationship between background knowledge and other variables:

4a) Is students' background knowledge associated with individual interest at the end of the semester through perceived cognitive autonomy support?

4b) Is students' background knowledge associated with situational interest at the end of the semester through perceived choice?

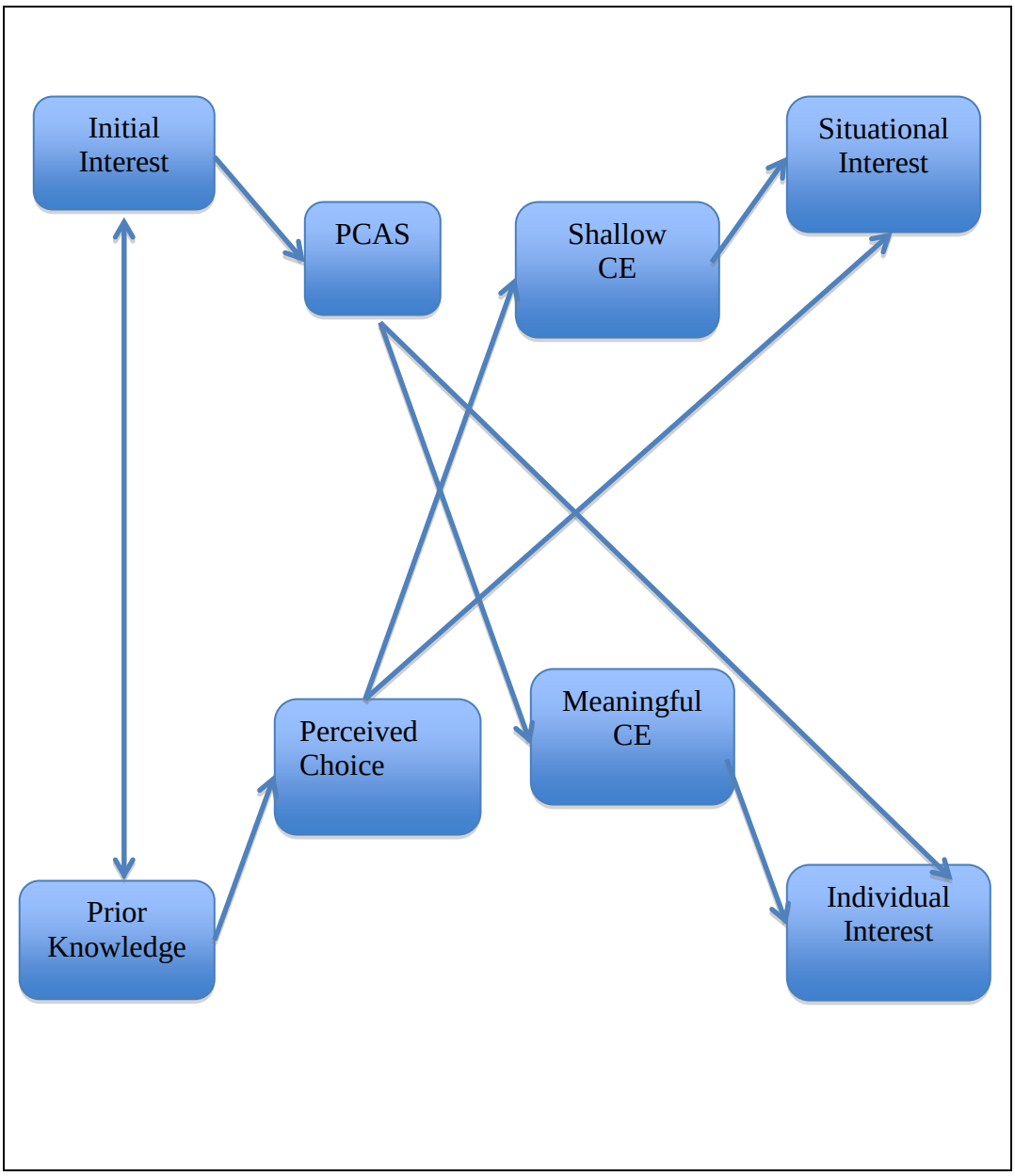

Figure 2. A Path Model

Method

Participants

The participants in this study will be undergraduate students enrolled in different courses at a large research university in Texas. Using the G*Power program, a power analysis will be conducted to determine the appropriate sample size in this study. Cohen's medium effect size (*d*= .5), a power of .80, and the alpha level of .05 will produce the total sample size. I estimate at this point that I will need 800 respondents.

Measures

Initial interest. With respect to preexisting individual interest, Hidi and Renninger (2006) noted that "although situational interest represents the initial phases of the development of individual interest, there are multiple possibilities for the person with an existing individual interest to experience related situational interests" (p. 117). This seems to imply that although some individuals already have preexisting individual interest in a specific area, the existing interest is also affected by some situational factors in a particular context. For instance, some learners having extant individual interest in psychology could lose their interest in an uninteresting situation over time.

However, most literature concerning interest considers initial interest important for its possible impact on the dependent variables or for a careful examination of development (Harackiewicz, Durik, Barron, Linnenbrink-Garcia, & Tauer, 2008). For instance, some researchers posit that psychological states of interest may be triggered when contents are perceived as relevant to the interest that the individuals bring to a situation (Tsai, Kunter, Ludke, & Trautwein, 2008). That is, situational interest in a specific condition can interact with the individual interest that people bring into the

situation. It is natural that their interest can be also influenced by external stimuli and support in the given specific situation, and that it can be triggered and maintained in a different way. For example, students who come to an introductory class with a well-developed individual interest might deepen their individual interest if they experience more value or meaning in the course (Harackiewicz et al., 2008).

For the purpose of a careful examination of initial baseline differences, students' initial interest in a course will be measured at two weeks into the semester. The questionnaire will include seven items rated on a 7-point scale (1-not at all true of me, 7-very true of me): "I've always been fascinated by this topic," "I'm really looking forward to learning more about this topic," and so forth. This scale was used in Harackiewicz et al.'s (2008) study to measure students' initial interest, with a high reliability of 0.90 (Cronbach's alpha coefficient).

Background Knowledge. Students' background knowledge will be measured at two weeks into the semester along with initial interest to look into any relationship between students' prior knowledge and either perceived cognitive autonomy support or student interest. The scale was used by Harackiewicz, Durik, Barron, Linnenbrink-Garcia, and Tauer (2008). Three items measure students' background knowledge (e.g., "This class is my first exposure to the field of this topic," "I studied the related topic in another class or did reading on my own," and " I have very little experience with the topic in this class"(Reversed)). Each item will be rated on a 7-point scale. Harackiewicz et al. (2008) reported a Cronbach alpha of .90 in their study.

Situational interest. Students' situational interest will be measured 12 weeks into the term, using what Linnenbrink-Garcia et al. (2010) developed to differentiate three

factors of situational interest: triggered-SI (situational interest) focusing on students' attention and affective reactions to class lectures in general; maintained-SI-feeling referring to affective reactions to domain content experienced in the classroom (enjoyment); and maintained SI-value (value and importance). Linnenbrink-Garcia et al. (2010) demonstrated that three factors can be distinct from one another, noting that the measure would be appropriate to assess situational interest across various academic areas in different levels of school settings, from middle school to college contexts.

There are 12 items in the scale, which will be a modified version by exchanging 'math' with 'this course': *Triggered-SI* (e.g., "When we take this course, my instructor does things that grab my attention"); *Maintained-SI-Feeling* (e.g., "What we are learning in this class this year is fascinating to me"); and *Maintained-SI-value* (e.g., "What we are learning in this clss this year can be applied to real life"). The items will be rated on a 7-point scale. The Triggered-SI (Cronbach's alpha= .86), Maintained-SI-Feeling (Cronbach's alpha= .92), and Maintained-SI-Value (Cronbach's alpha= .88) have high reliability in Linnenbrink-Garcia et al.'s (2010) study. The Cronbach's alpha in this study will be measured.

Individual interest. Students' individual interest will be measured 12 weeks into the semester. Individual interest will be assessed using an adapted version from the "Motivated Strategies for Learning Questionnaire" (MSLQ; Pintrich, Smith, Garcia, & Mckeachie, 1993). There are 8 items in the scale (Cronbach's alpha= .90) (see Linnenbrink-Garcia et al., 2010). The scale was designed to cover both feeling and value components. For instance, there will be the following questions: "This course is practical for me to know," "This course helps me in my daily life outside of school," "It is

important to me to be a person who reasons psychologically," and "I enjoy doing this course." Students will indicate their individual interest based on a 7-point scale, raging from 1 (not at all true) to 7 (very true). The reliability in this study will be checked.

Shallow/ meaningful cognitive engagement. Students' cognitive engagement will be measured 12 weeks into the semester along with other scales, selecting cognitive engagement items from the revised version of the Motivational and Strategy Use Survey developed by Greene and Miller (1993). There are two subscales for cognitive engagement in this measure: 25 items for meaningful cognitive engagement and 13 items for shallow cognitive engagement will be used with a 7-point scale. For instance, the scale includes the following questions: "When learning the new material, I summarized it in my own words" for meaningful cognitive engagement, and "In order for me to understand what technical terms meant, I memorized the textbook definitions" for shallow cognitive engagement. The reliability for meaningful cognitive engagement was 0.90 in Greene and Miller's (1996) study. Shallow cognitive engagement showed a reliability of 0.81 (Cronbach's alpha). The reliability will be checked in this proposed study.

Perceived cognitive autonomy support. Participants will be asked to respond to the Perceived Cognitive Autonomy Support (PCAS) scale, which was used in Tsai et al.'s (2008) study on interest, at 12 weeks into the semester. In this proposed study, the scale consisting of four items will be used. This scale measures whether students perceive instruction as involving them cognitively and as scaffolding their conceptual understanding with four items: "We worked through exercises that helped us understand the topic," "Different students presented their solutions to the same task," "Our instructor

set tasks that required time to reflect," and "Our instructor emphasized the relations between the topics discussed" (Tsai et al., 2008, p. 464). The Cronbach's alpha was reported to be 0.76 in Tsai et al.'s (2008) study.

Perceived choice. Students' perceived choice will be measured at 12 weeks into the semester. This scale is in Intrinsic Motivation Inventory (IMI) developed by Deci and Ryan. There are 7 items to measure students' perception of having choice in class (e.g., "I believe I have some choice about doing some activity," "I feel like it is not my own choice to do some task in this course (R)," "I don't really have a choice about doing some task (R)," "I feel like I have to do some task (R)," "I do some activity because I have no choice (R)," "I do some activity because I want to," and "I do some activity because I have to (R)."). They are all pertaining to experiencing *choice* excluding other types of autonomy support.

Procedure

Participants will be recruited from students enrolled in several undergraduate courses by contacting approximately 60 instructors. The instructors will be given the information about this study and asked for permission to contact their students. When they give their permission, the students will be contacted via email, asked to read the consent form and sign the form if they are willing to participate. Data will be gathered using online questionnaires at both Time 1 (2 weeks into the term) and Time 2 (12 weeks into the semester). At Time 1, students will be asked to fill out three questionnaires including the demographic information questions, their initial interest, and their background knowledge. It is anticipated to take less than 15 minutes to complete the

surveys. At time 2, they will be encouraged to fill out the four questionnaires measuring perceived cognitive autonomy support, perceived choice, interest (including both situational and individual interest), and cognitive engagement (including shallow and meaningful cognitive engagement) during an online session. It is expected to take less than 30 minutes.

Hypotheses

On the basis of theoretical rationales, this study would test the following hypotheses.

Hypothesis 1a. Perceived cognitive autonomy support will predict students' individual interest.

Hypothesis 1b. Perceived cognitive autonomy support will be associated with students' individual interest, mediated by meaningful cognitive engagement.

Hypothesis 2a. Perceived choice will predict students' situational interest.

Hypothesis 2b. Perceived choice will be associated with situational interest, mediated by shallow cognitive engagement.

Hypothesis 3a. Students' initial interest will be associated with individual interest at the end of the semester through perceived cognitive autonomy support.

Hypothesis 3b. Students' initial interest will be associated with situational interest at the end of the semester through perceived choice.

Hypothesis 4a. Students' background knowledge will be associated with individual interest at the end of the semester through perceived cognitive autonomy support.

Hypothesis 4b. Students' background knowledge will be associated with situational interest at the end of the semester through perceived choice.

Data Analysis Procedure and Anticipated Results

A path analysis using Mplus will be employed to identify both direct and indirect relationships among multiple variables of initial interest, background knowledge, perceived cognitive autonomy support, perceived choice, shallow cognitive engagement, meaningful cognitive engagement, situational interest, and individual interest.

First, the results of preliminary analyses will be reported using independent sample t-tests and ANOVA to determine the effects of demographic variables (age, gender, grades, requirement of the course, ethnicity, major, perceived classroom structure). Second, descriptive statistics will be conducted to see if there are significant mean differences between variables. Third, a multiple correlation analysis among eight variables will be employed to see if there are strong associations between variables. Fourth, reliability for each scale will be checked since scale reliability is critical in path analyses in that exogenous variables are presumed to have no error variances.

The purposes of this proposed study are both to examine how different types of perceived autonomy support may be associated with different phases of student interest based on Hidi and Renninger's (2004) model of interest development and to explore how their relationships hold, focusing on mediating variables as a source of explanation of the relationships (Kline, 2005).

In this path model, I anticipate that a full model with direct paths and indirect paths will show how differently student interest interacts with various types of autonomy

support and what occurs in the course of interactions. In particular, I expect that students' perceived cognitive autonomy support will be more strongly associated with students' individual interest at the end of the semester than students' perceived choice. Furthermore, meaningful cognitive engagement is expected to mediate the relationship between their relationships. Also, perceived choice is presumed to have association with situational interest and their relationship is expected to be mediated by shallow cognitive engagement.

CHAPTER 4: DISCUSSION

Summary and Implications

This study starts with a basic but important question about how educators can support students' interest development. From Hidi and Renninger's (2006) perspective, interest may develop when learners are supported by external stimuli and simultaneously more cognitively engaged over time. Among various kinds of external support, *autonomy support* has been closely associated with interest and academic outcomes. Little research has been done, however, about what kinds of autonomy support better contribute to the development of interest by fostering cognitive functioning in practical educational contexts.

Stefanou et al. (2004) proposed the importance of cognitive autonomy support (CAS) as a different way from the provision of choice to use autonomy support to create different effects on motivation and cognition from the provision of choice. In particular, learners as thinking agents may experience the enhancement of interest and engagement in the classroom context, where they feel free to think various ways along with teachers' autonomy support (Reeve, 2002). Hence, the proposed study would examine the relationship between different types of autonomy support and different phases of student interest, mediated by different levels of cognitive engagement.

This study seeks to provide empirical research findings about the effects of perceived cognitive autonomy support over perceived choice, focusing on cognitive facets of interest. In addition, it seeks to initiate further studies about how to implement various kinds of instructional practices by providing various types of autonomy support and boosting student interest in a course based on the positive impact on student interest.

Basically, the findings are expected to remind educators of their potential to guide and support the development of students' interest by fostering students' ownership in thinking and satisfying their basic needs. If the hypotheses can be confirmed in this proposed study, educators may make more effort in their instructional practices to focus on supporting students' cognitive autonomy with persistence in order to advance their students' interest and engagement. And, they may encourage autonomous and creative thinkers by giving students enough time and chances to think in various ways, with effective scaffoldings. Especially, based on the findings of the effects of CAS, educators are expected to optimize the benefits of more various types of autonomy support according to their specific purposes and proper situations.

Limitations and Future Directions

Even though the findings of the proposed study on CAS are expected to provide meaningful educational implications in terms of understanding student motivation and cognition, there is scant empirical research on CAS, especially in higher educational settings. This results in the first potential limitation in this study. That is, there is little study on whether college students perceive instructors' CAS and whether they can differentiate it from other types of autonomy support in real classroom settings. If the students do not perceive CAS differently from the provision of choice, responses on measures may not be associated as predicted. Thus, future studies would investigate whether students can perceive and differentiate CAS from other types of choice through thorough qualitative research to support findings of an empirical study in college settings.

In relation to this, there may be another limitation to conduct this study in terms of a scale for CAS. There are only four items on the measure of students' perceived cognitive autonomy, even though the Perceived Cognitive Autonomy Support scale is validated in Tsai et al.'s (2008) study (Cronbach alpha= 0.76). In order to run a path analysis, the scale should have high reliability as discussed above. Based on what Stefanou et al. (2004) found and what future qualitative studies would bring up, a more reliable scale should be developed. Also, a confirmatory factor analysis to differentiate perceived CAS and choice should be conducted to see whether there are the significant difference in their different impacts on student interest.

A third limitation is concerned with how to measure students' perceptions and their feeling of interest correctly. The result of this study is dependent upon students' self-report rather than objective behavioral observation. With regard to the first and second limitations, students may perceive their instructors' teaching practices incorrectly.

A fourth limitation is concerned with the simple path model. The suggested design could be more elaborated to demonstrate the positive effect of cognitive autonomy support on student interest, by adding and exploring other influential variables. For example, Jang, Reeve, and Deci (2010) investigated teachers' instructional styles incorporating as autonomy support and structure and demonstrated their effects on students' engagement, hypothesizing that students' engagement would be highest when teachers implement high levels of both teaching styles. They found that autonomy support and structure were positively correlated and that both autonomy support and structure predicted students' behavioral engagement. Also, there are some missing relationships among the eight variables. For instance, the direct relationship between

initial interest and situational or individual interest is not examined here. In future research, more detailed relationships would be explored.

Appendix A

Initial Interest

1. I’ve always been fascinated by this course.
2. I chose to take this course because I’m really interested in the topic.
3. I’m really excited about taking this class.
4. I’m really looking forward to learning more about this course.
5. I think the field of this course is an important discipline.
6. I think what we will study in this course will be important for me to know.
7. I think what we will study in this course will be worthwhile to know.

Appendix B

Background Knowledge

1. This class is my first exposure to the field of this topic.
2. I studied the related topic in another class or did reading on my own.
3. I have very little experience with the topic in this class.(Reversed)

Appendix C

Situational Interest

1. My instructor in this course is exciting.

2. What we are learning in this course this year is fascinating to me.

3. This year, this course is often entertaining.

4. What we are studying in this course is useful for me to know.

5. When we take this course, my instructor does things that grab my attention.

6. I am excited about what we are learning in this course this year.

7. I like what we are learning in this course this year.

8. I find this course we do in class this year interesting.

9. This course is so exciting it's easy to pay attention.

10. The things we are studying in this course this year are important to me.

11. What we are learning in this course this year can be applied to real life.

12. We are learning valuable things in this course this year.

Triggered-SI: 1, 5, 3, 9

Maintained-SI-Feeling: 2, 6, 7, 8

Maintained-SI-value: 4, 10, 11, 12

Appendix D

Individual interest

1. This course is practical for me to know.
2. This course helps me in my daily life outside of school.
3. I enjoy the subject of this course.
4. I like this course.
5. I enjoy doing this course.
6. This course is exciting to me.

Appendix E

Cognitive Engagement

1. I made a plan for achieving the grade I wanted.
2. When I studied, I stopped to ask myself whether or not I am understanding the material.
3. I tried to write down exactly what my instructor said during lectures.
4. When learning the new material. I summarized it in my own words
5. I tried to memorize answers to questions from test study guides.
6. In order for me to understand what technical terms meant, I memorized the text-book definitions.

Shallow Cognitive Engagement: 3, 5, 6

Meaningful Cognitive Engagement: 1, 2, 4

Appendix F

Perceived Cognitive Autonomy Support

1. We worked through exercises that helped us understand the topic.

2. Different students presented their solutions to the same task.

3. Our instructor sets tasks that required time to reflect.

4. Our instructor emphasized the relations between the topics discussed.

Appendix G

Perceived Choice

1. I believe I have some choice about doing some activity.

2. I feel like it is not my own choice to do some task in this course. (R)

3. I don’t really have a choice about doing some task. (R)

4. I feel like I have to do some task. (R)

5. I do some activity because I have no choice. (R)

6. I do some activity because I want to.

7. I do some activity because I have to. (R)

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