

CULTURE, EPISTEMOLOGY, AND ACADEMIC STUDYING

by

HEATH MARRS

B.A., Tabor College, 1994

M.S., Fort Hays State University, 1998

Ed.S., Fort Hays State University, 1999

AN ABSTRACT OF A DISSERTATION

submitted in partial fulfillment of the

requirements for the degree

DOCTOR OF EDUCATION

Department of Counseling and Educational Psychology

College of Education

KANSAS STATE UNIVERSITY

Manhattan, Kansas

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## ABSTRACT

This study explored the implications of cultural conceptions of the self (independent vs. interdependent) for epistemological beliefs, ways of knowing, and academic studying. Community college students ( $N = 340$ ) were recruited from two community colleges in the Midwestern United States and one predominantly Hispanic community college in the Southwestern United States. Students completed a number of paper-and-pencil instruments, including measures of epistemological beliefs, self-construal, ways of knowing, and approaches to studying. As predicted, significant correlations were found between interdependent self-construal and omniscient authority, and also between interdependent self-construal and connected knowing. Although no effects were found for ethnicity on epistemological beliefs and ways of knowing, acculturation appears to be an important influence on ways of knowing. A path analysis indicated that acculturation exhibited both a direct and indirect effect on connected knowing. The indirect effect on connected knowing was through interdependent self-construal. Students who were less acculturated (i.e. more likely to speak English as a second language or to be born in another country) were more likely to endorse an interdependent self-construal, and consequently more likely to endorse connected knowing. These results suggest that conceptions of the self may be important influences on personal epistemology.

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Major Professor  
Dr. Stephen Benton

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## Chapter One

### Introduction

This study examines two important concerns in educational psychology: cultural differences in epistemological beliefs, and the influence of personal epistemology on studying and academic performance. For educators working with college students, these two concerns may have important implications for understanding the academic experiences of students in postsecondary education. Possible influences on student experiences in higher education come not only from academic ability, past performance, and motivation, but also from student beliefs about knowledge and learning as well as from patterns of social interaction and definitions of self-concept (Markus & Kitayama, 1991; Singelis, 1994). All of these influences are important to consider when seeking an understanding of the student experience in higher education as well as student patterns of studying and academic performance.

The concern for the academic performance of college students has a long history. Since the early 1920's, educators have commented on the need for courses and programs focused on the development of study skills for entering college students (Nist & Simpson, 2000; Stahl & King, 2000). Researchers have recently investigated a number of areas related to academic studying and learning, including self-regulated learning (Schunk, 1995; Schunk & Zimmerman, 1997; Zimmerman, 1998; Zimmerman & Paulson, 1995), test-preparation strategies (Pressley, Yokoi, van Meter, Van Etten, & Freebern, 1997; Van Etten, Freebern, & Pressley, 1997; Van Meter, Yokoi, & Pressley, 1994), and note taking (Kiewra, 1991, 1994; Kiewra, DuBios, Christian, & McShane, 1988), as well as models of academic studying that attempt to explain the influence of both student and

environmental characteristics (Rowher, 1984; Thomas & Rohwer, 1993a, 1993b).

Despite the vast research literature, some important variables that may be important for understanding studying have received little attention. For example, although educators have realized the importance of considering the unique cultural experiences of students, the impact of cultural differences on academic studying has received little research attention (Grossman, 1995).

### Significance of the Study

In their review of the current research in the area of college studying, Nist and Simpson (2000) noted that academic studying is a complex activity that is influenced by a number of variables, including characteristics of the course and environment, a variety of student characteristics (e.g., prior knowledge, metacognitive ability, motivation, interest, students' beliefs), and the application of adaptive learning strategies. Because of the complexity inherent in the process of academic studying, research on studying is notoriously difficult. Like many behaviors, a variety of influences must be taken into account in the development of a research design. However, understanding the various influences on successful academic studying is crucial for promoting success in higher education (Nist & Simpson, 2000). As students progress through the educational system, the emphasis on independent learning (i.e. studying) becomes more pronounced. In the work world, individuals who are proficient in studying are much more likely to continue to develop their skills and advance in their chosen profession. Despite the importance of studying for educational and occupational success, psychologists and educators are just beginning to understand the multi-dimensional nature of academic studying. Considering the importance of studying and the meager success of interventions for studying

difficulties (Hadwin & Winne, 1996), research that contributes to a better understanding of studying processes is certainly needed.

### Purpose and Research Questions

The purpose of this study is to better understand the complex relationships among variables identified as potentially important to epistemological beliefs and academic studying. Nist and Simpson (2000), in their review of current research on college studying, noted the need for studies investing the “interactive nature of studying (p. 660).” By this they mean studies that take into account the many different variables that likely contribute to successful studying outcomes for students. As an example of the need for interactive studies, Nist and Simpson (2000) noted the emerging research literature on the role of epistemological beliefs in student learning and motivation. Although epistemological beliefs appear to be important influences on reading comprehension (M. P. Ryan, 1984), study strategies (Schommer, 1993b), and academic performance (Hofer, 2000), there is little understanding as to how epistemological beliefs interact with other variables that are important to academic studying. Nist and Simpson (2000) also described the limitations in research designs in the existing research literature related to academic studying. Citing the reliance on correlational research in the existing literature, they emphasize the need for more complex quantitative approaches, such as path analysis and structural equation modeling, to explore the relationships between the various components related to academic studying.

In addition to the need for research on the role of epistemological beliefs in academic studying, there is also a need to understand the role of culture in the development of epistemological beliefs. Is the current research literature on

epistemological beliefs relevant to students from different cultures? Are underlying cultural beliefs relevant to the development of beliefs about the nature of knowledge and learning? An understanding of cultural influences on epistemological beliefs would be helpful in applying the current knowledge of epistemological beliefs to educational settings with students from different cultures.

The theoretical framework guiding the design of this study is the embedded systemic model of epistemological beliefs (Schommer, 2004). The embedded systemic model of epistemological beliefs presents a conception of how epistemological beliefs are influenced by a number of other important constructs, such as cultural beliefs, self-construal, and ways of knowing. In this study, the influence of various student belief systems (epistemological beliefs and self-construal) on student approaches to academic studying will be explored. In addition, the implications of culture for personal epistemology and academic studying will be investigated.

The following broad research questions guided the development of this study:

1. How does personal epistemology (epistemological beliefs, ways of knowing) relate to cultural beliefs and beliefs about the self?
2. How does acculturation, as indicated by use of English as a first language and country of origin, relate to beliefs about the self and ways of knowing?

## Chapter Two

### Literature Review

#### *Current Research on Academic Studying*

Although the need for more research on academic studying in higher education contexts is great (Nist & Simpson, 2000), there is a large body of related research that informs current understanding of studying in learning contexts (Butler & Winne, 1995; Mayer, 1996; Pressley et al., 1997; Slavin, 2003; Zimmerman, 1990, 1998). Most of this research has focused on the topic of self-regulation in academic studying. Although the concept of self-regulation is hard to define because of the many different theoretical perspectives on self-regulation available in the literature, Zimmerman (1990) has identified a number of common concepts that are typically descriptive of self-regulated learning. Self-regulated learners are “metacognitively aware as well as motivationally and behaviorally active in their own learning” (Zimmerman, 1990, p. 4) Students who self-regulate are aware of their success in learning efforts and constantly evaluate the need to modify their approach to learning. This is accomplished as students set goals and plan their learning activities, implement the learning activities and monitor their effectiveness, and then make changes based on the conclusions derived from the results of the monitoring.

As an example of a self-regulated learner, consider college students who initially experience difficulty in a course but make adjustments over the course of a semester in order to improve their achievement. After performing poorly on the first exam, the students recognize that they will need to adjust their study strategies in order to meet the objectives of the course. Rather than emphasizing memorization of important terms and

concepts, the exams and assignments in the course require students to understand concepts, relate them to each other, and then apply them creatively to novel situations. The students' new approach to studying includes such strategies as relating ideas to each other when going over notes, seeking assistance from classmates and the instructor when having difficulty verbalizing difficult concepts, and reading other sources about the concepts when the textbook seems inadequate. The students also recognize the importance of consistent study, and they develop a system for reinforcement when they complete the strategies. Rather than become discouraged after the first exam, this students demonstrate the ability to evaluate and adjust in response to the demands of the learning situation.

A number of self-regulatory processes that are important to academic studying have been identified (Zimmerman, 1998). These include goal setting, task strategies, imagery, self-instruction, time management, self-monitoring, self-evaluation, self-consequences, environmental restructuring, and help seeking. A number of studies have confirmed that these self-regulatory processes are important for academic achievement, and that high achievers engage in almost all of these processes much more frequently than low achievers (Purdie, Hattie, & Douglas, 1996).

Theoretical models of academic studying have also been developed (Thomas & Rohwer, 1986). One model, the Autonomous Learning Model (Angelo & Cross, 1993; Thomas, 1988; Thomas & Rohwer, 1986, 1993a, 1993b), provides a fairly comprehensive framework for understanding the "big picture" when it comes to academic studying. The model identifies a role in academic studying for the characteristics of particular academic courses. For example, some courses call for more

complex study behavior than others. In addition to course characteristics, the model also identifies an important role for individual student characteristics such as epistemological beliefs. Despite the potential utility of the Autonomous Learning Model as a comprehensive framework for understanding academic studying, few studies in the area of academic studying have attempted to examine the many variables identified by the model in a comprehensive manner (Nist & Simpson, 2000). This critique can also be directed towards the literature on epistemological beliefs (Schommer, 2004).

### *Epistemological Beliefs and Studying*

The study of personal epistemology is gaining increasing interest in the field of educational psychology because of the apparent importance of student beliefs about knowledge in the learning process (Schraw, 2001). The concept of personal epistemology, as used in educational psychology, is also commonly referred to as epistemological beliefs or theories, ways of knowing, epistemological reflection, or epistemic cognition (Hofer, 2002). In each case, personal epistemology generally refers to conceptions of learning and knowledge that affect how students approach and evaluate information and problems faced in both the classroom and daily life. These conceptions of learning and knowledge may be represented in cognitions, beliefs, attitudes, ways of thinking, or reasoning skills (Pintrich, 2002).

### *Foundations of Epistemological Belief Research*

Although epistemology is typically associated with the field of philosophy, interest in epistemological beliefs (beliefs about knowledge and learning) began with the publication of William Perry's landmark study *Forms of Ethical and Intellectual Development in the College Years: A Scheme* in 1970. Using interviews with Harvard



undergraduates, Perry and his colleagues developed a framework for understanding how students' thinking about knowledge developed and matured throughout the college years. Perry identified a series of nine "positions" or "stages" through which students progress as they experience the personal and intellectual challenges of higher education (Moore, 1994). These positions are abstract descriptions of students' understandings of the nature of knowledge and the process of gaining or constructing knowledge. In its most general form, Perry organizes the nine positions into four broad categories: dualism, multiplicity, contextual relativism, and commitment within relativism. Students typically enter college demonstrating a "position" Perry termed *dualism*. *Dualism* refers to the tendency to view the nature of knowledge in all or nothing terms. Knowledge is either right or wrong; it either exists or it doesn't. From this position, it is the job of the teacher to provide the correct answers, and it is the job of the learner to acquire them. The possibility of differing conceptions of knowledge is given little thought from the dualism perspective. At the other end of the continuum from dualism is the position *commitment within relativism*. Students in this position acknowledge the complexity and diverse perspectives on knowledge, but also make commitments to knowledge within certain contexts. Knowledge is neither simple nor iron-clad (as suggested by dualism), nor based solely on personal opinion and idiosyncratic standards (as in the position of multiplicity and relativism).

Although Perry's work has influenced college student development theory (e.g., identity formation, student experiences of the college environment), it also has important implications for understanding the study processes of college students. In the original Perry study, students who developed sophisticated epistemological beliefs were much

more likely to experience positive development and intellectual growth during the college years. They became increasingly competent in ‘making meaning,’ and gradually came to understand that learning is more than a process of acquiring truth from an authority (i.e. a professor) (Moore, 1994). Instead, learning is understood as a personal endeavor that requires commitment, evaluation, and at times assistance from others. These realizations are potentially important for understanding how students study. Thus, the Perry study stimulated research on epistemological beliefs in learning, motivation, critical thinking, and problem solving.

Although a number of questions regarding the role of epistemology and educational processes remain unanswered, considerable progress has been made (Buehl & Alexander, 2001; Cunningham & Fitzgerald, 1996; Hofer & Pintrich, 2002; Schraw, 2001). Researchers have developed operational definitions of epistemological beliefs and have also constructed measures of different aspects of epistemological beliefs (Buehl & Alexander, 2001). Research on epistemology (Perry, 1999; Schommer, 1990, 1993a, 1993b; Schommer, Calvert, Gariglietti, & Bajaj, 1997; Schommer & Dunnell, 1994; Schommer & Walker, 1997) and reflective judgment (King & Kitchener, 1981) --a related construct--has provided evidence that student beliefs are important to academic performance and critical thinking.

#### *Current Conceptions of Epistemological Beliefs*

Although research regarding the definitional aspect of epistemological beliefs continues at the present time (Pintrich, 2002), the current study will use the framework of epistemological beliefs developed by Schommer (1990, 1993a, 1994) and Schraw, Bendixen, and Dunkle (2002) as a foundation for exploring the role of epistemological

beliefs in academic studying. With the development of the Epistemological Beliefs Questionnaire, Schommer (1990) conceptualized personal epistemology as a system of more or less independent beliefs, including (a) the stability of knowledge (Certain Knowledge), ranging from tentative to unchanging; (b) the structure of knowledge (Simple Knowledge), ranging from isolated bits to integrated concepts; (c) the source of knowledge (Omniscient Authority), ranging from handed down by authority to gleaned from observation and reason; (d) the speed of knowledge acquisition (Quick Learning), ranging from quick-all-or-none learning to gradual learning; and (e) the control of knowledge acquisition (Innate Ability), ranging from fixed at birth to life-long improvement (Schommer-Aikens, 2002).

What remains to be tested is *how* important student beliefs are when considered along with other components included in the model (e.g., course and task characteristics, student characteristics) of academic studying. In his review of the current state of research on personal epistemology, Pintrich (2002) suggested that “personal epistemologies can facilitate and constrain academic cognition, motivation, and learning (p. 405).” Noting the considerable correlational research that has established links between epistemological beliefs and better cognitive strategy use, reading comprehension, and academic performance (M. P. Ryan, 1984; Schommer-Aikens, 2002; Schraw, Bendixen, & Dunkle, 2002), Pintrich called for research using other designs, such as experimental and longitudinal designs, that examine the influence of personal epistemology on academic outcomes.

### *Epistemological Beliefs and Study Strategies*

Epistemological beliefs can influence study strategies. In a study of adult college students, Schommer, Crouse, and Rhodes (1992) investigated the relationship between epistemological beliefs and comprehension of statistical information. An additional purpose of the study was to investigate the influence of epistemological beliefs on study strategies and learning. Results indicated that belief in simple knowledge predicted comprehension of statistical information, with stronger beliefs in simple knowledge associated with poorer comprehension. Schommer et al. (1992) found a substantial relationship “between belief in simple knowledge and test-preparation strategies... and between test-preparation strategies and test performance (p.441).” Using path analysis, the authors concluded that the epistemological belief in simple knowledge has both a direct and an indirect effect on test performance, with the indirect effect mediated by test-preparation strategies.

In a study of the relationship between epistemological beliefs and student motivation, Paulsen and Feldman (1999) identified a number of significant correlations between the dimensions of Schommer’s Epistemological Beliefs inventory and the subscales on the Motivated Strategies for Learning Questionnaire. As in Schommer’s (1992) research, the epistemological belief of simple knowledge was related to student motivation. Those with more sophisticated beliefs about knowledge (i.e. knowledge is complex rather than simple) were more likely to demonstrate “an intrinsic goal orientation, to appreciate the value of learning tasks, to perceive an internal control over learning, and to feel efficacious about their capacity to learn (Paulsen & Feldman, 1999, p. 20).” Although the study did not address study strategies directly, it appears likely that

students taking on the motivational orientation described by Paulsen and Feldman might struggle with employing effective study practices, especially when faced with challenging academic tasks.

In addition to the work addressing study strategies and motivational beliefs (Paulsen & Feldman, 1999; Schommer, Crouse, & Rhodes, 1992), a number of studies have found relationships between epistemological beliefs and other academic variables related to studying and academic performance, including reading comprehension (M. P. Ryan, 1984), moral reasoning (Bendixen, Schraw, & Dunkle, 1998), and reasoning about complex issues (Kardash & Scholes, 1996; Schommer-Aikens & Hutter, 2002). The weight of the current research appears to confirm the crucial link between epistemological beliefs and academic studying and learning.

#### *Cultural Differences in Epistemological Beliefs*

One of the major research questions that has received little attention in the epistemological beliefs literature is the potential cross-cultural variability in epistemological beliefs (Chan & Elliot, 2004; Schraw, 2001). Are epistemological beliefs similar across cultures? Because epistemological beliefs have been conceptualized as multi-dimensional, do the same dimensions emerge when measured across cultural groups? Due to the great variations in fundamental beliefs, traditions, experiences, and understandings about the self and the world, it seems likely that epistemological beliefs may vary greatly depending on cultural background as well as unique educational experiences.

Researchers have investigated the cultural underpinnings of epistemological beliefs by exploring the epistemological beliefs of teacher-education students (Brownlee,

2003; Brownlee, Purdie, & Boulton-Lewis, 2001; Chan, 2003; Chan & Elliot, 2003). Noting that underlying beliefs about knowledge are crucial to understanding teacher behavior in the classroom, instructional goals, and conceptions of teaching, researchers have focused on testing the applicability of North American conceptions of epistemological beliefs (i.e. Schommer, 1990) to teacher-education students in Australia and Hong Kong. Brownlee and colleagues (Brownlee, 2003; Brownlee et al., 2001) tracked changes in epistemological beliefs as students progressed through teacher-education training in Australia. Chan (2003) and Chan and Elliot (2003) explored epistemological beliefs among teacher education students in a non-western culture, specifically Chinese students in Hong Kong.

Chan and Elliot (2003) examined the factor structure of Schommer's (1990) 63-item epistemological beliefs questionnaire with a sample of students of Chinese descent enrolled in the teacher education program of the Hong Kong Institute for Education. Chan and Elliot hypothesized that the underlying dimensions of epistemological beliefs would differ among students raised in the Chinese culture. Specifically, the authors expected the dimension labeled *source of knowledge (omniscient authority)* to be somewhat different because of the frequent references to the term 'authority' in Chinese culture.

Chan and Elliot (2003) administered the epistemological beliefs questionnaire to 352 final-year students enrolled in teacher education. Using exploratory factor analysis, the authors found that the subscale for *omniscient authority* loaded highly (-.85 factor loading) on the *certain knowledge* factor, in contrast to the clear difference between these two dimensions when using the Schommer questionnaire with North American samples

(Schommer, 1990). Schommer (1990) identified *certain knowledge* as a dimension, but not *omniscient* authority. In the Chan and Elliot (2003) sample, one dimension (which they named *omniscient authority*) combined the elements of certain knowledge and omniscient authority. The authors concluded that this difference in factor structure was likely due to “cultural/contextual factors (Chan & Elliot, 2003, p. 229).” They suggested that ‘authority’ has a unique meaning in Asian/Chinese culture. In general, authorities are viewed with respect and admiration, and children are taught to revere the knowledge handed down by elders or experts. Chan and Elliot (2003) suggested that perhaps the unique developmental experiences of students raised in a Chinese cultural context influence the structure of their beliefs about knowledge. In addition to the differences in the dimension of *omniscient authority*, only three factors were identified as opposed to Schommer’s (1990) four factors, and there were many subscales that loaded on more than one factor, making it difficult to clearly label the various factors. In all, Chan and Elliot (2003) identified a three-factor structure composed of Fixed/Innate Ability, Omniscient Authority/Certain Knowledge, and Certain Knowledge. Of all the factors, omniscient authority was the most prominent, indicating the possible important role of omniscient authority in Asian cultures.

In an extension of Chan and Elliot (2003), Chan (2003) explored the relationship between epistemological beliefs and study approaches in a sample of 292 teacher education students in Hong Kong. Chan wanted to explore the nature of epistemological beliefs in a non-western cultural context as well as the relationship between epistemological beliefs and ‘surface’, ‘deep’, and ‘achieving’ study approaches (Chan, 2003; Marton & Saljo, 1976). A surface approach refers to a tendency to focus on

reproducing or memorizing information. In contrast, a deep approach refers to a tendency to focus on understanding. Finally, an achieving approach is focused on attaining recognition and enhancing the ego. Of particular interest to the study of cultural influences on epistemological beliefs, Chan (2003) found that the factor structure of epistemological beliefs in the sample of Hong Kong teacher education students was slightly different from Schommer's (1990) results. Both the Chan (2003) and Schommer (1990) studies identified the dimensions of *innate/fixed* ability and *certainty of knowledge*. However, Chan (2003) identified the dimensions of *authority/expert knowledge* and *learning effort/process* instead of the *simple knowledge* and *quick learning* dimensions that Schommer (1990) found. Chan does not elaborate on the specific differences between these dimensions, but does conclude that the dimensions are somewhat different in the particular cultural context of the study.

Chan (2003) reported low but significant correlations (ranging from .12 to .21) between each of the epistemological dimensions (*innate/fixed* ability, *learning effort/process*, *authority/expert knowledge*, *certainty knowledge*) and 'deep', 'surface', and 'achieving' study approaches. For example, belief in *innate/fixed ability* was significantly correlated ( $r = .21, p < .001$ ) with a surface approach to studying. Students who believed that the ability to learn was fixed at birth and not likely to change were more likely to pursue a surface approach to studying, with a focus on memorizing or reproducing information rather than understanding. As another example, belief in *authority/expert knowledge* was positively correlated ( $r = .19$ ) with a surface approach and negatively correlated ( $r = -.17$ ) with a deep approach. Chan concluded that epistemological beliefs were an important variable to consider when exploring students



approaches to studying. In addition, Chan also concluded that “Hong Kong Chinese students tend to be deep and achieving-oriented in their learning approaches (Chan, 2003, p. 45),” in contrast to the claims of some researchers who conclude that Asian students “tend to rely on rote learning and a surface study approach (Chan, 2003, p. 45).”

Youn (2000) investigated the culture specificity of epistemological beliefs about learning in a sample of Korean college students. Youn was interested in the possible differences in epistemological beliefs among students raised in a predominantly “individualist” culture (i.e. the United States) versus students raised in a “collectivist” culture (i.e. South Korea). A number of differences regarding epistemological beliefs were found in the Korean sample. First, as in other studies (Chan, 2003; Chan & Elliot, 2003), the nature of the factor labeled omniscient authority was different in the Korean sample as opposed to the U.S. sample. In the Korean sample, omniscient authority clustered with the learning beliefs, whereas in the U.S. sample omniscient authority clustered with the knowledge beliefs. Second, unlike previous research on epistemological beliefs and education (Schommer, 1998), there was no relationship between age and educational level in the Korean sample. Youn offered a number of possible explanations for the difference between the two groups. A “ceiling effect” may have been present in the Korean sample, which was recruited from a number of selective universities in Seoul, Korea. Students in the Korean sample were high achieving, and initially may have had more sophisticated epistemological beliefs. Also, the nature of Korean culture and teacher-student relationships within the culture may have had an effect (Youn, 2000, p. 101). Third, the study found that epistemological beliefs were influenced by “independent (p. 102)” beliefs about the self, and that beliefs about the self

are important for understanding student beliefs about learning. Youn (2000) concluded that independent beliefs about the self develop differently in an individualistic culture as compared to a collectivist culture, and that the broad social influences of culture needs to be considered when exploring epistemological beliefs.

One recently published study that is especially relevant to the possibility of interactions between Hispanic cultural orientations and epistemological beliefs is an investigation of changes in epistemological beliefs in elementary science students (Conley, Pintrich, Vekiri, & Harrison, 2004). In addition to monitoring changes in epistemological beliefs over the course of instruction in an elementary science unit, the study looked the possible roles of gender, ethnicity, SES, and achievement in the development of epistemological beliefs. A sample of 187 fifth grade students from diverse ethnic backgrounds (46% Latino, 27% Anglo, 27% African American, 67% Low SES) participated in the study. Conley et al. (Conley et al., 2004) found that SES and achievement were related to epistemological beliefs, whereas gender and ethnicity were not. The study highlights the importance of considering SES when studying epistemological beliefs. Although Conley et al. failed to find differences in epistemological beliefs among students from different ethnic groups, the sample consisted of fifth-grade students rather than college students. It is possible that ethnicity may emerge as an important variable as students progress through the educational system and face more complex educational environments. Most investigations of personal epistemology have focused on students in late adolescence and early adulthood, when the capacity for complex cognition is emerging.

In summary, current research on culture and epistemological beliefs (Chan, 2003; Chan & Elliot, 2003; Youn, 2000) seems to support the view that cultural considerations must be taken into account when examining personal epistemology. Among students from different cultures, the underlying dimensions of epistemology may change, with corresponding differences in the way epistemological beliefs affect learning. Considering the preliminary research and the importance of personal epistemology to learning, research exploring cultural differences in epistemology is needed.

#### *Epistemological Beliefs and other Systems*

In a comprehensive review of the current state of research on epistemological beliefs, Schommer (2004) called for a new, more integrated approach to understanding epistemological beliefs.

Although the epistemological belief system paradigm contributes to the understanding of personal epistemology, the focus of research is still narrow in scope. There is a need to conceptualize and study epistemological beliefs embedded within other systems. The need for an *embedded systemic model* of epistemological beliefs, that is, a model that includes many other aspects of cognition and affect, comes from the assumption that epistemological beliefs do not function in a vacuum. Indeed, at any given moment, learners' thoughts, actions, or motivations represent the convergence of multiple systems (Schommer, 2004, p. 23)

Schommer (2004) suggests that a variety of "systems" need to be explored regarding epistemological beliefs. These systems include cultural relational views, beliefs about "ways of knowing," classroom performance, self-regulated learning, and two

systems that are typically considered epistemological beliefs: beliefs about knowledge and beliefs about learning (Schommer, 2004). According to Schommer (2004) each of these systems plays a potential role in student learning and motivation, and an understanding of how they work together is important for understanding how epistemological beliefs are developed and maintained.

### *Cultural Relational Views*

Although a number of researchers (Brownlee et al., 2001; Chan, 2003; Chan & Elliot, 2003; Youn, 2000) have examined the importance of culture in the development and nature of epistemological beliefs, Schommer (2004) was the first to propose how culture may interact with and influence the epistemological belief system. Drawing from work in social and cross-cultural psychology, Schommer suggests that epistemological beliefs may be strongly related to the ways in which people tend to interact with each other. This “social” component is likely related to various cultural mores regarding how one views the “self” and how the “self” interacts with others in the immediate environment. For example, one of the ways in which cultures tend to differ can be described by the terms “collectivist” and “individualist.” Individuals in collectivist cultures (such as Japan and China) tend to define themselves in terms of their relationship to the larger social system, such as family, friends, and the larger society (Matsumoto & Juang, 2004). Individuals within a collectivist culture can be described as having an “interdependent self-construal” (Markus & Kitayama, 1991). In contrast, individuals in individualistic cultures (Western societies) tend to define themselves as an independent, autonomous “self,” who is ultimately free from definitions drawing from social relationships. Individuals in individualistic cultures can be described as having an

“independent self-construal” (Markus & Kitayama, 1991), which “is a way of defining oneself in terms of one’s own internal thoughts, feelings, and actions and not in terms of the thoughts, feelings, and actions of others” (Aronson, Wilson, & Akert, 2004, p.143)

According to Schommer (2004), the interdependent and independent self-construal system may have important implications for understanding personal epistemology. There are a number of possible influences of self-construal on educationally relevant outcomes. For example, self-construal may affect how students approach the teacher-instructor relationship. Students may approach knowledge (or opportunities for knowledge) in a manner that is related to their tendencies in social interactions. Is knowledge something that is absorbed from others (handed down from other important people in the social system) or something to be attained through negotiation, individual evaluation, and critical analysis (a process that seems to parallel the epistemological belief of omniscient authority)? If cultural relational views do affect a students’ beliefs about the nature of knowledge and knowledge acquisition, it is important to place the epistemological belief system within the broader framework for understanding how people construct their concepts of self, how they relate to others, and how these relations affect the cognitive activities of thinking and learning.

In one of the first studies of the relationship between cultural relational views and epistemological beliefs, Tasaki (2001) found that whether a student endorsed an independent or interdependent self-construal had important implications for which epistemological beliefs they endorsed. Tasaki (2001) obtained a sample of 692 multiethnic students from a number of universities in the United States. One of the institutions included was the University of Hawaii, a school which has a large population

of Asian and Asian American students. Tasaki (2001) was particularly interested in the possible influence of Asian cultural beliefs such as collectivism (and consequently self-construal) on epistemological beliefs.

Epistemological beliefs were measured using a modified version of Schommer's Epistemological Beliefs Inventory (Schommer, 1990). Tasaki (2001) found a number of significant relationships between self-construal and the epistemological beliefs of *certainty of knowledge, omniscient authority, rigid learning, and innate ability*. Students who endorsed an interdependent self-construal displayed a stronger belief in omniscient authority, certainty of knowledge, rigid learning, and innate ability. Students who endorsed an independent self-construal were more likely to believe that knowledge is uncertain and evolving and to have weaker beliefs in omniscient authority. These findings are significant because the current literature on epistemological beliefs would characterize students with interdependent self-construals (and the consequent epistemological beliefs) as being less sophisticated in their epistemological thinking. Tasaki (2001) suggests that this finding may indicate that western educational systems that promote certain epistemological beliefs may be biased against students from non-western cultures who approach educational experiences with a unique culturally-based epistemology.

Tasaki (2001) provides initial support for the contention that self-construal has important implications for personal epistemology, although the study had a number of limitations. One of the weaknesses was the epistemological beliefs measure. Tasaki (2001) used a modified version of Schommer's instrument and was unable to replicate the factor structure of the original instrument. Also, the composite reliabilities of the

factors were low (.63 for certainty of knowledge, .37 for omniscient authority, .47 for rigid learning, and .42 for innate ability). Another limitation of the study is the lack of connection to educationally relevant outcome measures. Tasaki (2001) suggested a number of educational implications, but did not explore any of these empirically.

### *Ways of Knowing*

Another important system that may be relevant to understanding personal epistemology is the conception of “ways of knowing” (Belensky, Clinchy, Goldberger, & Tarule, 1986/1997; Galotti, Clinchy, Ainsworth, Lavin, & Mansfield, 1999). In the current literature, ways of knowing refer to evaluating and constructing knowledge. In a landmark study Belensky et al., (1986/1997) identified two distinct ways of knowing. The first, *separate knowing*, refers to the tendency to evaluate knowledge in an “objective, analytical, and detached manner” (Galotti et al., 1999, p. 746). In contrast to separate knowing, *connected knowing* refers to the tendency to evaluate things from another person’s point of view and to understand how someone could develop that particular point of view before attempting a thorough evaluation (Galotti et al. 1999). Although it is unclear how ways of knowing relate to conventional notions of epistemological beliefs (i.e. Schommer), Galotti et al. (1999) envisioned ways of knowing as a type of epistemological or cognitive style. Future research is needed to examine whether ways of knowing and epistemological beliefs are overlapping or distinct constructs.

One of Belensky et al.’s (1986/1997) most significant findings was the existences of gender differences in ways of knowing, with women tending to display a preference for connected knowing as opposed to separate knowing. Although the existence of gender differences in ways of knowing continues to provoke controversy (M. K. Ryan & David,

2003), the research on ways of knowing suggests that gender (and the corresponding tendency towards separate or connected knowing) may play a role in student approaches to knowledge. This finding also suggests that gender may be an important variable to consider when examining system influences on personal epistemology.

Like the influence of cultural relational views, ways of knowing may access the epistemological systems through the vehicle of social interactions between the learner and fellow learners or teachers. How this interaction works as well as which epistemological beliefs are most directly affected remain open questions, but the potential for interacting systems appears plausible. Galotti (1999) suggests that there may be many possible connections between ways of knowing and important educational processes. For example, separated and connected knowers may react uniquely to different presentations of information, they may utilize different study strategies when completing educational assignments, and they may experience a different ‘emotional’ response to various types of learning activities (i.e. lectures, discussions, group projects). Research exploring the connections between ways of knowing, epistemological beliefs, and educational settings and activities appear to hold promise for understanding the unique educational experiences of individual students.

*Personal Epistemology, Ways of Knowing, and Self-Construction  
among Hispanic-American Students*

After a thorough review of the literature, only a few studies were discovered that investigated epistemological beliefs among unique cultural groups in North America (Conley et al., 2004; Tasaki, 2001). Because of the possibility of cultural influences on personal epistemology, it is important to examine whether or not the current framework



for epistemological beliefs is appropriate for students from a minority cultural background. In order to examine the possible cultural influences on personal epistemology, this study will explore epistemological beliefs among Hispanic college students in the Southwestern United States. Do Hispanic cultural beliefs influence personal epistemology? World views, cultural beliefs, and so forth may have implications for personal epistemology,. Identifying the unique character of personal epistemology among Hispanic students will not only help further our understanding of the cultural aspects of personal epistemology but it will also hopefully inform culturally responsive educational practice. If Hispanic (or other cultural groups) conceptions of personal epistemology are somewhat unique, educators would certainly benefit from a deeper understanding of how students view knowledge and learning.

Before exploring research regarding Hispanic learning and education, it is important to remember that the conception of ‘Hispanic’ as a unique cultural group is somewhat misleading. It may be more appropriate to use the concept of ‘Hispanic cultural *groups*’ because of the vast diversity among Hispanic groups in the United States (Jeria, 1999). The term “Hispanic” may be more accurately conceived of as a political term rather than a descriptor of a particular ethnic group. Jeria (1999) noted that the term “Hispanic” was used by the United States Bureau of the Census in the 1970’s to refer to the many cultural groups who were descendents of immigrants of Spanish-speaking or Portuguese-speaking countries or who descended from cultural groups who resided in the United States (i.e. Texas) before the creation of this country. For example, “Hispanic” may refer to people with roots from such diverse countries as Mexico, Puerto Rico, Cuba, Guatemala, or other Latin American countries. With the vast number of unique Hispanic

cultural groups in the United States, there is a corresponding diversity in cultural characteristics such as worldviews, belief systems, social structures, political systems, and traditions of history and art.

Another factor that needs to be considered when exploring the possible cultural influences on personal epistemology is the degree of acculturation to the predominant American culture. Perez and Padilla (2000) found that the degree of acculturation to American culture increased linearly across three generations, whereas the degree of commitment to Hispanic cultural orientation decreased across three generations. Although the acculturation to predominant American cultural values was significant, Perez and Padilla (2000) noted that most Hispanic adolescents continued to adhere to Hispanic ‘familial values,’ which refers to a focus on family as the locus of social support as opposed to a more individualistic orientation. In addition to acculturation, it may be possible to differentiate between Hispanic-Americans, with deep roots in the United States, and Hispanic Immigrants, who may have recently immigrated to the country. Considering these vast differences among Hispanic groups it may be difficult to investigate a single Hispanic epistemology. At the same time, the lack of previous research and the great disparity between a variety of Hispanic cultural beliefs and those of the dominant non-Hispanic American society provide a rationale for exploring Hispanic personal epistemology and the possible influences of epistemology on academic studying.

This study will explore the potential differences between Hispanic/Latino students and white/caucasian students on the concepts of ways of knowing (separated vs. connected), self-construal (independent vs. interdependent), and epistemological beliefs.

Singelis (1994) found that white/caucasian students demonstrated a tendency toward independent self-construal, whereas Asian-American students demonstrated a tendency towards interdependent self-construal. Singelis (1994) suggests that there may be differences in self-construal among minority groups in U.S. culture. For example, Singelis (1994) noted that the emphasis on familial values among many Hispanic/Latino cultural groups may influence the development of an interdependent self-construal. With regards to the possible cultural influences on ways of knowing, Singelis (1994) found no published studies investigating possible cultural differences. However, it seems reasonable to expect that culture, in addition to gender, may play a role in whether one tends towards a 'connected' or 'separate' way of knowing.

Although differences in ways of knowing and self-construal between Hispanic/Latino and white/caucasian students may be an important question in itself, this study will also explore the possible implications of these differences on educationally related variables such as epistemological beliefs and academic studying. The influence of culture on the educational experience of students from ethnic minority groups is a well-discussed topic in educational research (Grossman, 1995; Portes, 1996). A number of studies have investigated the possibility of differences among ethnic groups in such constructs as motivation, learning styles, cognitive styles, patterns of relationships, and perceptual tendencies.

Although little research has been conducted on the role of culture in epistemological beliefs, the relationship between culture and learning styles has been explored in a number of studies (Griggs & Dunn, 1996; Hilberg & Tharp, 2002). At the present time, there appears to be no universally accepted definition of learning style.

Most researchers describe learning style as a preferred learning strategy or cognitive style that influences the way students process information and interpret learning tasks (Hilberg & Tharp, 2002). Research on learning styles continues to be problematic because of the sheer number of learning styles proposed, the problems of developing reliable and valid measures of learning styles, and the vastly different terminology used by learning style researchers from various academic disciplines (Hilberg & Tharp, 2002; Sternberg & Grigorenko, 1997). Still, a number of authors have investigated the differences in learning styles among students of various cultures.

Griggs and Dunn (1996) have summarized some of the unique cultural values and learning styles identified in Hispanic-American students. One of the most important cultural values that Griggs and Dunn (1996) mention as an important consideration for learning is a strong sense of family commitment, “which involves loyalty, a strong support system, a belief that a child’s behavior reflects on the honor of the family, a hierarchical order among siblings, and a duty to care for family members” (Griggs & Dunn, 1996, p. 2). This commitment to family seems to run counter to the mainstream American commitment to individualism (Griggs & Dunn, 1996; Perez & Padilla, 2000), and may have implications for ways in which Hispanic-American students construe the self (independent vs. interdependent).

Griggs and Dunn (1996) also describe research demonstrating a number of unique learning styles of Hispanic-American students. Studies reviewed by Griggs and Dunn (1996) suggest the Hispanic-American students tend to prefer collaborative learning situations rather than individual learning situations and may be more ‘conforming’ than students from other ethnic groups. Also, Hispanic-American students, and particularly

Mexican-American students, may be more 'field dependent' in psychological processing than non-minority students. According to Griggs and Dunn (1996), "field dependent students are more group-oriented and cooperative and less competitive than field independent students" (p. 3). In their review of the research, Griggs and Dunn (1996) failed to describe the theoretical rationale for the various differences in learning styles, although other researchers have also claimed to find a general preference for collaborative learning contexts among Hispanic students (Grossman, 1995). Also, much of the research on cultural differences in learning style is hampered by the controversial nature of the learning style construct (Sternberg & Grigorenko, 1997), difficulties in measurement, as well as the generally poor quality of research in the area. For example, many of the studies reviewed by Griggs and Dunn (1996) consist of dissertation research or other unpublished research. Rarely does research on learning styles appear in the more rigorous peer-reviewed journals in education and educational psychology. Despite these limitations, the possibility of cultural differences in learning styles provides support for cultural differences in personal epistemology. In this study, I hope to contribute to answering this question by investigating the possible differences between Hispanic-American and white/caucasian students in the areas of epistemological beliefs, ways of knowing, and self-construal.

Although learning style and epistemological beliefs are very different constructs, there may be some overlap between particular learning style characteristics and epistemological beliefs. For example, the preference for a collaborative versus a competitive (or individualistic) learning situation may also have connections to the epistemological belief of omniscient authority or the 'connected' way of knowing. With

the emerging research noting the differences in the structure of epistemological beliefs in collectivist cultures (Chan, 2003; Chan & Elliot, 2003; Youn, 2000), differences in personal epistemology, rooted in unique cultural experiences, may be present in Hispanic-American students.

### *Research Questions*

This study is guided by two research questions. First, what is the underlying structure of epistemological beliefs in a unique cultural group in North America, particularly Hispanic-American college students? Are current conceptualizations of epistemological beliefs identified in studies with white/caucasian undergraduates (Schommer, 1990; Schraw et al., 2002) applicable to Hispanic-American college students, or do underlying dimensions of epistemological beliefs differ in a particular cultural setting, as implied by recent work with Asian samples (Chan, 2003; Chan & Elliot, 2003; Tasaki, 2001; Youn, 2000). Based on the current literature emphasizing the differences between the worldviews of the dominant culture and Hispanic-Americans (Perez & Padilla, 2000; Reyhner & Jacobs, 2002), the following hypotheses are offered. These hypotheses should be considered extremely tentative considering the lack of research on cultural differences in personal epistemology and the likely differences in the structure of epistemological beliefs.

1. Because of the emphasis on family in many Hispanic cultures (Perez & Padilla, 2000), Hispanic-American students will endorse epistemological beliefs regarding authority that differ from those of white/Caucasian students. Specifically, Hispanic-American students will score higher on measures of Omniscient Authority compared to other students.

The hypothesis that Hispanic-American students will endorse different views regarding authority was derived primarily the emphasis on ‘familial values’ inherent in many Hispanic cultures and the possible similarity between this particular cultural value and the values of collectivist cultures (Matsumoto & Juang, 2004). In addition, Hispanic-American students prefer a more collaborative rather than competitive educational environment (Griggs & Dunn, 1996; Grossman, 1995; Hilberg & Tharp, 2002). As Schommer (2004) suggests, students who approach social situations with a stance toward enhancing collaboration may be less willing to ‘challenge’ the pronouncements of authorities (i.e. textbooks, instructors).

The second research question addresses how epistemological beliefs affect academic studying when examined along with systems that may interact with epistemology, such as cultural relational views and ways of knowing (Schommer, 2004)? This question seeks to answer the call for studies into complex interactions of variables related to studying (Nist & Simpson, 2000; Pintrich, 2002; M. K. Ryan & David, 2003; Schommer, 2004) by investigating the interaction of the epistemological belief system with other systems that affect views of self, social interactions, and tendencies to evaluate knowledge. In order to examine these relationships, a model of epistemology and academic studying was adapted from the ideas of Schommer (2004) (See Figure 2). Specifically, the following relationships were proposed in the model of epistemology and academic studying.

1. Cultural relational views, as measured by independent and interdependent self-construal, will be significantly related to personal epistemology (both epistemological beliefs and ways of knowing). Students who endorse an

independent self-construal will display more sophisticated epistemological beliefs regarding omniscient authority, certainty of knowledge, and innate ability, whereas those who endorse an interdependent self-construal will display less sophisticated beliefs regarding omniscient authority.

2. Cultural relational views will be significantly related to ways of knowing. Specifically, independent self-construal will be related to separate knowing, and interdependent self-construal will be related to connected knowing.

This hypothesis emerges from Schommer's (2004) notion that how one approaches social interactions may also be relevant to how one relates to knowledge and learning situations. Students with an interdependent self-construal may be less likely to critically examine knowledge presented by someone in authority. If knowledge remains unchallenged (because of the social implications), it is likely that over time the student will conceive of knowledge as largely handed down from those in authority rather than obtained through critical thinking and negotiation.

3. Hispanic-American students will score higher than white/caucasian students on a measure of interdependent self-construal. Conversely, white/caucasian students will score higher than Hispanic-American students on a measure of independent self-construal.

These hypotheses were derived from the findings of Singelis (1994) indicating differences in self-construal that originate in underlying cultural beliefs.



4. Epistemological beliefs will be significantly related to study processes.

Students who endorse more sophisticated epistemological beliefs--that is those who believe that knowledge is changing rather than certain (certain knowledge), that learning takes time and effort rather than happens quickly (quick learning), and that ability is changeable rather than fixed (innate ability)-- will be more likely to endorse a *deep approach* to academic studying (emphasis on understanding) as opposed to a *surface approach* to academic studying (emphasis on memorizing the correct answers) (Biggs, 1987). Connections between the other variables examined in this study (ways of knowing, self-construal) and study processes will also be examined.

5. Epistemological beliefs will be significantly related to socioeconomic status (SES) (Conley et al., 2004). Students classified as lower SES will display less sophisticated epistemological beliefs than students who are classified as high SES.

Although findings in the literature and Schommer's (1994) theoretical model have guided the preceding hypotheses, this study is primarily exploratory. The concept of epistemological beliefs has been developed primarily using North American college students as research participants. Although research is emerging that examines the cross-cultural applications of epistemological beliefs (Chan, 2003; Chan & Elliot, 2003; Youn, 2000), a literature review revealed no studies on the nature of epistemological beliefs among Hispanic students in the United States. There may very well be unique conceptions of personal epistemology depending on cultural background, and if so it is

important to identify these unique conceptions as well as the possible contributing variables that may impact the development of unique, culturally-based, personal epistemologies.

In addition to the specific hypotheses described above, the possible influence of gender will also be explored in this study. In their original work, Belensky et al. (1986) explored ways of knowing among women, and subsequent research (Galotti et al., 1999) has supported gender differences in ways of knowing, with men more likely to endorse separate knowing and women more likely to endorse connected knowing. For the other variables explored in this study (epistemological beliefs, self-construal), there has been little mention of gender as a variable in previous research. In this study, the influence of gender on each of these variables will be explored.

## Chapter III

### Method

#### *Selection of Participants*

Faculty members at three community colleges were contacted and asked to participate. Because of the need to obtain a sample that included both Hispanic-American and white students, campuses with varying degrees of diversity were sampled. Two community colleges in the Midwest were sampled in addition to a community college in the southwestern United States that was approximately 85% Hispanic.

#### *Participants*

Participants were recruited from a variety of courses in the disciplines of psychology, sociology, philosophy, and physical education. All questionnaires were completed during class time. Class sizes ranged from 8 to approximately 50 students. Instructors were provided with a list of instructions for completing the questions and were asked to follow a standardized protocol for distributing and collecting the questionnaires in order to ensure confidentiality of responses. Instructors were allowed to offer extra credit for participation, although all instructors chose not to.

#### *Materials*

*Epistemological Beliefs Inventory (EBI)*. Epistemological beliefs were assessed with a questionnaire developed by Bendixen et al. (1998) (*See Appendix C*). This is a 32-item Likert-type questionnaire that measures Schommer's (1990) five epistemic factors. On the questionnaire, students respond to each of the 32 statements by circling a number on a five-point Likert scale, with 1 corresponding to "strongly disagree" and 5 corresponding to "strongly agree."

Very little psychometric data are available on the Epistemological Beliefs Inventory. However, the Epistemological Beliefs Inventory is closely related to a second instrument called the Epistemic Beliefs Inventory (Schraw et al., 2002). The Epistemic Beliefs Inventory consists of 24 of the 32 items on the Epistemological Beliefs Inventory and four new items. It consists of five factors: (a) Omniscient Authority (coefficient  $\alpha = .68$ ), (b) Certain Knowledge (coefficient  $\alpha = .62$ ), (c) Quick Learning (coefficient  $\alpha = .58$ ), (d) Simple Knowledge (coefficient  $\alpha = .62$ ), and (e) Innate Ability (coefficient  $\alpha = .62$ ). Test-retest correlations after a one-month interval were  $r = .66, .81, .66, .64,$  and  $.62$  for each of the five factors (Schraw et al., 2002).

The Epistemological Beliefs Inventory was acquired from Schraw before the initial conceptualization of this study. Although it appears that the Epistemic Beliefs Inventory is a descendent of the Epistemological Beliefs Inventory, the study was conducted under the assumption that the instruments were the same and that the psychometric data from Schraw et al. (2002) were applicable to the instrument used in this study. Although the instruments shared 24 of the 32 items, it is a different instrument and it is inappropriate to assume that the reliabilities from the Epistemic Beliefs Inventory will apply to the older Epistemological Beliefs Inventory. The factors are the same, with the exception of Innate Ability, which is called Fixed Ability in the older instrument.

*Attitudes Towards Thinking and Learning Survey (ATTLS)*. Galotti et al. (1999) developed the ATTLS in order to measure tendencies towards separate and connected knowing. The ATTLS is a 20-item questionnaire which asks participants to rate their level of agreement with various statements on a 7-point Likert scale (1 = strongly disagree, 4 = neither agree nor disagree, 7 = strongly agree). Examples of statements reflecting separate knowing include (a) "It's important for me to remain as objective as possible when I analyze something", and (b) "I have certain criteria I use in evaluating arguments." Examples of statements reflecting connected knowing include (a) "When I encounter people whose opinions seem alien to me, I make a deliberate effort to 'extend' myself into that person, to try to see how they could have those opinions," and (b) "I try to think with people rather than against them." The full scale is included in Appendix C.

Galotti (1999) obtained adequate internal consistency reliability for a sample of 255 college students, with an alpha of .83 for the connected knowing scale and .77 for the separate knowing scale. In addition, ways of knowing refers to cognitive styles or learning styles rather than intellectual abilities or capacities. No significant correlations were found between ways of knowing and measures of recall memory, distortion of memory, reasoning, or nonverbal intelligence (Galotti et al., 1999).

*Self-Constructal Scale (SCS)*. The SCS (Singelis, 1994) is a 24-item paper-and-pencil measure of independent and interdependent self-construals (See Appendix C). The scale presents 24 statements containing a 7-point Likert-type response format (1=strongly disagree, 7=strongly agree). Each statement purportedly assesses either thoughts, feelings, or actions that indicate the presence of an independent or interdependent self-construal. The scale was initially validated on a multi-ethnic sample of (N=364)

undergraduates (Singelis, 1994). In this initial sample, Cronbach alpha reliabilities were .69 for the independent subscale and .73 for the interdependent subscale. For a second sample (N=165) reported by Singelis (1994), Cronbach alpha reliabilities were .70 for the independent subscale and .74 for the interdependent subscale. The self-construal scale appears to be a valid indicator of differences in self-construal between students from different cultures. White students scored significantly higher than Asian-American students on the independent dimension, whereas Asian-American students scored significantly higher than white students on the interdependent dimension (Singelis, 1994).

*The Shortened Study Process Questionnaire (Fox, McManus, & Winder, 2001).*

To assess the possible implications of differences in epistemological beliefs, ways of knowing, and self-construal on study strategies, the shortened Study Process Questionnaire was administered (See Appendix C). This instrument is based on the 42-item Study Process Questionnaire (SPQ) developed by Biggs (1987). Biggs developed the SPQ to measure three different approaches to studying that students typically employ. The deep approach is characterized by an active seeking of understanding when confronted with a study situation, whereas the surface approach refers to a tendency to rely on rote learning and memorization of facts and ideas that the student deems important. The SPQ also assesses the Achieving approach, which refers to the tendency to use any strategy necessary in order to achieve high grades and to compete successfully with others. In addition to the three approaches, the SPQ also measures two dimensions of each approach: motivation and process (strategy). For example, a surface motive might be a fear of failure, and a deep motive might be interest in the subject. A surface strategy

would be rote learning of facts and ideas, whereas a deep strategy would be to relate ideas to evidence.

Fox, McManus, and Winder (2001) developed the Shortened Study Process Questionnaire for the purpose of providing a shorter scale measuring each of the study approaches that would be useful for research purposes. The result is an 18-item questionnaire that successfully measures each of the six subscales of the SPQ (surface motive, surface strategy, deep motive, deep strategy, achieving motive, achieving strategy) (see Appendix C). The Shortened SPQ demonstrated the same first order factor structure as the 42-item SPQ in a longitudinal study of 1349 British medical students (Fox et al., 2001). Cronbach alpha reliability values for the sample at the conclusion of the study were .32 for surface motivation, .62 for surface strategy, .75 for deep motivation, .55 for deep strategy, .76 for achieving motivation, and .70 for achieving strategy. Despite the limitations in reliability for some of the scales, the authors suggest that the shortened SPQ should be adequate for research use, particularly when a short measure of study approaches is needed. Because of the many scales included in this particular study and the need for a short questionnaire, the shortened SPQ was judged to be an adequate instrument.

*Background Information.* Students completed a questionnaire measuring a variety of demographic variables, including year in college, age, gender, country of birth, primary language, ethnicity, educational level of parents, presence of a learning disability, and religious participation.

### *Procedure*

Data were collected by either this researcher or faculty members at each of the colleges. The purpose of the study was explained and students were assured of confidentiality. Signed informed consent forms were not collected; however, consent was implied by turning in the completed questionnaires. Students were given a packet containing a demographic information sheet and a number of paper-and-pencil instruments to be completed during class. During the session, students completed the *Attitudes Towards Thinking and Learning Survey* (Galotti et al., 1999), the *Epistemological Beliefs Inventory* (Bendixen et al., 1998), the *Self-Constructual Scale* (Singelis, 1994), and the *Shortened Study Process Questionnaire* (Fox et al., 2001). Questionnaires were turned in to the researcher or faculty member upon completion, with most students taking 20-40 minutes to complete the packet.



## Chapter IV

### Results

The results are organized into four sections. The first section provides descriptive statistics for the sample. The second section addresses the factor structure of the Epistemological Beliefs Inventory. The third section examines the influence of gender and ethnicity on each of the dependent measures, and the fourth section describes a test of a model of relationships among the variables.

#### *Descriptive Statistics*

Questionnaires were collected from a total of 341 students at three community colleges. Two of the community colleges were located in the Midwestern United States ( $N = 201$ ) and one college was located in the Southwestern United States ( $N = 140$ ). The sample consisted of 118 men and 223 women. Of the entire sample, 96.5% reported that they were either freshman or sophomores in college, and 82% fell between the ages of 18 and 22. The mean age for the sample was 21.79, and the standard deviation was 7.17. A grouped frequency table is presented in Table 1. Self-reported ethnicity included 3 Asian, 162 Hispanic/Latino, 14 African-American, 148 White/Caucasian, 3 Native American, and 10 Other. Because of missing values, some analyses were conducted using fewer than 341 cases.

Table 1

*Age of Participants at Time of Study (N = 338)*

<u>Age Interval</u>	<u>n</u>	<u>%</u>
18-22	277	82.0
23-27	25	7.4
28-32	7	2.1
33-37	6	1.8
38-42	7	2.1
43-49	12	3.6
50-55	3	0.9
56-60	1	0.3

Intercorrelations between each of the variables in the study are displayed in Table 2. A number of significant correlations were found; many of these correlations will be discussed later in the results section. The significant correlation between connected knowing and separate knowing ( $r = .23, p < .01$ ) is especially interesting. Gallotti et al. (1999) did not find a significant correlation between connected knowing and separate knowing in their sample, suggesting that connected knowing and separate knowing represent independent ways of knowing. The significant correlation found in this sample is similar to the correlation ( $r = .29, p < .001$ ) reported by Ryan and David (2003) in a recent study of 267 Australian undergraduates.

#### *Factor Structure of the Epistemological Beliefs Inventory*

Preliminary analyses of coefficient alpha of the subscale scores of the instruments used in this study indicated possible problems with the *Epistemological Beliefs Inventory*. Coefficient alphas for the five subscales were much lower than expected (Bendixen et al., 1998; Schraw et al., 2002). Using the original subscales specified by the instruments

authors, the alphas were .39 for Omniscient Authority, .17 for Certain Knowledge, .55 for Quick Learning, .31 for Simple Knowledge, and .59 for Fixed Ability. Subsequent confirmatory and exploratory factor analyses also indicated problems with the instruments. Because of the difficulties, the subscales of the *Epistemological Beliefs Inventory* were computed using items specified by Bendixen et al. (1998). This resulted in subscales with fewer items. The coefficient alphas for these subscales are reported in Table 2. Using the shortened subscales resulted in improved alphas for Certain Knowledge and Simple Knowledge, and decreased alphas for Omniscient Authority, Quick Learning, and Fixed Ability. All subsequent analyses were conducted using the shortened subscales.

Table 2

*Intercorrelations and Coefficient Alphas for Scores on the Epistemological Belief Inventory, Attitudes Towards Thinking and Learning Survey, Self-**Construal Scale, and the Shortened Study Process Questionnaire*

Measure	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. OA	<b>.21</b>														
2. CK	.16**	<b>.57</b>													
3. QL	-.02	.34**	<b>.31</b>												
4. SK	.17**	.19**	.10	<b>.49</b>											
5. FA	.04	.32**	.28**	.27**	<b>.57</b>										
6. ConK	.12*	-.01	-.17**	.08	-.03	<b>.84</b>									
7. SepK	-.02	.28**	.01	-.02	.21**	.23**	<b>.83</b>								
8. Ind	.08	-.03	-.04	.11	.01	.20**	.07	<b>.81</b>							
9. Inter	.17**	.07	-.02	.14*	.00	.26**	-.01	.45**	<b>.77</b>						
10. SM	.13*	.10	-.13	.19**	-.05	.24**	.08	.10	.21**	<b>.45</b>					
11. SS	.14*	.20**	.15**	.22**	.16**	.01	.10	.08	.18**	.32**	<b>.48</b>				
12. DM	.17**	.16**	-.19**	-.06	.08	.27**	.27**	.16**	.16**	.30**	.18**	<b>.69</b>			
13. DS	.03	.17**	-.16**	.05	.15**	.34**	.29**	.19**	.18**	.45**	.21**	.51**	<b>.55</b>		
14. AM	.20**	.03	-.24**	.09	.05	.31**	.11	.16**	.23**	.51**	.27**	.45**	.46**	<b>.72</b>	
15. AS	.10	.08	-.11*	.08	.10	.32**	.05	.04	.07	.34**	.25**	.43**	.33**	.51**	<b>.61</b>

**Note.** Coefficient Alphas are presented in boldface along the diagonal. OA = omniscient authority; CK = certain knowledge; QL = quick learning; SK = simple knowledge; FA = fixed ability; ConK = connected knowing; SepK = separate knowing; Ind = independent self-construal; Inter = interdependent self-construal; SM = surface motive; SS = surface strategy; DM = deep motive; DS = deep strategy; AM = achieving motive; AS = achieving strategy.

\*  $p < .05$ . \*\*  $p < .01$

In order to examine the underlying factor structure of the *Epistemic Beliefs Inventory* (EBI), a Confirmatory Factor Analysis was conducted using LISREL 8.7 (Joreskog & Sorbom, 1996). Missing values in the data set were replaced with the means of the variable for the sample. A five-factor model proposed by Bendixen et al. (1998) was tested for goodness of fit. The five-factor model of epistemological beliefs consisted of the latent variables Omniscient Authority, Simple Knowledge, Certain Knowledge, Quick Learning, and Fixed Ability. The five-factor model did not fit the data well ( $N = 337$ ), with a Goodness of Fit index of .74 and an Adjusted Goodness of Fit index of .70. The Root Mean Square Residual (RMSR) was 5.84. For this sample, it appears that the EBI failed to measure the five components of epistemic beliefs identified in previous research using the instrument.

Because of the poor fit of sample data to the measurement model of the EBI, a principal components analysis was conducted (Stevens, 2002). The number of factors was determined by examination of the scree plot. A total of three factors emerged in the principal components analysis. After varimax rotation, Factor 1 accounted for 12.6 % of the variance, Factor 2 accounted for 9.7 % of the variance, and Factor 3 accounted for 6.4 %. Although three factors emerged, no clear conceptual structure was identified. Other methods of exploratory factor analyses were attempted (principal axis factoring, oblimin rotations), however, the problems with factor structure remained and the instrument appeared to lack a clear factor structure. In light of these difficulties, items Bendixen et al. (1998) recommended were used to form shortened subscales of the five epistemological beliefs factors.

### *Influence of Gender and Ethnicity on the Dependent Measures*

A number of specific hypotheses regarding differences between Hispanic American students and white/caucasian students were evaluated. These hypotheses included:

1. Hispanic American students will score higher on a measure of omniscient authority compared to white/caucasian students.
2. Hispanic American students will score higher on a measure of interdependent self-construal.
3. White/caucasian students will score higher on a measure of independent self-construal.

In order to test these hypotheses and examine other possible differences, a series of two-way multivariate analyses of variance (MANOVA) were conducted with gender and ethnicity as independent variables and the subscales of the Self-Construal Scale, the *Attitudes Towards Thinking and Learning Survey*, and the Epistemological Beliefs Inventory as dependent variables. Means, standard deviations, and multivariate analyses are included in Tables 3-8. The effect of gender was particularly interesting because of previous research noting gender differences in ways of knowing (Belensky et al., 1986/1997). Because of the predominance of Hispanic and white/caucasian students in the sample, only students who self-reported their ethnicity as Hispanic/Latino or white/caucasian were included in the subsequent analyses.

#### *Self-Construal Scale*

Means and standard deviations are reported in Table 3. For the subscales of the self-construal scale (Independent and Interdependent), no significant main effects or

interaction effects were found. Hypotheses 2 and 3 were not supported by the current data.

Table 3

*Mean Scores and Standard Deviations for Self-Construal as a Function of Gender and Ethnicity*

Group	Self-Construal Scale					
	<u>Independent</u>			<u>Interdependent</u>		
	<u>N</u>	<u>M</u>	<u>SD</u>	<u>N</u>	<u>M</u>	<u>SD</u>
White						
Male	56	61.6	11.0	56	58.4	10.6
Female	86	63.0	10.6	86	59.8	8.9
Hispanic						
Male	40	60.7	14.3	40	60.4	12.3
Female	112	61.2	11.0	112	60.5	10.5

Table 4

*Multivariate and Univariate Analyses of Variance F Ratios for Gender x Ethnicity Effects for Self-Construal*

Variable	ANOVA		
	<u>MANOVA</u>	<u>Independent</u>	<u>Interdependent</u>
	<u>F (2, 289)</u>	<u>F (1, 289)</u>	<u>F (1, 289)</u>
Gender (G)	.267	.432	.338
Ethnicity (E)	1.85	.878	1.18
G x E	.141	.104	.272

Note. F ratios are Wilks' Lamda.

*Attitudes Towards Thinking and Learning Survey*

For the *Attitudes Towards Thinking and Learning Survey*, a significant multivariate main effect was found for gender, Wilks's Lambda = .88,  $F(2, 268) = 19.10$ ,  $p < .001$ . The multivariate eta squared = .12, indicating that 12% of multivariate variance of the dependent variables is associated with the gender factor. A univariate ANOVA indicated that for connected knowing, there was a significant difference between men ( $M = 48.8$ ,  $SD = 9.3$ ) and women ( $M = 53.7$ ,  $SD = 8.8$ ),  $F(1, 269) = 15.65$ ,  $p < .001$ ,  $MS = 1273.27$ ,  $\eta^2 = .06$ . A univariate ANOVA also indicated that for separate knowing, there was a significant difference between men ( $M = 44.8$ ,  $SD = 9.1$ ) and women ( $M = 41.0$ ,  $SD = 9.8$ ),  $F(1, 269) = 9.75$ ,  $p < .001$ ,  $MS = 896.69$ ,  $\eta^2 = .04$ . The multivariate main effects of ethnicity and the Gender x Ethnicity interaction were not significant. For separate knowing, neither the main effect nor the interaction effect was significant.

Table 5

*Mean Scores and Standard Deviations for Ways of Knowing as a Function of Gender and Ethnicity*

Group	Ways of Knowing					
	Connected			Separate		
	<u>N</u>	<u>M</u>	<u>SD</u>	<u>N</u>	<u>M</u>	<u>SD</u>
White						
Male	50	48.2	8.7	50	44.4	9.4
Female	88	54.1	8.9	88	39.5	10.1
Hispanic						
Male	32	49.7	10.4	32	45.5	8.8
Female	103	53.4	8.8	103	42.3	9.5



Table 6

*Multivariate and Univariate Analyses of Variance F Ratios for Gender x Ethnicity Effects for Ways of Knowing*

Variable	MANOVA F (2, 268)	ANOVA	
		Separate Knowing F (1, 269)	Connected Knowing F (1, 269)
Gender (G)	19.10**	9.75*	15.65**
Ethnicity (E)	1.13	2.24	.09
G x E	.86	.39	.83

Note. F ratios are Wilks' Lamda.

\* $p < .01$ , \*\* $p < .001$

#### *Epistemological Beliefs Inventory*

Means and standard deviations, as well as results of the MANOVA are summarized in Tables 7 and 8. The MANOVA was significant for both gender and ethnicity, whereas the interaction of Gender x Ethnicity was not significant. Univariate ANOVAs indicated that there were significant differences between men and women on Certain Knowledge, Quick Learning and Fixed Ability. For Certain Knowledge, men ( $M = 11.0$ ,  $SD = 2.8$ ) were significantly higher than women ( $M = 9.9$ ,  $SD = 2.7$ ),  $MS = 95.24$ ,  $\eta^2 = .05$ . For Quick Learning, men ( $M = 4.4$ ,  $SD = 1.6$ ) were significantly higher than women ( $M = 3.8$ ,  $SD = 1.3$ ),  $MS = 25.09$ ,  $\eta^2 = .04$ . For Fixed Ability, men ( $M = 12.1$ ,  $SD = 2.3$ ) were significantly higher than women ( $M = 11.2$ ,  $SD = 2.3$ ),  $MS = 47.93$ ,  $\eta^2 = .03$ .

The MANOVA was also significant for ethnicity. Univariate ANOVAS indicated that there were significant differences between Hispanic/Latino students and white/caucasian students on the subscales of Certain Knowledge (Hispanic:  $M = 11.0$ ,  $SD$

= 2.9; White:  $M = 9.6$ ,  $SD = 2.6$ ),  $MS = 143.34$ ,  $\eta^2 = .07$ , and Quick Learning (Hispanic:  $M = 4.2$ ,  $SD = 1.6$ ; White:  $M = 3.9$ ,  $SD = 1.2$ ),  $MS = 13.97$ ,  $\eta^2 = .02$ .

Although significant differences were found for these subscales, the hypothesis that Hispanic/Latino students would score higher on a measure of Omniscient Authority was not supported.

In addition to the main effects, the interaction of Gender x Ethnicity was significant for Quick Learning. The difference between mean scores of men and women were greater for Hispanic/Latino students (Men:  $M = 4.9$ ,  $SD = 1.9$ ; Women:  $M = 3.9$ ,  $SD = 1.4$ ) than for white/caucasian students (Men:  $M = 4.0$ ,  $SD = 1.3$ ; Women:  $M = 3.8$ ,  $SD = 1.2$ ). Means are reported in Table 7.

Table 7

*Mean Scores and Standard Deviations for Epistemological Beliefs Inventory as a Function of Gender and Ethnicity*

	Epistemological Beliefs Inventory														
	<u>Simple Knowledge</u>			<u>Certain Knowledge</u>			<u>Omniscient Authority</u>			<u>Quick Learning</u>			<u>Fixed Ability</u>		
	<u>N</u>	<u>M</u>	<u>SD</u>	<u>N</u>	<u>M</u>	<u>SD</u>	<u>N</u>	<u>M</u>	<u>SD</u>	<u>N</u>	<u>M</u>	<u>SD</u>	<u>N</u>	<u>M</u>	<u>SD</u>
White															
Male	52	9.8	2.29	52	10.3	2.4	52	7.1	1.5	52	4.0	1.3	52	11.8	2.0
Female	88	10.2	1.9	88	9.1	2.6	88	7.6	1.3	88	3.8	1.2	88	11.5	2.3
Hispanic															
Male	40	9.7	2.3	40	11.9	3.2	40	7.5	1.7	40	4.9	1.9	40	12.4	2.7
Female	105	9.6	2.0	105	10.6	2.7	105	7.3	1.5	105	3.9	1.4	105	11.0	2.3

Table 8

*Multivariate and Univariate Analyses of Variance F Ratios for Gender x Ethnicity for the Epistemological Beliefs Inventory*

Variable	Epistemological Beliefs					
	<u>MANOVA</u>	<u>Certain Knowledge</u>	<u>Simple Knowledge</u>	<u>Omniscient Authority</u>	<u>Quick Learning</u>	<u>Fixed Ability</u>
	<u>F(5, 277)</u>	<u>F(1, 281)</u>	<u>F(1, 281)</u>	<u>F(1, 281)</u>	<u>F(1, 281)</u>	<u>F(1, 281)</u>
Gender (G)	5.10***	13.4***	.22	.37	12.78***	8.79**
Ethnicity (E)	5.52***	20.2***	1.67	.01	7.01**	.01
G x E	2.21	.00	1.11	2.98	4.6*	3.59

Note. F ratios are Wilks's lambda.

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

*Additional analyses of ethnicity and self-construal*

Although the effect of ethnicity on self-construal was not significant, additional analyses of the effects of cultural background on self-construal were conducted. Students were asked four questions that may indicate the degree of influence of the culture of their country of origin. These questions asked a) whether or not English was their first language, b) whether English was the primary language in the home, c) whether they were born in another country, and d) whether their parents were born in another country? Correlations between these variables and relevant dependent measures are included in Table 9. As predicted, the questions that indicated a greater possible influence of the country of origin (i.e. born in another country) were significantly related to interdependent self-construal. In contrast, none of the correlations with independent self-

construal were significant. This finding indicates that measures of “acculturation” or “assimilation” need to be considered when exploring the possible effects of ethnicity on personal epistemology.

Table 9

*Intercorrelations for Measures of Acculturation and Ways of Knowing, Self-Construal, and Parent Education*

Measure	1	2	3	4	5	6	7	8	9
1. English 1 <sup>st</sup> language?	1.0								
2. English primary language in home?	.81**	1.0							
3. Born in another country?	-.61**	-.58**	1.0						
4. Parents born in another country?	-.75**	-.81**	.54**	1.0					
5. Separate Knowing	-.20**	-.16**	.23**	.15*	1.0				
6. Connected Knowing	-.14*	-.12*	.13*	.12*	.23**	1.0			
7. Interdependent self-construal.	-.14*	-.08	.12*	.12*	-.01	.26**	1.0		
8. Independent self-construal.	.02	-.00	-.06	-.04	.07	.20**	.45**	1.0	
9. Parent Education	.37**	.44**	-.26**	-.40**	-.05	-.05	.06	.10	1.0

\* $p < .05$ ; \*\* $p < .01$

*Relationships between Self-Construal, Ways of Knowing, Epistemological Beliefs, and Study Processes.*

A number of specific hypotheses were offered regarding relationships between self-construal, ways of knowing, epistemological beliefs, and study processes. These hypotheses include:

*Hypothesis: Students who endorse an independent self-construal will display more sophisticated epistemological beliefs regarding omniscient authority, certainty of knowledge, and innate ability, and ways of knowing, whereas those who endorse an interdependent self-construal will display less sophisticated beliefs regarding omniscient authority.*

This hypothesis was tested by conducting one-tailed, independent samples *t*-tests comparing mean epistemological belief scores of those students who were “hi” or “low” on independent and interdependent self-construal. Students were classified as either “hi” or “low” by using a median-split procedure. Because one-tailed *t*-tests were selected, the critical value of *t* was set at 1.645. For independent self-construal, no significant differences were found between “hi” and “low” students on any of the scores on the EBI. For Simple Knowledge,  $t(325) = 1.37, p > .05$ , for Certain Knowledge,  $t(328) = .18, p > .05$ , for Quick Learning,  $t(330) = -1.35, p > .05$ , for Omniscient Authority,  $t(327) = 1.32, p > .05$ , and for Fixed Ability,  $t(328) = .69, p > .05$ . The hypothesis that those students who endorse an independent self-construal will endorse more sophisticated epistemological beliefs was not supported in this study.

For interdependent self-construal, significant differences were found between students classified as “hi” or “low” on the epistemological beliefs of Certain Knowledge,  $t(328) = 2.18, p < .05$ , Omniscient Authority,  $t(327) = 2.41, p < .05$ , and Simple Knowledge,  $t(325) = 1.80, p < .05$ . For Certain Knowledge, students classified as “low interdependent” scored significantly lower ( $M = 10.05, SD = 2.69$ ) than students classified as “high interdependent” ( $M = 10.75, SD = 3.16$ ). The effect size  $d$  was .24, which is considered a “small” effect (Hurlburt, 2003). For Omniscient Authority, students classified as “low interdependent” scored significantly lower ( $M = 7.2, SD = 1.5$ ) than those classified as “high interdependent” ( $M = 7.6, SD = 1.5$ ). The effect size index  $d$  was .27, which is considered a “small” effect (Hurlburt, 2003). This finding provides support for the idea that self-construal is related to views of authority. For Simple Knowledge, students classified as “low interdependent” scored significantly lower ( $M = 9.7, SD = 2.2$ ) than those classified as “high interdependent” ( $M = 10.1, SD = 2.0$ ). The effect size index  $d$  was .19, which is considered a “small” effect (Hurlburt, 2003). No significant differences were found for Quick Learning,  $t(330) = -.001, p > .05$ , or Fixed Ability,  $t(328) = .29, p > .05$ .

In addition to the epistemological beliefs measured by the EBI, differences in ways of knowing between “hi” and “low” interdependent and independent students were examined. For connected knowing, a significant difference was found between “hi” interdependent students and “low” interdependent students,  $t(313) = 4.38, p < .001$ . The “hi” interdependent students scored significantly higher ( $M = 54.18, SD = 8.90$ ) on connected knowing than the “low” interdependent students ( $M = 49.73, SD = 9.13$ ). The effect size index  $d$  was .48, which is considered a “medium” effect (Hurlburt, 2003). The

difference between “hi” and “low” independent students on connected knowing was also significant,  $t(311) = 2.39, p < .05$ . The “hi” independent students scored significantly higher ( $M = 53.23, SD = 9.52$ ) on connected knowing than the “low” independent students ( $M = 50.75, SD = 8.85$ ). The effect size index  $d$  was .27, which is considered a “small” effect.

For separate knowing, no significant differences were found for either the interdependent or independent groups. For interdependent self-construal, the difference between the “hi” and “low” groups was not significant,  $t(311) = 1.31, p > .05$ . For the independent self-construal, the difference between the “hi” and “low” groups was not significant,  $t(311) = 1.60, p > .05$ .

*Hypothesis: Independent self-construal will be related to separate knowing, and interdependent self-construal will be related to connected knowing.*

This hypothesis was tested by examining the Pearson correlation coefficients for the respective variables. Significant positive correlations were found between connected knowing and both independent ( $r = .20$ ) and interdependent ( $r = .26$ ) self-construal. The correlation between separate knowing and independent self-construal was not significant ( $r = .07$ ). Also, the correlation between separate knowing and interdependent self-construal was not significant ( $r = -.01$ ). Although this hypothesis was partially supported, the significant correlation between independent self-construal and connected knowing was unexpected, and further research is needed in order to understand the possible reasons for the connection.

*Hypothesis: Students who endorse more sophisticated epistemological beliefs-- that is those who believe that knowledge is changing rather than certain (certain*



*knowledge), that learning takes time and effort rather than happens quickly (quick learning), and that ability is changeable rather than fixed (fixed ability)-- will be more likely to endorse a deep approach to academic studying (emphasis on understanding) as opposed to a surface approach to academic studying (emphasis on memorizing the correct answers) (Biggs, 1987).*

Due to the difficulties with the factor structure of the EBI, the decision was made not to test these hypotheses. Because of the lack of adequate reliabilities for each of the factors of the EBI, the potential for error in estimations of the relationships between epistemological beliefs and study processes was high. A set of alternative hypotheses regarding the relationship between self-construal and ways of knowing was tested instead. Results of these analyses are described below.

*Hypotheses: Students classified as lower SES will display less sophisticated epistemological beliefs than students who are classified as high SES.*

In order to test this hypothesis, parent educational level was used as an indicant of socio-economic status. Students were asked to report the highest level of education completed for both their mother and father. There were 7 options for educational level, including a) less than high school, b) some high school, c) high school graduate, d) some college, e) Associate's degree, f) Bachelor's degree, and e) graduate or professional degree. In order to produce a composite variable for parent educational level, each level was assigned a score from 1 (less than high school) to 7 (graduate or professional degree). These scores were combined for both parents to create a "parent educational level" variable.

Students were divided into two groups based on average parent educational level. Students with scores of 6 or below were classified as “high school,” indicating that on average, their parents had a high school education or lower. For example, if both parents were high school graduates, their individual education level would be coded as “3”. When added together, the combined educational level would be coded as “6”. Students with scores of 7 or above were classified as “college”, indicating that on average, at least one of their parents had at least some college experience. For the sample, 128 students were classified as “high school”, and 180 were classified as “college”.

Independent-samples t-tests were conducted in order to test for significant differences between the “high school” and “college” students on the epistemological belief measures. No significant differences were found for any of the epistemological belief measures. Means, standard deviations, and *t* statistics are included in Table 10.

Table 10

*Group Differences for Epistemological Beliefs Between Students with Parents with High School Education and College Education*

Epistemological Belief	High School		College		df	t
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>		
Simple Knowledge	9.91	2.06	9.87	2.15	325	-.19
Certain Knowledge	10.76	2.84	10.15	3.01	328	-1.86
Quick Learning	4.19	1.46	4.09	1.58	330	-.59
Omniscient Authority	7.39	1.54	7.42	1.47	327	.16
Fixed Ability	11.58	2.37	11.53	2.39	328	-.19
Separate Knowing	42.29	9.25	42.13	10.12	311	-.14
Connected Knowing	52.30	8.29	51.82	9.93	313	-.50

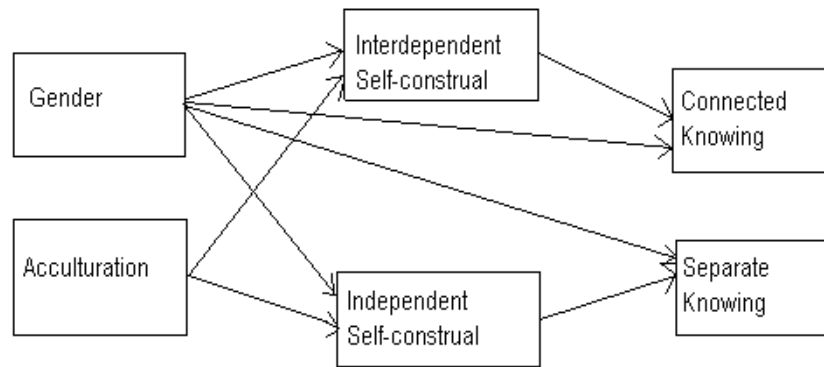
*Path Model of Relationships between, Self-Construal, Gender, Acculturation, and Ways of Knowing.*

Although connected knowing, separate knowing and self-construal have attracted much research attention within their respective areas, no research has addressed the possible implications of self-construal on ways of knowing. Theoretically, the idea that the two concepts are related seems plausible, with interdependent self-construal linked to connected knowing and independent self-construal linked to separate knowing. Understanding the possible relationships between these two concepts would help researchers better understand some of the developmental and interpersonal influences on ways of knowing.

In order to explore the possible relationships between gender, self-construal, acculturation and ways of knowing, a series of path models were tested. All path models were tested for goodness of fit using LISREL 8.7. Because of the lack of theory in the research literature to guide the development of possible models, an exploratory approach to the data analysis was utilized. An initial exploratory model was proposed, and then a series of alternate models were tested until an acceptable goodness of fit was achieved. Considering the approach used for these analyses, it is important to remember that the results should be considered extremely tentative. With multiple models, the possibility of arriving at a model with acceptable fit by chance is increased. However, in light of the exploratory nature of this research, this approach seemed appropriate. Future research with additional samples is needed to test the validity of the final model, although this method did identify possible directions for future research.

Based on the available research literature and speculation about possible relationships, it was hypothesized that self-construal may play a mediating role in the relationship between gender, acculturation and ways of knowing. Previous research has indicated that gender is related to ways of knowing, with women more likely to endorse connected knowing, and men more likely to endorse separate knowing (Hardin, Leong, & Bhagwat, 2004). It is also possible that gender exhibits an indirect effect on ways of knowing through self-construal. In addition to gender, acculturation was also hypothesized to affect ways of knowing through self-construal. The hypothesized model was developed to answer the following question: Do collectivist or individualist cultural values, as indicated by self-construal, influence ways of knowing? In light of these possible relationships, an initial path model was constructed (See figure 1).

Model 1 hypothesized that gender and acculturation are related to both independent and interdependent self-construal, which in turn, are related to ways of knowing. No specific hypotheses were offered for the relationship between gender and interdependent or independent self-construal. For acculturation, it was hypothesized that greater acculturation (e.g. English as the primary language, born in the United States) has a negative relationship to interdependent self-construal and a positive relationship to independent self-construal. At the next stage of the model, it was hypothesized that interdependent self-construal would be related to connected knowing, and independent self-construal would be related to Separate Knowing.



*Figure 1. Proposed path model for relationships between gender, acculturation, self-construal, and ways of knowing.*

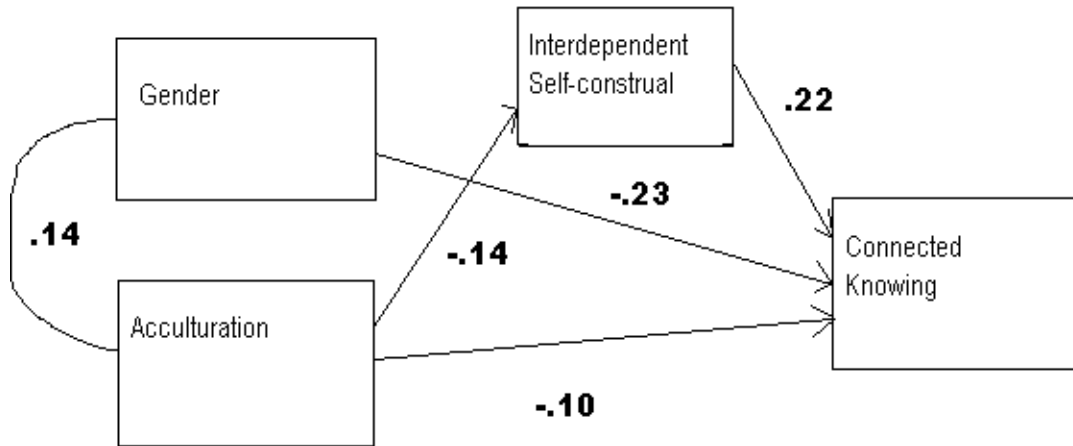
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The overall fit of the model was poor,  $\chi^2(6, N=340) = 137.462$ , Goodness of Fit Index (GFI) = .887, Adjusted Goodness of Fit Index (AGFI) = .605, Standardized Root Mean Square (SMRS) = .135. This indicates that Model 1 did not fit the data well.

Although the overall fit of the model was poor, four of the hypothesized paths in the model were significant. The path from acculturation to interdependent self-construal was significant ( $\beta = -.14, p < .05$ ), indicating that students who were more acculturated (i.e. less likely use English as a second language, more likely to be born in another country) tended to endorse high interdependent self-construal. This finding was consistent with the hypothesis that acculturation would have a negative relationship with interdependent self-construal. Also, the path from interdependent self-construal to connected knowing was significant ( $\beta = .24, p < .05$ ), indicating that students who scored higher on

interdependent self-construal tended to score higher on connected knowing. This finding was also consistent with the hypothesis that interdependent self-construal would be related to connected knowing. The third significant path was from gender to connected knowing ( $\beta = -.24, p < .05$ ) and the last significant path was from gender to separate knowing ( $\beta = .23, p < .05$ ). Although each of these paths was significant, the paths between gender and self-construal, acculturation and independent self-construal, and independent self-construal and separate knowing were not significant.

In light of the significant paths between acculturation, interdependent self-construal, and connected knowing, a series of alternative models were tested in order to identify a model that demonstrated acceptable fit and also identified possible variables that would be important to explore in future research. A final model was identified that fit the data well (see figure 2).



*Figure 2. Final model with path coefficients.*  
 All paths are significant ( $p < .05$ ).

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The final model demonstrated exceptionally good fit according to commonly used measures (Kline, 1998),  $\chi^2(1, N=340) = 0.255$ , GFI = 1.0, AGFI = .996, SRMS = .008. In the model, acculturation was a key influence on connected knowing, exhibiting both a small direct effect ( $B = -.10, p < .05$ ) and an indirect effect through interdependent self-construal (acculturation  $\rightarrow$  interdependent:  $B = -.14, p < .05$ ; interdependent  $\rightarrow$  connected knowing:  $B = .22, p < .05$ ). Gender exhibited a direct effect on connected knowing ( $\beta = -.23, p < .05$ ).

In the final model, both independent self-construal and separate knowing are missing. In preliminary models gender and acculturation did exhibit significant effects on separate knowing. However, neither of the effects ran through independent self-construal,

and none of the models exhibited acceptable goodness of fit data. Acceptable goodness-of-fit statistics (i.e. goodness of fit  $> .90$ ; standardized root mean square  $< .05$ ) (Kline, 1998) weren't obtained until both independent self-construal and separate knowing were removed from the model. At least for this study, it appears that interdependent self-construal is the more important dimension in regards effects on ways of knowing.



## Chapter V

### Discussion

One of the primary research questions proposed in this study was the relationship between epistemological beliefs and study processes. Difficulties in measuring epistemological beliefs prevented the testing of models of studying processes and epistemological beliefs. However, some findings did contribute to a better understanding of these relationships (i.e. ways of knowing and study processes). Despite these limitations, the data gathered in this study did provide some interesting results that may be helpful in developing a better understanding of the complex relationships between cultural background and personal epistemology. Also, this study has gathered data from a population of students that is somewhat unique when compared to previous research. Continued research is needed, particularly in light of the need to gather data on epistemological beliefs from samples more diverse than the typical major university course in psychology or education (Schraw & Sinatra, 2004).

#### *Summary of Findings*

Although some of the hypotheses set out prior to the completion of this study were not supported, a few of the hypotheses were. In addition, the exploratory nature of this study has also identified a number of possible areas for future research. Some of the main findings are discussed in the following sections.

#### *Significant Correlations*

This study explored relationships between a number of variables that were unexamined in previous research, including self-construal, epistemological beliefs, ways

of knowing, and study motives and processes. An examination of the bivariate correlations indicates a number of possible relationships between the variables.

As predicted, a significant negative correlation ( $r = -.17$ ) was found between interdependent self-construal and omniscient authority. Although small, this correlation does provide support for Schommer's (2004) notion that underlying conceptions of the self (individualistic or collectivistic) are related to how one views authority. This finding should be considered extremely tentative considering the reliability of the omniscient authority scale. Another significant correlation was found between omniscient authority and connected knowing ( $r = .12$ ). Students who endorsed a belief in omniscient authority tended to score higher on connected knowing. Although this relationship was small, the finding provides additional support for the idea that conceptions of the self and ways of knowing are related to views of authority.

Significant correlations were also found between ways of knowing and the various study motives and study strategies. Connected knowing was significantly related to surface motive ( $r = .27$ ), deep motive ( $r = .27$ ), deep strategy ( $r = .34$ ), achieving motive ( $r = .31$ ), and achieving strategy ( $r = .32$ ). Separate knowing was significantly related to deep motive ( $r = .27$ ) and deep strategy ( $r = .29$ ). Although no predictions were offered regarding the relationships between these variables, the results do present some interesting questions for future research.

On the surface, the correlations appear to indicate that connected knowing may be more conducive to productive study strategies. The motives and strategies typically seen as being related to achievement (deep and achieving) were all positively correlated with connected knowing. In contrast, the only significant relationships with separate knowing

were deep motive and deep strategy. One alternative explanation is that gender may play a role in both connected knowing and achievement. However, an examination of correlations for both men and women indicated that the pattern of correlations was similar. Although the results of this study provide little in terms of explaining the relationships between ways of knowing and study motives and processes, the results do provide initial support for some kind of connection. Future research investigating the connection may help identify factors that contribute to effective studying. Does a tendency to endorse connected knowing lead to adaptive study approaches? Are both connected knowing and adaptive study processes actually influenced by other variables? These questions seem particularly interesting in light of the criticism that conventional educational techniques tend to promote the development of separate knowing while underemphasizing connected knowing (Goldberger, Tarule, Clinchy, & Belensky, 1996).

#### *Gender, Ethnicity, and Epistemological Beliefs*

The poor psychometric quality of the Epistemological Beliefs Inventory is a major limitation in drawing conclusions regarding the influence of gender and ethnicity on epistemological beliefs related to knowledge, learning, and authority. Significant effects for gender were found Certain Knowledge, Quick Learning, and Fixed Ability, with men endorsing less sophisticated beliefs in these areas. However, the effect sizes for gender were small. Although gender has been discussed frequently in the literature examining ways of knowing (Belensky et al., 1986/1997; Clinchy, 1996; Galotti, 1998; Galotti et al., 1999; Goldberger et al., 1996; Stanton, 1996), there have been few references to gender as a possible factor in the development of epistemological beliefs regarding knowledge, learning, and authority. One study (Wood & Kardash, 2002), using

different factors of epistemological beliefs, found that in a sample of college freshman and sophomores, men scored higher on the epistemological beliefs of Structure of Knowledge and Knowledge Construction and Modification, whereas females scored higher on Speed of Knowledge Acquisition and Characteristics of Successful Students. Future research is needed to clarify these relationships.

In addition to the significant effects of gender on epistemological beliefs, significant effects for gender were found for ways of knowing. As mentioned previously, gender has been an important consideration in discussions of connected and separate knowing ever since the introduction of the concepts by Belensky et al. (1986/1997). In this study, women scored higher than men on connected knowing, and men scored higher than women on separate knowing, a finding that is consistent with much of the previous research on ways of knowing (Galotti et al., 1999; Knight et al., 2000; Knight, Efenbein, & Martin, 1997). An important question that remained largely unexplored is how these differences develop, and what factors play a role in this development. Knight et al. (1997) have suggested that both educational experiences and family experiences may play a role in the development of connected and separate knowing. Future research that examines cultural factors, in addition to unique educational experiences (e.g. classroom structures) and family experiences (e.g. parenting styles), would be useful in gaining a better understanding of the development of ways of knowing.

The role of ethnicity was also explored in this study. Specifically, this study examined possible differences in epistemological beliefs between Hispanic/Latino students and white/caucasian students. Somewhat surprisingly, few differences were found on the epistemological belief measures. No effects for ethnicity were found for

connected knowing and separate knowing. On the EBI, Hispanic/Latino students demonstrated fewer sophisticated beliefs than white/Caucasian students in areas of Certain Knowledge and Quick Learning. Although statistically significant, the effect sizes for both of these differences were very small (Certain Knowledge:  $\eta^2 = .07$ ; Quick Learning:  $\eta^2 = .02$ ) and may indicate that these differences have little practical significance.

A variable that appears to be more important than ethnicity is acculturation. For this study, a “degree of acculturation” variable was created by asking a series of questions about English as a primary language and country of birth for both the students and parents. Although not measuring “acculturation” directly, each of these indicants seemed to represent how acculturated a student is to mainstream, individualistic, U.S. culture. For example, a student whose primary language was Spanish could be seen as less acculturated than a student whose primary language was English. As expected, the four questions that served as indicants of degree of acculturation were significantly related to a number of variables. There were significant negative correlations between “English 1<sup>st</sup> language” and separate ( $r = -.20$ ) and connected knowing ( $r = -.14$ ) as well as interdependent self-construal ( $r = -.14$ ). There were also significant correlations, all in the expected direction, on these same three variables for the questions “Born in another country?” and “Parents born in another country?” These correlations, as well as the lack of an effect for ethnicity on self-construal, indicate that measures of acculturation may be helpful in understanding cultural influences on epistemological beliefs.

The finding that acculturation is an important variable may also be somewhat weakened by the large variability in age for the sample and also by the particular method

used for measuring race/ethnicity. Although 82% of the sample fell between the ages of 18 and 22, there were a number of older students in the sample (See Table 1). The variability in age may have affected the sensitivity of the questions measuring acculturation. For example, having parents who were born in another country may mean something different for a student of traditional college age (18-22 years) as compared to an older adult. The older adult has had more time to “acculturate” to the dominant culture, and this may mean that the question works differently as a measure of acculturation depending on age.

Another limitation was that no options were offered for students who may consider themselves as “mixed race” or “mixed ethnicity.” The options offered on the demographic survey were “Hispanic\Latino”, “White\Caucasian”, “African-American”, “Asian”, “Native American”, and “other.” The lack of significant differences for ethnicity on many of the variables may have been due to the diversity of students who may have endorsed one of the race/ethnicity categories. Future studies in this area would benefit from precise measurement of race and ethnicity in order to control for the possibility of variability within each of the groups.

#### *Cultural Influences on Ways of Knowing*

Although the cultural influences on epistemological beliefs were difficult to assess in light of the measurement difficulties with the EBI, partial support for Schommer’s (2004) assertion that personal epistemology is related to underlying cultural beliefs was offered by the positive correlations between connected knowing and self-construal. Significant positive correlations were found between connected knowing and both independent ( $r = .20$ ) and interdependent ( $r = .26$ ) Self-Construal. This connection is

further supported by the lack of significant correlations between separate knowing and independent ( $r = .07$ ) and interdependent self-construal ( $r = -.01$ ).

In addition to the correlations, significant differences between “hi” and “low” interdependent students were found on connected knowing. Students classified as high interdependent self-construal scored significantly higher (approximately .5 standard deviations) on connected knowing than students classified as low interdependent self-construal.

As additional evidence of the relationship between self-construal and ways of knowing, a path analysis identified significant relationships between gender, acculturation, self-construal, and connected knowing. Gender significantly influenced connected knowing, whereas acculturation influenced connected knowing both directly and indirectly through interdependent self-construal. A path model that included the variables of gender, acculturation, interdependent self-construal and connected knowing demonstrated excellent goodness of fit. Although the path analysis procedures used to develop the model were exploratory, this finding provides initial support for the contention that acculturation and interdependent self-construal may play important roles in further understanding connected knowing.

These findings seem to indicate that an interdependent self-construal may influence the development of a personal epistemology characterized by a “connected” approach to knowledge. Persons with an interdependent self-construal tend to view the “group” or the “other” as a focus of concern (Markus & Kitayama, 1991), similar to how someone with a connected knowing approach recognizes the importance of attempting to examine knowledge from an empathic, relational perspective as opposed to a critical,

evaluative stance (Clinchy, 1996). Though speculative at this point, this study does provide initial data examining the possible connections between self-construal (and possibly the larger cultural constructs of individualism and collectivism) and connected knowing.

This connection not only informs theory regarding the possible antecedents of personal epistemology, but may also be important in terms of Belensky et al.'s (1986/1997) claim that separate knowing is a more highly valued mode of discourse in our modern educational system. Goldberger et al. (1996) make the claim that both separate knowing and connected knowing should be considered legitimate procedures for constructing knowledge. One of the major criticisms of the ways of knowing perspective has been the mischaracterization of connected knowing as less intellectual, less critical, and anti-rational. In fact, Goldberger (Goldberger, 1996) claims that connected knowing is not necessarily the antithesis of critical thinking, but rather it is an alternative way of constructing knowledge that requires effort and diligence. In many ways, the skepticism regarding connected knowing as a legitimate procedure for discovering knowledge mirrors broader controversies of an epistemological nature in intellectual discourse, such as controversies regarding modernism versus post-modernism, quantitative versus qualitative, and what counts as 'scientific' educational research. If Belensky's claim that separate knowing is a more valued method for attaining knowledge is legitimate, the finding that self-construal is an influence on connected knowing may help educators understand some of the subtle implications of differing cultural backgrounds in classrooms.



### *Connected Knowing, Separate Knowing, and Educational Practice*

Perhaps the most important finding from the perspective of educational psychology is the apparent relationships between connected (CK) and separate knowing (SK), self-construal, and study processes. In their original article introducing the *Attitudes Towards Thinking and Learning Survey*, Galotti et al. (1999) suggested a number of possible research questions that might be addressed by future researchers. One of these questions asked whether or not CK and SK scores “affect the strategies with which students approach different learning assignments (Galotti et al., 1999, p. 763).” This study explored this question by examining the connections between ways of knowing and the study processes identified by the *Shortened Study Process Questionnaire*.

Connected and separate knowing, and the larger theory of ways of knowing has captured the attention of educators in a variety of fields, including nursing education, occupational therapy, economics, business law, and social work (Stanton, 1996). Although research on ways of knowing has generated interest in many disciplinary areas of education, few researchers have included ways of knowing in the larger research context of personal epistemological beliefs (Schommer, 2004). Broadening the study of personal epistemology to include ways of knowing may be useful in gaining a better understanding of the many complex factors involved in learning and educational experiences.

Schommer (2004) suggested that understanding conceptions of the self is important for building a comprehensive model of the various influences on the development of personal epistemology. Considering conceptions of the self in research designs also helps position personal epistemology within the larger context of basic

research in cognition, personality and social psychology, and cross-cultural psychology. This study identified significant relationships between self-construal and ways of knowing, providing initial support for Schommer's (2004) hypothesis that self-construal, and cultural influences on self-construal, are important considerations for the study of personal epistemology. Future research will need to further examine these connections and also explore the practical educational implications of these connections.

#### *Limitations of the Study*

A number of limitations need to be considered when evaluating the results of this study. These limitations include (a) the difficulties in measuring epistemological beliefs, (b) the possible effects of using convenience samples, and (c) alternative explanations for the results. Each of these limitations is described below.

##### *Difficulties in Measuring Epistemological Beliefs*

One of the major limitations of this study was the poor psychometric qualities of the Epistemological Beliefs Inventory. As explained previously, the instrument used in this study lacked previous research support. Although the instrument has been used in previously published research (Bendixen et al., 1998), the psychometric properties of the instrument were poor. Using a better instrument would have greatly improved the quality of this study. In addition, although evidence for links between self-construal and ways of knowing was found, the question of the possible influence of underlying cultural beliefs about the self on beliefs about knowledge, learning, and authority remains unaddressed. Preliminary evidence for a link is present in this study, but again, the poor measurement of these beliefs is a major limitation.

Although using a better instrument would have been preferable, they are hard to find considering the current state of research (Clarebout, Elen, Luyten, & Bamps, 2001). The measurement of epistemological beliefs is notoriously difficult (Hofer & Pintrich, 1997), and the development of paper-and-pencil measures of epistemological beliefs is an important research challenge for the future. Much of the foundational literature in the field of personal epistemology, such as the work of Perry, relied on interviews and other qualitative methods. Quantitative methods have also been employed in the study of personal epistemology, but problems remain. As an example of the current state of measurement, one recent study (Sinatra & Kardash, 2004) measured the epistemological beliefs of Speed of Knowledge Acquisition (8-items) and Knowledge Construction and Modification (11-items) and achieved internal consistency reliabilities of .59 and .54. Clearly, difficulties in measurement hinder the ability to study epistemological beliefs using quantitative methods.

#### *Use of Convenience Samples*

This study utilized available students from three different community colleges. Although students from a wide variety of courses were included, the sample was determined in part by the willingness of instructors at each of the campuses to either allow the researcher to administer the surveys or to actually administer the surveys themselves. Instructors taught a wide variety of courses, from general psychology to ethics to physical education. In addition, the course size ranged from 8 to over 50 students. Although students included in this study may be fairly representative of the typical community college population, it is possible that systematic differences between students enrolled in the various courses existed.

*The Community College Experience in the Midwest and Southern California*

Another issue related to sampling was the unique experience of Hispanic/Latino students at each of the community colleges. Of the 162 Hispanic/Latino students in the sample, 131 attended the community college in Southern California, whereas 29 attended the community college in a small Midwestern community. The students in the Southern California community college attended a school that was overwhelmingly Hispanic/Latino. Of the 139 students in the sample, 131 listed their ethnicity as Hispanic/Latino and 5 listed their ethnicity as White/Caucasian. In contrast, the students from the Midwestern community college experienced a much more diverse college atmosphere. Of the 102 students from this college, 3 listed their ethnicity as Asian, 29 Hispanic/Latino, 9 African-American, 56 White/Caucasian, 2 Native American, and 5 other.

In addition to the differences in the student population, another possible influence is the ethnicity of faculty. As mentioned previously, Hispanic/Latino students were sampled from two institutions with very different ethnic profiles. The Midwestern community college was fairly diverse, while the Southern California community college was overwhelmingly Hispanic/Latino. As expected, the ethnicity of faculty was also different. At the Midwestern community college, 3% of the full-time faculty are currently classified as ethnic minority (C. Tatro, personal communication, May 31, 2005), while at the Southern California community college, 20% of the full-time faculty in 2003 were classified as Hispanic/Latino (Imperial Valley College, 2005). It is unknown whether the differing rates of minority faculty had an impact on the variables examined in the study, but it is possible that the unique educational environments may have played a role. Future

research investigating the impact of a diverse educational environments and faculty ethnicity on personal epistemology would be useful.

#### *Alternative Explanations*

One possible explanation for the significant differences between men and women on connected and separate knowing, as well as other variables, is the possibility of gender differences in academic achievement and motivation. Although all of the students were attending community colleges at the time of this study, the women attending community college may have been higher achieving. Gender differences in connected and separate knowing may have been related to underlying achievement, although the fact that gender differences have been found in other samples supports the interpretations offered by this study. Data on academic achievement was unavailable, but it is possible that achievement may have played a role in the outcome of the study. In addition to the lack of data on academic achievement, another variable that was not measured but may be important is academic major. Although a variety of general education courses were sampled, students in particular academic majors may have differed in personal epistemology. Although this variable is less relevant at the community college level because of the predominance of undeclared majors, it may be an important variable to explore in future research.

Another possible explanation related to academic achievement and motivation is the possible differences between recent immigrants and more “acculturated” students. Perhaps those students with closer ties to their country of origin (Mexico) approached their educational experience differently than White-Caucasian students or more assimilated Hispanic students. In fact, recent research (Tseng, 2004) has documented the high motivation and valuing of education among children of recent Mexican and Central

American immigrants. Children of immigrants tend to experience a strong sense of family interdependence and view educational attainment as a way of honoring the family and recognizing their sacrifices. Tseng (2004) also notes that students with a stronger sense of interdependence may experience the conflicting demands for academic achievement as well as commitment to supporting the family. For example, college age students may desire to achieve academically, but often attend colleges that are closer to home in order to support the family both emotionally and financially. If local colleges are unavailable, this sense of obligation may prevent attendance, or direct the student towards a less-challenging environment (e.g. a community college rather than a selective university).

These findings may mean that the relationship between interdependent self-construal and connected knowing is more complex than it appears. In addition to conceptions of the self, factors such as family values regarding education and the unique experience of being an immigrant in the United States may be important. Research on the experiences of students of recent immigrants may be a promising avenue for research on cultural influences on epistemology. This research could expand the understanding of the development of epistemology by considering not only broad cultural values such as collectivism but also family level variables such as “family interdependence.” Both variables are likely related, and both may play a role in the development of personal epistemological beliefs such as connected knowing and views of authority. Adding measures of the family to future studies would be helpful.

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Appendix A

Informed Consent Document

Project Title: Culture, Epistemology, and Academic Studying

Thank you for agreeing to participate in this research project. This study is being conducted in order to learn more about the relationships between cultural beliefs about the self and beliefs about knowledge and learning. During this study, you will need to answer a number of questions regarding your beliefs about learning and education, your study habits, and how you interact with others. Completing the questionnaires should take you approximately 20-30 minutes.

**It is important for you to know that your participation in this project is completely *voluntary*.** This means that you do not have to complete the questionnaires, and you may stop answering questions at any time. If there are any questions that make you uncomfortable, they may be skipped. You will not be penalized in any way for not completing the questionnaires. By completing the questionnaires, it is assumed that you are providing consent to participate.

Also, every effort will be made to ensure that your responses to the questions are *anonymous*. Although you will not be asked your name, there is a slight risk that you could be identified based on your responses to the demographic questions. In order to ensure that this doesn't happen, only the researcher will see your questionnaire. When you have completed the questionnaire, you will need to place it in a manila envelope at the front of the class. This envelope will be sealed, and no one from this college will see your questionnaire. Also, your questionnaire will be kept in a secure location by the researcher.

There are no known risks anticipated for participating in this study. One of the benefits of participating in this study will be contributing to the knowledge base regarding the relationships between culture and beliefs about knowledge and learning.

This research project has been approved by the Institutional Review Board (IRB) at Kansas State University. You may contact the IRB if you have any questions or want to discuss any aspect of this research with an official of the university or the IRB. The chair of the IRB at Kansas State University is: Rick Scheidt, Chair, Committee on Research Involving Human Subjects, 1 Fairchild Hall, Kansas State University, Manhattan, KS, 66506, (785) 532-3224

Thanks again for participating. Should you have any questions concerning this project, or if you would like to have a copy of the results of this research at the completion of this research, please contact:

Heath Marrs Department of Psychology Fort Hays State University Hays, KS, 67601 Phone: 785 625-3432, E-mail: hmarrs@fhsu.edu.	Dr. Stephen Benton (Dissertation Advisor) Department of Counseling and Educational Psychology Bluemont Hall 319 Kansas State University Manhattan, KS, 66506 (785) 532-5784
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Please tear off this page and keep for your records. Then proceed to the next page, answer the questions, and turn in your packet when completed. Thank You.

## Appendix B

### Demographic Questionnaire

Directions:

Please answer the following questions, then turn the page and complete the questionnaires.

1. Your year in college? (please circle your response)      Fresh   Soph
2. Are you 18 years of age or older?      Yes   No  
    If Yes, please continue.  
    If No, please turn in your questionnaire to the researcher.
3. Your Age? \_\_\_\_\_
4. Your Gender?      Male   Female
5. Is English your first language?      Yes   No
6. Was English the primary language in your home when you were growing up?  
    Yes   No
7. Were you born in another country?      Yes   No  
    If Yes, which country? \_\_\_\_\_  
    If No, skip to next question.
8. Were either of your parents born in another country?      Yes   No  
    If Yes, which country? \_\_\_\_\_  
    If No, skip to next question.
9. Which of the following best describes your ethnicity?
  - Asian
  - Hispanic / Latino
  - African - American
  - White / Caucasian
  - Native American
  - Other
10. Have you ever been diagnosed with a learning disability?      Yes   No
11. How frequently do you attend religious services (e.g. church, mosque, temple)?



Always

Sometimes

Never

12. On a scale of 1 to 10, how committed are you to the beliefs of a particular religion?  
(Please circle your response. 1 is “not committed at all” and 10 is “extremely committed”)

Not committed at all 1 2 3 4 5 6 7 8 9 10 Extremely committed

13. What is the highest level of education your *father* has completed?

- less than high school
- some high school
- high school graduate
- some college
- Associate’s degree
- Bachelor’s degree
- graduate or professional degree (Ph.D., M.D., M.B.A., J.D., etc.)

14. What is the highest level of education your *mother* has completed?

- less than high school
- some high school
- high school graduate
- some college
- Associate’s degree
- Bachelor’s degree
- graduate or professional degree (Ph.D., M.D., M.B.A., J.D., etc.)

THANK YOU. Please complete the following questionnaires.

## Appendix C

### Instruments

#### Self-Construal Scale (Singelis, 1994)

For each statement, circle the number that indicates your level of agreement. If you “strongly disagree” circle 1, if you “strongly agree”, circle 7. If your level of agreement is somewhere in the middle, circle the corresponding number.

1. I have respect for the authority figures with whom I interact.

Strongly Disagree      1      2      3      4      5      6      7      Strongly Agree

2. It is important for me to maintain harmony within my group.

Strongly Disagree      1      2      3      4      5      6      7      Strongly Agree

3. My happiness depends on the happiness of those around me.

Strongly Disagree      1      2      3      4      5      6      7      Strongly Agree

4. I would offer my seat in a bus to my professor.

Strongly Disagree      1      2      3      4      5      6      7      Strongly Agree

5. I respect people who are modest about themselves.

Strongly Disagree      1      2      3      4      5      6      7      Strongly Agree

6. I will sacrifice my self-interest for the benefit of the group I am in.

Strongly Disagree      1      2      3      4      5      6      7      Strongly Agree

7. I often have the feeling that my relationships with others are more important than my own accomplishments.

Strongly Disagree      1      2      3      4      5      6      7      Strongly Agree

8. I should take into consideration my parents' advice when making education/career plans.

Strongly Disagree      1      2      3      4      5      6      7      Strongly Agree

9. It is important for me to respect decisions made by the group.

Strongly Disagree      1      2      3      4      5      6      7      Strongly Agree

10. I will stay in a group if they need me, even when I'm not happy with the group.

Strongly Disagree      1      2      3      4      5      6      7      Strongly Agree

11. If my brother or sister fails, I feel responsible.

Strongly Disagree      1      2      3      4      5      6      7      Strongly Agree

12. Even when I strongly disagree with group members, I avoid an argument.

Strongly Disagree      1      2      3      4      5      6      7      Strongly Agree

13. I'd rather say "No" directly, than risk being misunderstood.

Strongly Disagree      1      2      3      4      5      6      7      Strongly Agree

14. Speaking up during a class is not a problem for me.

Strongly Disagree      1      2      3      4      5      6      7      Strongly Agree

15. Having a lively imagination is important to me.

Strongly Disagree      1      2      3      4      5      6      7      Strongly Agree

16. I am comfortable with being singled out for praise or rewards.

Strongly Disagree      1      2      3      4      5      6      7      Strongly Agree

17. I am the same person at home that I am at school.
- Strongly Disagree      1      2      3      4      5      6      7      Strongly Agree
18. Being able to take care of myself is a primary concern for me.
- Strongly Disagree      1      2      3      4      5      6      7      Strongly Agree
19. I act the same way no matter who I am with.
- Strongly Disagree      1      2      3      4      5      6      7      Strongly Agree
20. I feel comfortable using someone's first name soon after I meet them, even when they are much older than I am.
- Strongly Disagree      1      2      3      4      5      6      7      Strongly Agree
21. I prefer to be direct and forthright when dealing with people I've just met.
- Strongly Disagree      1      2      3      4      5      6      7      Strongly Agree
22. I enjoy being unique and different from others in many respects.
- Strongly Disagree      1      2      3      4      5      6      7      Strongly Agree
23. My personal identity independent of others is very important to me.
- Strongly Disagree      1      2      3      4      5      6      7      Strongly Agree
24. I value being in good health above everything.
- Strongly Disagree      1      2      3      4      5      6      7      Strongly Agree

## Epistemological Beliefs Inventory

Directions: Please indicate how strongly you agree or disagree with each of the statements listed below. Please circle the response that corresponds to the strength of your belief

	Strongly Disagree	Disagree	Neither agree not disagree	Agree	Strongly Agree
25. It bothers me when instructors don't tell students the answers to complicated problems.	SD	D	N	A	SA
26. Truth means different things to different people.	SD	D	N	A	SA
27. Students who learn things quickly are the most successful.	SD	D	N	A	SA
28. People should always obey the law.	SD	D	N	A	SA
29. Some people will never be smart no matter how hard they work.	SD	D	N	A	SA
30. Absolute moral truth does <b>not</b> exist.	SD	D	N	A	SA
31. Parents should teach their children all there is to know about life.	SD	D	N	A	SA
32. Really smart students don't have to work as hard to do well in school.	SD	D	N	A	SA
33. If a person tries too hard to understand a problem, they will most likely end up being confused.	SD	D	N	A	SA
34. Too many theories just complicate things.	SD	D	N	A	SA
35. The best ideas are often the most simple.	SD	D	N	A	SA
36. People can't do too much about how smart they are.	SD	D	N	A	SA
37. Instructors should focus on facts instead of theories.	SD	D	N	A	SA
38. I like teachers who present several competing theories and let their students decide which is best.	SD	D	N	A	SA
39. How well you do in school depends on how smart you are.	SD	D	N	A	SA
40. If you don't learn something quickly, you won't ever learn it.	SD	D	N	A	SA
41. Some people just have a knack for learning and others don't.	SD	D	N	A	SA
42. Things are simpler than most professors would have you believe.	SD	D	N	A	SA
43. If two people are arguing about something, at least one of them must be wrong.	SD	D	N	A	SA
44. Children should be allowed to question their parents' authority.	SD	D	N	A	SA

45. If you haven't understood a chapter the first time through, going back over it won't help.	SD	D	N	A	SA
46. Science is easy to understand because it contains so many facts.	SD	D	N	A	SA
47. The moral rules I live by apply to everyone else.	SD	D	N	A	SA
48. The more you know about a topic, the more there is to know.	SD	D	N	A	SA
49. What is true today will be true tomorrow.	SD	D	N	A	SA
50. Smart people are born that way.	SD	D	N	A	SA
51. When someone in authority tells me what to do, I usually do it.	SD	D	N	A	SA
52. People who question authority are trouble makers.	SD	D	N	A	SA
53. Working on a problem with no quick solution is a waste of time.	SD	D	N	A	SA
54. You can study something for years and still not really understand it.	SD	D	N	A	SA
55. Sometimes there are no right answers to life's big problems.	SD	D	N	A	SA
56. Some people are born with special gifts and talents.	SD	D	N	A	SA

Shortened Study Process Questionnaire (Fox et al., 2001)

For each of the following statements, circle the response that indicates how often the statement is true.

	Rarely true	Sometimes true	True half the time	Frequently true	Usually true
57. While I am studying, I often think of real life situations to which the material that I am learning would be useful.	1	2	3	4	5
58. I chose my present courses largely with a view to the job situation when I graduate rather than their intrinsic interest to me	1	2	3	4	5
59. I find that at times studying gives me a feeling of deep personal satisfaction	1	2	3	4	5
60. I want top grades in most or all of my courses so that I will be able to select from among the best positions when I graduate.	1	2	3	4	5
61. I think browsing around is a waste of time, so I only study seriously what's been given out in class or in course outlines.	1	2	3	4	5
62. I try to work consistently throughout the term and review regularly when the exams are close.	1	2	3	4	5
63. I would see myself basically as an ambitious person and want to get to the top, whatever I do.	1	2	3	4	5
64. I find that I have to do enough work on a topic so that I form my own point of view before I am satisfied.	1	2	3	4	5
65. I try to do all of my assignments as soon as possible after they have been set.	1	2	3	4	5
66. I find that studying academic topics can at times be as exciting as a good novel or film.	1	2	3	4	5
67. I usually become increasingly absorbed in my work the more I do.	1	2	3	4	5
68. I generally restrict my study to what is specifically set as I think it is unnecessary to do anything extra.	1	2	3	4	5
69. I almost resent having to do further years of studying after leaving school, but feel that the end results make it all worthwhile.	1	2	3	4	5

	Rarely true	Sometimes true	True half the time	Frequently true	Usually true
70. I see getting high marks as a kind of competitive game, and I play it to win.	1	2	3	4	5
71. I find it best to accept the statements and ideas of my lecturers and question them only under certain circumstances.	1	2	3	4	5
72. Whether I like it or not, I can see that further education is for me a good way to get a well-paid or secure job.	1	2	3	4	5
73. I try to relate new material, as I am reading it, to what I already know on the topic.	1	2	3	4	5
74. I keep neat, well organized notes for most subjects.	1	2	3	4	5



Shortened Version of the Attitudes Towards Thinking and Learning Survey (Galotti et al., 1999)

Indicate your level of agreement with each of the following statements by circling a number.

	Strongly Disagree	Somewhat Disagree	Slightly Disagree	Neither agree nor	Slightly Agree	Somewhat Agree	Strongly Agree
75. When I encounter people whose opinions seem alien to me, I make a deliberate effort to “extend” myself into that person, to try to see how they could have those opinions.	1	2	3	4	5	6	7
76. I can obtain insight into opinions that differ from mine through empathy.	1	2	3	4	5	6	7
77. I tend to put myself in other people’s shoes when discussing controversial issues, to see why they think the way they do.	1	2	3	4	5	6	7
78. I’m more likely to try to understand someone else’s opinion than to try and evaluate it.	1	2	3	4	5	6	7
79. I try to think with people instead of against them.	1	2	3	4	5	6	7
80. I feel that the best way for me to achieve my own identity is to interact with a variety of other people.	1	2	3	4	5	6	7
81. I always am interested in knowing why people say and believe the things they do.	1	2	3	4	5	6	7
82. I enjoy hearing the opinions of people who come from backgrounds different from mine – it helps me understand how the same things can be seen in such different ways.	1	2	3	4	5	6	7
83. The most important part of my education has been learning to understand people who are very different from me.	1	2	3	4	5	6	7
84. I like to understand where other people are “coming from,” what experiences have led them to feel the way they do.	1	2	3	4	5	6	7
85. I like playing devil’s advocate – arguing the opposite of what someone is saying.	1	2	3	4	5	6	7

	Strongly Disagree	Somewhat Disagree	Slightly Disagree	Neither agree nor	Slightly Agree	Somewhat Agree	Strongly Agree
86. It's important for me to remain as objective as possible when I analyze something.	1	2	3	4	5	6	7
87. I try to listen to other people's positions with a critical eye.	1	2	3	4	5	6	7
88. I find that I can strengthen my own position through arguing with someone who disagrees with me	1	2	3	4	5	6	7
89. One could call my way of analyzing things "putting them on trial," because of how careful I am to consider all the evidence.	1	2	3	4	5	6	7
90. I often find myself arguing with the authors of books I read, trying to logically figure out why they're wrong.	1	2	3	4	5	6	7
91. I have certain criteria I use when evaluating arguments.	1	2	3	4	5	6	7
92. I try to point out weaknesses in other people's thinking to help them clarify their arguments.	1	2	3	4	5	6	7
93. I value the use of logic and reason over the incorporation of my own concerns when solving problems.	1	2	3	4	5	6	7
94. I spend time figuring out what's "wrong" with things; for example, I'll look for something in a literary interpretation that isn't argued well enough.	1	2	3	4	5	6	7