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A Cross-Cultural Study of Epistemological Beliefs and Moral Reasoning Between American and Chinese College Students

Zhongtang Ren
Old Dominion University

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**A CROSS-CULTURAL STUDY
OF EPISTEMOLOGICAL BELIEFS AND MORAL REASONING
BETWEEN AMERICAN AND CHINESE COLLEGE STUDENTS**

By

Zhongtang Ren

B.A. July 1984, Henan Normal University, China

M.S. August 2001, Old Dominion University, U.S.A.

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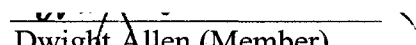
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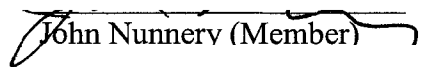
OLD DOMINION UNIVERSITY

August 2006

Approved by:


Stephen Tonelson (Director)


Dwight Allen (Member)


John Nunnery (Member)

ABSTRACT**A CROSS-CULTURAL STUDY
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Zhongtang Ren

Old Dominion University, 2006

Director: Dr. Stephen Tonelson

This study investigated the cultural differences of epistemological beliefs and moral reasoning between American and Chinese college students ($N = 452$) recruited from three universities, Old Dominion University in the eastern United States, Luoyang Normal University in the central China and Central University for Nationalities in northern China. A series of factorial MANOVA was conducted to explore the influence of gender, ethnicity and nationality as the independent variables on epistemological beliefs measured with five EBI (Epistemological Beliefs Inventory) scores and moral reasoning measured with two DIT (Defining Issues Test) scores as dependent variables.

No effects were found for gender and ethnicity on epistemological beliefs and moral reasoning. Significant differences were found between American college students and Chinese college students in the epistemological beliefs of simple knowledge, certain knowledge, omniscient authority and quick learning. Additionally, a significant, but small correlation between moral reasoning and epistemological beliefs was found in the American sample while no significant correlation was found between moral reasoning and epistemological beliefs in the Chinese group.

Co-Directors of Advisory Committee: Dr. Dwight Allen
Dr. John Nunnery

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To my wife and son and in memory of my parents.

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I. INTRODUCTION

Epistemology, the philosophic study of the nature, origin and scope of human knowledge, has a long history of philosophers' conceptual exploration (Lenk & Paul, 1993; Geaney, 2002; Paul, 2002). The term, derived from Greek *episteme* (i.e. knowledge) and *logos* (i.e. explanation), has remained a taproot of philosophical inquiry for centuries. Plato, in his *Theaetetus*, explored the elemental components of knowledge—truth, belief and justification. Kant (1781) differentiated between a priori knowledge (i.e. what we know prior to experience) and a posterior knowledge (i.e. what we know based on experience), distinguishing rational knowledge from empirical knowledge. He argued that a prior knowledge is all of the following: 1) logically necessary, 2) not derivable from particular sensations and experiences, 3) presupposed in all our experiences, and 4) contributed by our mind. James (1890), Peirce (1877), Dewey (1916), and Whitehead (1967) indicated in their writings a psychological turn in issues related to knowledge and knowing.

Contemporary epistemological studies have shifted focus toward the empirical investigation of personal epistemological development and epistemological beliefs (Hofer, 2004a), namely, 1) how individuals come to know, 2) how the individual develops a conception of knowledge, and 3) how that individual uses their knowledge to understand the world (Stewart, 2005). The third area, which centers on how epistemological assumptions influence thinking and reasoning process, will be the focus of this dissertation.

The current study of personal epistemology began with the groundbreaking work of Perry (1970), whose research was based on a four-year study during which his team interviewed Harvard undergraduates. Using open-ended and nondirective longitudinal interviews as well as a paper-and-pencil instrument—the Checklist of Educational Views (CLEV), Perry and his team explored the individuals' beliefs about knowledge and learning and how those beliefs changed over time. According to Perry, at the beginning of their college years, students are dualistic in holding a right or wrong, absolute view and belief that truth can be known and the role of the teacher is to communicate it. Students believe that simple and unchangeable facts are handed down by omniscient authority. By the time they reach their senior year, students turn to more realistic in believing that complex and tentative knowledge is derived from reason and empirical inquiry. Therefore, Perry hypothesized nine developmental positions classified into four categories that served as the path from being a dualistic thinker in early college years to being a committed relativistic thinker at the end of the four-year college experience.

Since Perry (1970) developed his unidimensional intellectual development model, educationalists and psychologists have attempted different models (Hofer, 2004a) to examine personal beliefs about the nature of knowledge that may influence comprehension (Schommer, 1990), cognitive processing (Kardash & Howell, 2000), and conceptual change learning (Qian & Alverman, 2000). Different approaches are used in the conceptualization and investigation of personal beliefs. The reflective judgment model (King & Kitchener, 1994) was based on 20 years of both cross-section and longitudinal research involving interviews with individuals from high school age through adulthood. The model was developed into a seven-stage developmental path traversing

three levels—pre-reflective, quasi-reflective, and reflective—for understanding the assumptions related to individuals’ judgments about ill-structured problems. The embedded systemic model (Perry, 1970; Ryan, 1984; Schommer-Aikins 2004) includes cultural relational views and addresses issues of reciprocal interaction. Schommer makes the assumption that epistemology should be viewed as a system of beliefs capable of being independently and asynchronously developed. Initially, Schommer created a five-belief taxonomy that includes beliefs about the following: 1) simple knowledge (i.e., knowledge consists of discrete facts), 2) certain knowledge (i.e., absolute knowledge exists and will eventually be known), 3) omniscient authority (i.e., authorities have access to otherwise inaccessible knowledge), 4) quick learning (i.e., learning occurs in a quick or not-at-all fashion), and 5) innate ability (i.e., the ability to acquire knowledge is endowed at birth). The epistemological reflection model (Baxter Magolda, 1992, 2001) is used widely in higher education for understanding the development of college students. Baxter Magolda (2002) identified this sequence of knowing: absolute, transitional, independent, and contextual, which was based on her epistemology study using interviews concerning gender. The epistemic metacognition (Kichener 1983; Kuhn, 1999b) is commonly activated in the knowledge acquisition and construction in everyday learning. The model encompasses two aspects—Kitchener’s (1983) three-level model: 1) cognition, 2) metacognition, and 3) epistemic cognition, in which each level builds up a foundation for the next as well as a developmental model by Kuhn (1999a, 1999b, 2000a, 2000b) that is known as “metaknowing,” categorized into these three levels: 1) metacognitive knowing, 2) metastrategic knowing, and 3) epistemological meta-knowing. Kuhn concludes that early epistemological meta-knowing begins in the transition “from

simply knowing that something is true to evaluating whether it might be” (Kuhn, 2000b, p. 317). The “epistemological resources” (Hammer & Elby, 2000, 2002) are used to compare the various epistemological frameworks. Hammer and Elby identified resources for understanding the nature and sources of knowledge, (knowledge as propagated stuff, knowledge as free creation, and knowledge as fabricated stuff), and epistemological activities, (accumulation, formation, and checking). Bendixen and Rule (2004) synthesized findings from a variety of studies to propose a more integrated model in an attempt to provide a guiding framework for addressing some of the key issues raised by diverse models. The model elaborates on the following fundamental elements of personal epistemology: 1) a mechanism of change (i.e., epistemic doubt, epistemic volition, and resolution strategies), 2) dimensions of beliefs, 3) advanced beliefs, 4) metacognition, 5) conditions for change (i.e., dissonance and personal relevance), 6) affect, 7) cognitive abilities and environment, and 8) reciprocal causation.

By summarizing and commenting upon recent research on epistemological beliefs, Schraw (2001) suggests that more research should be completed to investigate the links between epistemological beliefs and cognitive and motivational outcomes. It is necessary to better understand how epistemological beliefs affect complex cognitive processes such as problem solving, moral reasoning, and decision making in that the sophistication of epistemological beliefs is related to a wide variety of reasoning skills, including argumentation skills (Kuhn, 1991), problem solving (Kardash & Scholes, 1996; Schraw et al., 1995), reading comprehension (Schommer, 1990), and moral reasoning (Bendixen et al., 1998).

Moral reasoning is a study in psychology that overlaps with moral philosophy. Perennial philosophical views of moral reasoning can be traced back to Confucius, Aristotle, Rousseau and Rawls, but in modern empirical research, the most prominent figure is Kohlberg, who, as a follower of Piaget, has identified a detailed stage sequence for moral reasoning by using moral dilemmas, or hypothetical situations in which people have to make decisions (Crain, 2005). Kohlberg defines moral reasoning as judgment about right and wrong, which, according to Rest et al. (1999b), relates to a person's cognitive development.

Kohlberg's (1984) theories on cognitive-moral development emerged from the cognitive development understandings introduced by Piaget (1965), together with Kantian concepts of justice that emerged from the work of Rawls (1971). Kohlberg's work identified six stages in the development of moral reasoning grouped into three major levels. The progression through the stages reflects individuals' cognitive development in the understanding of moral issues. The progression depends on the broadening cognitive capacity to understand the perspective of others. Kohlbergian theories, according to Rest et al. (1986, 1999; Narvaez, 2002), are most useful for issues of "macromorality," which concerns the formal structure of society as defined by institutions, rules, and roles.

Following Kohlberg's system to represent logical moral reasoning, Rest et al. (1986, 1999; Narvaez, 2002) developed a neo-Kohlbergian perspective based on 25 years of data collection with the Defining Issues Test. Rest introduces (1999a, 1999b) the concept of "micromorality," which concerns the particular face-to-face relations that people have in everyday life. Rest (1999) defines cognitive structures in terms of schemas

rather than stages, reformulating the definition of postconventional moral thinking, and using different research strategies.

Since Kohlberg, a small number of researchers (Bendixen, Schraw, & Dunkle, 1998; King & Kitchener, 1994, 2002) have undertaken the examination of the relationship between moral reasoning and epistemological beliefs among individuals. The results of a number of the studies (Bendixen et al., 1998) confirmed the hypothesis that five epistemological dimensions (simple knowledge, certain knowledge, omniscient authority, quick learning, and innate ability) would explain unique variance in moral reasoning above and beyond all other variables such as age, education, gender, syllogistic reasoning skills, grade point average and academic major; in other words, multiple epistemic assumptions play important roles in college students' moral reasoning.

In his dissertation to investigate a cultural variation of relationships between epistemological beliefs and moral reasoning, Jeong (2003) identified three assumptions about the development of epistemological beliefs and moral reasoning that share psychological and philosophical assumptions concerning constructivism and a cognitive developmental perspective. The first basic assumption underlying epistemological and moral development is that human beings construct meaning for themselves by thinking about and acting on the world (Colby & Kohlberg, 1987). A second basic assumption is that they fit a cognitive-developmental pattern. A third is that most research focuses on the development of epistemological cognition and moral judgment during the collegiate years.

Buehl and Alexander (2001) suggested that epistemological beliefs are 1) multidimensional and multi-layered in nature, 2) significantly related to other learning

outcomes, and 3) characterized both as domain general and domain specific. Bendixen et al. (1998) investigated the relationship between epistemic beliefs and moral reasoning based on their predictions that, 1) gender, age, education, and syllogistic reasoning scores collectively would explain a significant proportion of the variance in principled moral reasoning scores using the P index from Rest's (1979) Defining Issues Test (DIT); 2) age and education would be related to epistemic beliefs (Perry, 1970; Benack & Basseches, 1989; Schommer, 1990, 1993; Walker et al. 1991); and 3) several of the epistemic beliefs would explain a significant proportion of the variance in the DIT over and above the effects of social and personal variables. Bendixen et al. (1998) focused on these two questions: 1) whether epistemic beliefs are related to moral reasoning over and above the effects of other critical variables such as age, education, gender, and basic reasoning skills; and 2) the dimensionality of epistemic beliefs. Their findings support both of these predictions.

In addition to the measures of beliefs (Durell & Schommer-Aikins, 2001) such as the Epistemic Beliefs Inventory (EBI) developed by Schraw et al. (2002), based on Schommer's (1990) Epistemological Questionnaire (EQ) and Syllogisms, the Defining Issues Test (DIT), developed by Rest (1979), was used in their research in order for beliefs corresponding to simple knowledge, certain knowledge, omniscient authority, and quick learning each to explain the significant variation in performance on the DIT.

The Defining Issues Test (DIT) (Rest, 1979, 1986), based on Kohlberg's (1975) interview method, has been used extensively as a surrogate measure of levels of principled moral reasoning. The DIT has three versions—the long form which consists of six separate scenarios (Heinz and the Drug, Escaped Prisoner, Newspaper, Doctor's

Dilemma, Webster, Student Take-over), the short form that includes three scenarios (Heinz and the Drug, Escaped Prisoner, and Doctor's Dilemma), and the newer version DIT-2 (Rest et al., 1998; 1999) with five vignettes (Famine, Reporter, School Board, Cancer, and Demonstration), the latter being better-validated and more widely-used. The score on the DITs, which ranges from 0 to 95, measures the subject's reasoning level according to the cognitive moral development theory of Kohlberg.

Unfortunately, these investigations appear to have a methodological problem, namely, the use of interviews and questionnaires with college students who are, by and large, from the United States, so less is known about other populations around the world. Although some researchers (Boyes & Walker, 1988; Rest, 1986; Snarey, 1985) have attempted cross-cultural studies of moral reasoning or epistemological beliefs respectively, very few of them have touched the examination of the relationship between moral reasoning and epistemological beliefs (Bendixen et al., 1998; Jeong, 2003), and none of them has conducted a cross-cultural study of moral reasoning and epistemological beliefs and the relationships between moral reasoning and epistemological beliefs with mainland Chinese samples. It is due to the uniqueness of this population group that the author is interested in examining cultural differences and similarities in moral reasoning and epistemological beliefs and in the relationships of epistemological beliefs and moral reasoning between American and Chinese college students.

Statement of the Problem

As the economic and diplomatic climate in China has changed, there has been a noticeable increase in the frequency of contact between Chinese and Americans in all areas—business and economic, academic and scientific, professional and cultural. The trade volume of the United States and China grows, and the demand for cultural exchanges between two nations has been rising, for the governments of the two countries have realized the importance of fostering a broader and deeper understanding between two peoples; for instance, on December 9, 2003, the governments of the United States of America and the People's Republic of China signed a renewed Implementing Accord for Cultural Exchange. As the United States interacts with China with increasing frequency, the need to anticipate and to analyze change becomes paramount, the change concomitant with China's societal transition characterized by the formation of the market economy, the impact of globalization, mass media and the Internet, cultural diversity and value pluralism, trends toward democratization in politics, and structural changes in the family (Perry et al., 2001; Qi & Tang, 2004). One effective vehicle which can help the world understand such a change is to better understand individuals' moral reasoning and epistemological beliefs—in educational settings, students' perspective of viewing knowledge and making moral decisions.

As a means to conduct cross-cultural comparison, according to Buehl (2003), countries or sub-cultures are often categorized along these four cultural dimensions: 1) individualism/collectivism, 2) masculinity/femininity, 3) large power distance/small

power distance, and 4) weak uncertainty avoidance/strong uncertainty avoidance (Hofstede, 1980). According to Hofstede's cultural index, the United States and China agree in Uncertainty Avoidance Index (46 for the U.S. and 40 for China, with the range from 8 to 112) and Masculinity Index (62 for the U.S. and 66 for China, with the range from 5 to 95), whereas the two countries differ in the index of Power Distance (40 for the U.S. and 80 for China, with the range from 11 to 104), Individualism (91 for the U.S. and 20 for China, with the range from 6 to 91), and Long-Term Orientation (29 for the U.S. and 118 for China, with the range from 16 to 118).

Researchers tend to contrast cultures that differ along the individualism or collectivism dimension, the one commonly viewed as "the single most important dimension of cultural difference in social behavior" (Triandis, 1985). Individualistic cultures (e.g., the United States and Western Europe) tend to focus on the goals and rights of the individual over those of the larger group and heavily emphasize autonomy, competition, independence, self-initiative, and self-reliance (Triandis, 1990). In contrast, collectivist cultures (e.g., Asia, Africa, and South America) are characterized by "the subordination of individual goals to the goals of the collective, a sense of harmony, interdependence and concern for others" (Hui & Triandis, 1986, pp. 244-245). In a collectivist context, individuals view themselves in terms of their relationships with others and are respectful of perceived duties, obligations, and in-group norms (Matsumoto & Juang, 2004).

Individualism is a dominant value in the United States, a country considered multiracial and built on Judeo-Christian principles, whilst China, a nation characterized by its value of collectivism, is a populous country accounting for one-fifth of the world

human population. Traditionally influenced by Confucian, Taoist and Buddhist moral teachings, episodic with Maoist moral ideology from the 1950s to the 1980s, China is transforming itself into a market economic system in which moral values become implicit and pluralistic (Madsen, 1984, 1995; Seckington, 2002; Li et al., 2004; Qi & Tang, 2004; Wang, 2004). Contemporary studies examining relationships between individuals' epistemological beliefs and their moral judgments have primarily utilized interviews and a questionnaire method with American college students, but less is known about other populations.

Some authors (Buehl & Alexander, 2001; Hofer, 2001) have suggested that epistemological beliefs may differ considerably across cultures. Research is particularly needed in this area, in that differences between American and Asian schools may be differences in beliefs about the complexity of knowledge and speed of learning (Stevenson & Stigler, 1992). A recent study done by Jeong (2003) explored the relationships between epistemological beliefs and moral judgment between American and Korean college students. China is the most populous country in the world, with its unique traditions and current practices, and for the many reasons enumerated in the preceding paragraphs it will be of importance to investigate cultural differences and similarities in the relationships between epistemological beliefs and moral reasoning between American and Chinese college students.

Research Questions

In order to investigate the cultural differences of epistemological beliefs and moral reasoning between American and Chinese college students, the research questions of this study are as follows:

- 1) Are there differences in moral reasoning and epistemological beliefs between American and Chinese college students?
- 2) Do gender and ethnicity affect moral reasoning and epistemological beliefs between American and Chinese college students?
- 3) Is there any interaction between ethnicity and gender in moral reasoning and epistemological beliefs?

Significance of the Study

There is a need to understand the role of culture in the area of epistemological beliefs and moral reasoning. Is the current research literature on epistemological beliefs and moral reasoning relevant to students from different cultures? An understanding of cultural influences on epistemological beliefs and moral reasoning would be helpful in applying the current knowledge of epistemological beliefs and moral reasoning to educational settings with students from different cultures. With this end in mind, by selecting college student samples from the two nations, each unique in cultural setting, a cross-cultural study of students' epistemological beliefs and moral reasoning will help educators and prospective teachers understand their students, benefit policy makers in

developing adaptive programs to enhance more cultural exchanges and provide curriculum developers with a cultural consciousness and a global perspective.

If the results of this study indicate that no differences exist in epistemological beliefs and moral reasoning under the two different cultural settings, the author might suggest that the educators from the two nations attend to universal aspects of their students' moral development and epistemological beliefs instead of focusing on articulating cultural variation and diversification. Further, if the conclusion of the present study suggests that considerable overlap exists in psychological functioning across cultures, it may provide evidence in support of Kohlberg's model of cognitive and moral development in the debate between cultural psychologists and Kohlbergians. In contrast, if this study shows that there are significant differences in the Chinese and American cultural settings, cultural influences on students' moral development and epistemological beliefs must be taken into account, which may provide evidence in support of cultural psychologists in the area of moral development.

Given that all the participants in this study will be education majors in the United States and from a normal university oriented to the teaching profession in China, the results of this study also have implications for pre-service teacher education. Today's education students are tomorrow's teachers, and allowing them such a consciousness and a perspective for understanding student epistemological beliefs and moral reasoning will increase their sensibility and awareness, facilitating them in their real life after their graduation to enhance harmony and to reduce conflicts among the future society.

II. LITERATURE REVIEW

Introduction

This chapter has been divided into four sections. The first section synthesizes the major theories of moral judgment, from Aristotle in late 300 BC to Rest in the 20th century, followed by a critical review of cross-cultural research in the development of moral reasoning. The second section summarizes an overview of current theories of epistemological development, categorized from developmental model to integrated model, and then, reviews cross-cultural studies of epistemological theories. The third section describes research of moral reasoning and epistemological beliefs and research on the relationship between epistemological beliefs and moral reasoning. The fourth and final section covers the measurement of epistemological beliefs and moral reasoning.

Educational Theories on Moral Reasoning

Moral reasoning is an ancient topic, much discussed by philosophers. Confucius believed that humanity is naturally good, and this belief is the logical starting point of ancient Chinese ideas about the development of moral reasoning. Confucian traditions attributed “four beginnings” to human personality, which naturally unfolded into defining human virtues—benevolence, righteousness, courteousness and wisdom (Puka, 2005). These virtues, however, need cultivation and training through the environment and education if one wants to grow these moral seeds into actual moral character.

Aristotle focuses on habituation of moral virtues. Strands of natural growth and moral evolution are embedded throughout his depiction of human flourishing. For Aristotle, moral happiness or flourishing is the fulfillment of our natural human function. The “Aristotelean Principle” of cognitive motivation is one such strand, moving individuals to prefer more complex to less complex activities. This motivation, according to Aristotle, pulls individuals toward greater challenges and resulting cognitive growth in dealing with them over time. The development of the intellectual virtues is largely a process of natural growth toward natural function, and some of these virtues, *logos* and *sophrosune* especially, play necessary roles in the proper expression of moral virtues (Puka, 2005).

Recent philosophical history has given a rare nod to moral reasoning through Rawls’s (1972) *A Theory of Justice*. Like Kant before him, Rawls paid homage to Rousseau’s vision of moral cooperation. Such cooperation is nature’s way of humanizing and civilizing the human race, not merely of institutionalizing humanity’s civilizing intent to stabilize and protect it. We see in Rawls’s hands the degree to which supporting moral prescriptions with psychological proclivities has retreated under threats from the naturalistic fallacy, and other categorical mistakes. Rawls recognizes only the logical requirement that just social institutions remain compatible with the facts of human psychology and its development so that socializing each successive generation in justice institutions will be a feasible enterprise, assuring compliance. He does not turn to moral development for moral support, grounding value prescriptions on its facts.

From an educational perspective, according to Puente (1998), many hypotheses for explaining cognitive and moral development are based on the following three theories:

the romantic theory, the cultural transmission theory and the cognitive-developmental theory. The third theory will be the focus of this dissertation.

The romantic theory, which prevailed in the 19th century, was categorized with the expression principle and the freedom principle revealed in J.J. Rousseau's *Emile* and organic-genetic theory whose main proponent is Freud. For Rousseau, the integral development of the subject physically, intellectually and emotionally is accepted as a fundamental commitment within this theoretical approach. Thus, the school and the family must design environments that facilitate the development of all the potentialities possessed innately by learners. For Freud, the psychological theory conceives the child's mind as an organism, or plant, biologically prepared to grow as long as the environment nurtures its development. From the psychological point of view, the theory conceives that moral development occurs in a manner that parallels physical development, and there are a series of stages related to psycho-sexual development. These stages are basically hereditary, though there are some social factors that could favor or delay their expression. Therefore, moral development depends on the natural and spontaneous evolution of impulses and emotions (Puente, 1998).

The cultural transmission theory, inspired by associationism whose relevant representatives are Locke, Watson, Thorndike, and Skinner, conceives the mind as a "tabula rasa" or blank slate upon which the experiences of the environment are inscribed. The mind is initially empty and passive, determined by factors from the physical and social environment. Concepts and structures are a reflection of all that is outside the individual in the physical and social world. The individual's development is brought about through direct instruction or through the imitation of adult models with emphasis

on the acquisition of knowledge, abilities and skills. The acquisition of moral behavior is governed by the same general principles of learning. The origin of morality is not the individual, but society (Puente, 1998).

The cognitive-developmental theory is dialectical since it rejects the dichotomy between maturity or innate factors and environmental factors. Both have a role in the person's definition and both function in an articulated way; otherwise, there may be factors that delay both cognitive and moral development. Sometimes, certain innate factors begin to conflict with environmental factors, and from their resolution more advanced phases of development and more mature moral behaviors emerge (Puente, 1998).

The cognitive-developmental theory originated with Plato, was given a new meaning by Hegel and, lastly, was incorporated into the psychological point of view by Dewey and Piaget. Piaget and Dewey claim that mature thinking depends neither on genetic nor social factors; rather, it is the result of the reorganization of the psychological structures derived from the interaction between the organism and the environment. To understand Piaget and Dewey it is necessary to clarify the concept of cognition (Puente, 1998).

Cognitions are structures internally organized as a system of relations and as a set of beliefs. These structures are rules for the processing of information that an organism receives or for the connection of several events. Children's events and experiences are organized and actively processed; this is not merely a process of repetition or accumulation (Puente, 1998).

Cognitive development, defined as change in the cognitive structures, supposedly depends on experience. However, such effects are not considered as learning in the classical sense (training, instruction, modeling or practice). For example, if two events are presented in temporal proximity, it is probable that the child interprets the phenomenon in terms of a category as causality and not in terms of a simple associative relation. Simple associations can help to generate a structure, but this is basically “internal” and “stable”, though “modifiable” (Puente, 1998).

Cognitive Development and Moral Reasoning

Among the first psychologists directly relevant to contemporary theories of the development of moral reasoning, Piaget is best known for organizing cognitive development into a series of stages—the levels of development from infancy through childhood to adolescence. These four stages are labeled the Sensorimotor stage, the Preoperational stage, the Concrete Operational stage, and the Formal Operational stage. “Advancement through these levels was explained through biology and culture along with a ‘third factor’ called equilibration, working inter-dependently with the other two”. The characteristics of each stage are illustrated in the following table.

Table 1. Stages of Cognitive Judgment (Piaget)

Stage	Characterized by
Sensorimotor (Birth-2 years)	Differentiates self from objects Recognizes self as agent of action and begins to act intentionally: e.g. pulls a string to set mobile in motion or shakes a rattle to make a noise Achieves object permanence: realizes that things continue to exist even when no longer present to the sense
Preoperational (2-7 years)	Learns to use language and to represent objects by images and words Thinking is still egocentric: has difficulty taking the viewpoint of others Classifies objects by a single feature: e.g. groups together all the red blocks regardless of shape or all the square blocks regardless of color
Concrete operational (7-11 years)	Can think logically about objects and events Achieves conservation of number (age 6), mass (age 7), and weight (age 9) Classifies objects according to several features and can order them in series along a single dimension such as size.
Formal operational (11 years and up)	Can think logically about abstract propositions and test hypotheses systematically Becomes concerned with the hypothetical, the future, and ideological problems

In addition to his work in the area of cognitive development, Piaget also wrote about moral reasoning. According to Piaget's two-stage moral reasoning theory, the age of ten or eleven years to children serves as a dividing line to think about moral dilemmas differently—younger children regard rules as fixed and absolute, exhibiting a sense of moral realism while older children look at rules as more relativistic. They show a sense of moral relativism. For younger children, moral decisions and games are based on fixed rules coming from adults or God—authority figures that determine what is right or wrong. This is called the “heteronomous” stage of moral reasoning, characterized by a strict adherence to rules, duties, and obedience to authority. For older children, situations and intentions are taken into account when making moral judgment. They understand that it is permissible to change rules if everyone agrees. Rules are not sacred and absolute but are devices that humans use to get along cooperatively. As children consider these situations, they develop toward an “autonomous” stage of moral reasoning, characterized by the ability to consider rules critically and selectively apply these rules based on a goal of mutual respect and cooperation. Younger children base their moral judgments primarily on consequences, whereas older children base their judgments on intentions. When, for example, the young child hears about one boy who broke 15 cups trying to help his mother and another boy who broke only one cup trying to steal cookies, the young child thinks that the first boy did worse. The child primarily considers the amount of damage—the consequences—whereas the older child is more likely to judge wrongness in terms of the motives underlying the act (Piaget, 1965).

Cognitive-Moral Reasoning

Kohlberg's Six Stages of Moral Reasoning

Kohlberg's (1984) theories on cognitive-moral reasoning emerged from the cognitive development understandings introduced by Piaget (1965, 1997) together with Kantian concepts of justice that emerged from the work of Rawls (1971). Consistent with Piaget, Kohlberg proposed that children form ways of thinking through their experiences that include understandings of moral concepts such as justice, rights, equality and human welfare. Kohlberg followed the development of moral reasoning beyond the ages studied by Piaget, and determined that the process of attaining moral maturity took longer and was more gradual than Piaget had proposed.

On the basis of his research, Kohlberg identified six stages of moral reasoning grouped into three major levels: 1) pre-conventional: judgment is exclusively based on self-needs and perceptions; 2) conventional: judgments take into account the expectations of the society and of the law; and 3) post-conventional: judgments are based on principles that go beyond the specific law (Table 2).

Table 2. Six Stages of Moral Reasoning

Level	Stage	Orientation
Pre-conventional	1	Obedience and punishment
	2	Self-interest
Conventional	3	Interpersonal accord and conformity (a.k.a. <i>The good boy/good girl attitude</i>)
	4	Authority and social-order maintaining (a.k.a. <i>Law and order morality</i>)
Post-conventional	5	Social contract
	6	Universal ethical principles (a.k.a. <i>Principled conscience</i>)

Each level represented a fundamental shift in the social-moral perspective of the individual. At the first level, the pre-conventional level, a person's moral reasoning is characterized by a concrete, individual perspective. Within this level, a Stage 1 heteronomous orientation seeks to avoid breaking rules that are backed by punishment, obedience for its own sake and avoiding the physical consequences of an action to persons and property. As in Piaget's framework, the moral reasoning of Stage 1 is characterized by a concrete and egocentric perspective. At Stage 2 there is the early emergence of moral reciprocity. The Stage 2 orientation focuses on the instrumental, pragmatic value of an action. Reciprocity is of the form, but is more a matter of "quid pro

quo” exchanges than gratitude, loyalty or justice. The Golden Rule becomes, “You scratch my back and I’ll scratch yours.”

Individuals at the conventional level of reasoning, however, have a basic understanding of conventional morality and reason with an understanding that norms and conventions are necessary to uphold society. They tend to be self-identified with these rules and uphold them consistently, viewing morality as acting in accordance with what society defines as right. Within this level, individuals at Stage 3 are aware of shared feelings, agreements, and expectations that take primacy over individual interests. Persons at Stage 3 define what is right in terms of what is expected by people close to one’s self, and in terms of the stereotypic roles that define being good. Being good means having good motives, showing concern about others; it also means keeping mutual relationships, such as trust, loyalty, respect, and gratitude. The perspective is that of the local community or family. Behavior is judged by intentions for the first time, but there is not as yet a consideration of the generalized social system. Stage 4 marks the shift from defining what is right in terms of local norms and role expectations to defining right in terms of the laws and norms established by the larger social system, with individuals more broadly concerned with society as a whole. This is the “member of society” perspective in which one is moral by fulfilling the actual duties defining one’s social responsibilities.

Finally, at the post conventional level, moral reasoning is based on an understanding of the principles of just and social cooperation that underlie the norms and laws of society, using a “prior to society” perspective. While two stages have been presented within the theory, only one, Stage 5, has received substantial empirical support.

Stage 6 remains as a theoretical endpoint that rationally follows from the preceding 5 stages. In essence, this last level of moral judgment entails reasoning rooted in the moral fairness principles from which moral laws would be devised. Laws are evaluated in terms of their coherence with basic principles of fairness rather than upheld simply on the basis of their place within an existing social order. Thus, there is an understanding that elements of morality such as regard for life and human welfare transcend particular cultures and societies and are to be upheld irrespective of other conventions or normative obligations. These stages (1-5) have been empirically supported by findings from longitudinal and cross-cultural research (Power et al., 1989).

Table 3. The Six Moral Stages (Kohlberg)

Content of Stage			
Level and Stage	What Is Right	Reasons for Doing Right	Social Perspective Stage
LEVEL 1 – PRECONVENTIONAL Stage 1 – Heteronomous Morality	To avoid breaking rules backed by punishment, obedience for its own sake, and avoiding physical damage to persons and property	Avoidance of punishment, and the superior power of authorities	Egocentric point of view. Doesn't consider the interests of others or recognize that they differ from the actor's; doesn't relate two points of view. Actions are considered physically rather than in terms of psychological interests of others. Confusion of authority's perspective with one's own.
Stage 2 – Individualism, Instrumental Purpose, and Exchange	Following rules only when it is to someone's immediate interest; acting to meet one's own interests and needs and letting others do the same. Right is also what's fair, what's an equal exchange, a deal, an agreement.	To serve one's own needs or interests in a world where you have to recognize that other people have their interests, too.	Concrete individualistic perspective. Aware that everybody has his own interests to pursue and these conflict, so that right is relative (in the concrete individualistic sense).
LEVEL 2 – CONVENTIONAL Stage 3 – Mutual Interpersonal Expectations, Relationships, and Interpersonal Conformity	Living up to what is expected by people close to you or what people generally expect of people in your role as son, brother, friend, etc. "Being good" is important and means having good motives, showing concern about others. It also means keeping mutual relationships, such as trust, loyalty, respect and gratitude.	The need to be a good person in your own eyes and those of others. Your caring for others. Beliefs in the Golden Rule. Desire to maintain rules and authority which support stereotypical good behavior.	Perspective of the individual in relationships with other individuals. Aware of shared feelings, agreements, and expectations which take primacy over individual interests. Relates points of view through the concrete Golden Rule, putting yourself in the other guy's shoes. Does not yet consider generalized system perspective.
Stage 4 – Social System and Conscience	Fulfilling the actual duties to which you have	To keep the institution going as a whole, to	Differentiates societal point of view from

	agreed. Laws are to be upheld except in extreme cases where they conflict with other fixed social duties. Right is also contributing to society, the group, or institution.	avoid the breakdown in the system “if everyone did it,” or the imperative of conscience to meet one’s defined obligations (Easily confused with Stage 3 belief in rules and authority).	interpersonal agreement or motives. Takes the point of view of the system that defines roles and rules. Considers individual relations in terms of place in the system.
LEVEL 3 – POSTCONVENTIONAL, or PRINCIPLED Stage 5 – Social Contact or Utility and Individual Rights	Being aware that people hold a variety of values and opinions, that most values and rules are relative to your group. These relative rules should usually be upheld, however, in the interest of impartiality and because they are the social contract. Some non-relative values and rights like life and liberty, however, must be upheld in any society and regardless of majority opinion.	A sense of obligation to law because of one’s social contract to make and abide by laws for the welfare of all and for the protection of all people’s rights. A feeling of contractual commitment, freely entered upon, to family, friendship, trust, and work obligations. Concern that laws and duties be based on rational calculation of overall utility, “the greatest good for the greatest number.”	Prior-to-society perspective. Perspective of a rational individual aware of values and rights prior to social attachments and contracts. Integrates perspectives by formal mechanisms of agreement, contract, objective impartiality, and due process. Considers moral and legal points of view; recognizes that they sometimes conflict and finds it difficult to integrate them.
Stage 6 – Universal Moral Principles	Following self-chosen moral principles. Particular laws or social agreements are usually valid because they rest on such principles. When laws violate these principles, one acts in accordance with the principle. Principles are universal principles of justice: the equality of human rights and respect for the dignity of human beings as individual persons.	The belief as a rational person in the validity of universal moral principles, and a sense of personal commitment to them.	Perspective of a moral point of view from which social arrangements derive. Perspective is that of any rational individual recognizing the nature of morality or the fact that persons are ends in themselves and must be treated as such.

From L. Kohlberg, “Moral Stages and Moralization” (pp. 34-35). In T. Lickona (Ed.), *Moral Development and Behavior*, 1976, New York: Holt, Rinehart & Winston.

Moral Reasoning Components and Schemas (Rest et al)

Rest (1979) developed a four-component model describing the process most individuals use in moral decision-making and behavior. Lapsley (1996) concludes that multi-process models, such as Rest's four-component model, may be necessary "to improve our understanding of moral reasoning" (p.105). The four-component model depicts how these cognitive structures combine to lead to one's reasoning processes when presented with a moral dilemma.

Rest's Four Component Model (Rest & Narvaez, 1994) of moral behavior has been used as a framework for various professional moral education and research programs (Bebeau, 1994; Duckett & Ryden, 1994). The model describes moral behavior as a process, including (1) moral sensitivity, interpreting a social situation, (2) moral judgment, deciding which action is the most appropriate moral action, (3) moral motivation, prioritizing moral values over other values, and (4) moral action, having the ego strength, persistence, and implementation skills to carry out the moral behavior. According to the theory, one must be competent in each of those inner psychological processes in order to carry out a moral action. The strength of this model is in its comprehensiveness, for it takes into account other facets of human behavior besides reasoning or judgment.

Studies of component I of Rest's Four-Component Model indicate several findings. First, studies have shown that many people have difficulty identifying moral dilemmas (e.g. Staub, 1978). Studies have also found differences among people in their sensitivity to the needs and welfare of others. Bebeau et al. (1982) developed a moral

sensitivity scoring system to indicate a person's ability to identify a moral dilemma. A low moral sensitivity score means an individual is unaware of the moral issue and focuses primarily on technical problems.

Component II of Rest's model focuses on determining the appropriate course of moral behavior or action. Prescriptive reasoning is defined as "the consideration of what should be done to appropriately handle a moral dilemma" (Rest, 1979). Component II research is based on the cognitive stages of moral development developed by Kohlberg (1969) and extended upon by Rest (1979). Cognitive moral development posits that individuals advance along a stage-sequence continuum in their moral development. Cognitive moral development theory assumes that an individual with lower order moral reasoning is incapable of processing higher order moral reasoning (Rest, 1979, 1986).

Component III focuses on deciding what one should do when presented with a moral dilemma. Deliberative reasoning is defined as determining 'what will actually be done' to handle a moral dilemma (Rest, 1979). Component IV involves execution of the moral plan.

Rest et al. share the core assumptions of Kohlberg's "cognitive-developmental" approach which emphasizes rationality, constructivism, individual development and the shift from Conventional to Postconventional Thinking. They also share Kohlberg's other assumptions that

- people use justice-based thinking to make decisions about moral dilemmas,
- moral thinking can influence behavior,
- moral thinking develops in complexity as a result of age and education (particularly higher education), and

- Stages 5-6 (Postconventional thinking) exist and can be measured

Following Kohlberg's system to represent logical moral reasoning, Rest et al. (1986, 1999; Narvaez, 2002) developed a neo-Kohlbergian perspective based on 25 years of data collection with the Defining Issues Test. Rest introduces (1999a, 1999b) the concept of "micromorality" which concerns the particular face-to-face relations that people have in everyday life. Kohlbergian theories are most useful for issues of "macromorality" which concerns the formal structure of society, as defined by institutions, rules, and roles. Neo-Kohlbergian theory followed Kohlberg's approach to conceptualizing moral judgment by emphasizing 1) rationality, 2) constructivism, 3) individual development, and 4) shift from conventional to post-conventional thinking and by keeping the following Kohlbergian assumptions: 1) that people use justice-based thinking to make decisions about moral dilemmas, 2) that moral thinking can influence behavior, 3) that moral thinking develops in complexity as result of age and education, and 4) that Stage 5-6 (Post-conventional thinking) exist and can be measured.

Derived from Kohlberg's approach, the Defining Issues Test (DIT) makes several departures, for example, in defining cognitive structures in terms of schemas rather than stages, reformulating the definition of postconventional moral thinking, and using different research strategies to develop an empirical foundation. Rather than using the term "moral stages", neo-Kohlbergians prefer "moral schemas" which are thought to be more concrete. The following three structures in moral reasoning development are postulated: the Personal Interests Schema, which derives from Kohlberg's Stages 2 and 3;

the Maintaining Norms Schema, which derives from Kohlberg's Stage 4; and the Post-conventional Schema, which derives from Kohlberg's Stage 5 and Stage 6.

Individuals at the Personal Interests Schema show their concerns for those with whom they have an affectionate relationship, as in elements described by Kohlbergian Stages 2 and 3, not worrying about organizing cooperation on a society-wide basis. The Personal Interests Schema does not entail a socio-centric perspective. With the Maintaining Norms Schema, however, individuals can be more advanced in attaining a socio-centric perspective, not only considering people who are friends, kin, or well-known acquaintances. The elements the Maintaining Norms Schema contains: 1) the perceived need for generally-accepted social norms to govern a collective; 2) the necessity that norms apply society-wide, to all people in a society; 3) the need for the norms to be clear, uniform, and categorical (rule of law); 4) the norms are seen as establishing a reciprocity; and 5) the establishment of hierarchical role structures, of chains of command, of authority and duty. One is expected to obey authorities, not necessarily out of respect for the personal qualities of the authority, but out of respect for the social system. Morality is defined by maintaining the established social order, and "law" is connected to "order" in a moral sense. With the Post-conventional Schema, essential to moral reasoning is that moral obligations are to be based on shared ideals, are fully reciprocal, and are open to scrutiny. Moral consensus at this schema is achieved by appealing to ideals and logical coherence whilst the strategy of the Maintaining Norms Schema is to gain moral consensus by appealing to established practice and existing authority. Therefore, developmentally, the Post-conventional Schema is more advanced than the Maintaining Norms Schema.

Summary and Critique

The most outstanding characteristics of the cognitive-developmental approach are found in notions such as stages of development, sequential organization, and in a certain congruence between biological, intellectual and moral development. The development of moral reasoning, according to Piaget, is a direct consequence of cognitive development: the moral cannot be understood or explained without a complete comprehension of the cognitive. Kohlberg conceives that the stages of moral judgment are hierarchical, and a person who progresses to a higher stage of moral reasoning cannot skip stages. For example, a person cannot jump from being concerned mostly with peer opinions (stage three) to being a proponent of social contracts (stage five). However, when persons encounter a moral dilemma and find their current level of moral reasoning unsatisfactory, they will look to the next level. Discovery of the limitations of the current stage of thinking promotes moral development.

One criticism of Kohlberg's theory is that it emphasizes justice to the exclusion of other values, specifically, it may not adequately address the arguments of people who value other moral aspects of actions. Gilligan (1982) has argued that Kohlberg's theory is overly androcentric, pointing out that his theory was the result of empirical research using only male participants. Gilligan argued that Kohlberg's theory therefore did not adequately reflect the concerns of women. She developed an alternative theory of moral reasoning that is based on the value of care. Although recent research has generally not found any gender differences in moral development, Gilligan's theory illustrates that

theories on moral development need not focus on the value of justice. Other moral philosophers have challenged the assumption of universality of Kohlberg's stages of moral development, seeing morality is a social construction. By a *social* construction, it means that morality is not constructed in the mind of any one *individual*—as individual cognitive operations—but is negotiated among individuals, deliberated, and arrived at through agreement. Common morality might be different for different communities (and therefore relative), but the common morality can be debated and scrutinized by members of the community to reflect an equilibrium between the ideals of a community and moral intuitions about specific cases.

A neo-Kohlbergian approach emerged from a research team headed by Rest (1999) who modified Kohlberg's original theory in several ways, for example, emphasizing schema theory, changing the concept of development, reconceptualizing postconventionality, changing research strategy in several ways, to propose a new synthesis of ideas, providing new perspectives in the field of morality.

The Review of Cross-Cultural Research in Moral Reasoning

Since Kohlberg, researchers have continued to ask questions concerning cultural influences on moral reasoning. Do cultural influences have an effect on moral reasoning and judgment? Different studies have been launched to verify the universality versus the uniqueness of moral development. Longitudinal studies (e.g., Colby, Kohlberg, Gibbs, & Lieberman, 1983; Page, 1981; Walker, 1989) and cross-cultural research (Boyes & Walker, 1988; Rest, 1986; Snarey, 1985, Edwards, 1987; Gielen, 1990, 1991) support the validity and universality of Kohlberg's theory of moral development. Not surprisingly, however, some social scientists (Bloom, 1977; Buck-Morss, 1975; Edwards, 1975, 1982) dispute the hypothesis of the universality and permanence of the sequences of moral development. They consider moral development as culturally bound, since different values are determined by the ideological and political principles of a culture, as well as the environment and other factors.

In a review of 45 Kohlbergian moral judgment studies in 27 countries, Snarey (1985) concluded that the content of moral reasoning appears to be relative to socio-cultural context and that the deep structure underlying and operating on the content tends to be universal. Moreover, provided that the deep structure can be developmentally differentiated into stages, these stages and their developmental sequence are also universal. Snarey further suggested that only on the preconventional and conventional levels in the Kohlbergian model of moral reasoning has consensus been reached among researchers so far as universality is concerned. Still at issue is whether principled or postconventional moral reasoning is universal.

In Damon's (1977) study of children's reasoning concerning fair distribution and legitimate authority, it has been reported that at least stages 1 through 3 were in evidence. In the three studies (Wark & Krieb, 1996; Miller, 1990, 1992; Bersoff, 1993) comparing American and Indian moral development it becomes evident that understanding moral reasoning is a very complex endeavor. However universally the underlying processes of moral reasoning might extend, cultural influences have a partial impact on development.

With respect to Chinese culture, Ma (1988, 1992) constructed a developmental model of moral judgment using the Defining Issues Test (Rest, 1975) by integrating Piaget's, Kohlberg's (1981, 1984), as well as the Chinese perspectives on moral development based on Confucianism and Taoism. Ma concluded that the initial three stages were universal, but the final three stages of moral development were influenced by cultural contexts.

In a study investigating developmental changes in moral reasoning about sibling and parental relationships in Mainland Chinese children, Fang et al. (2003) found that the result suggested universal stage-like progression in moral judgment from superficial (stages 1 and 2) to profound (stage 3), and that culture-specific moral reasoning also existed. For example, in comparison to children in Kohlberg's studies, Chinese children's moral decisions emphasized respect for authority, altruism, and concern over their siblings' moral correctness. The authors argued that Chinese children's moral characteristics are influenced by the cultural context.

Summary and Critique

Studies that used cognitive developmental approaches in researching the development of moral reasoning revealed that the deep structure underlying and operating on morally problematic situations tends to be similar, whereas studies that used psychosocial approaches showed the importance of cultural factors (e.g., interpersonal relationship oriented) in moral development. These findings suggest that psychosocial development in group-oriented cultures such as China differs from development in individualistic cultures such as the United States.

Moral Reasoning Measurement

Kohlberg's Interview Method

Kohlberg's (1958) basic interview consists of a series of dilemmas including "Heinz Steals the Drug". His core sample was comprised of 72 boys at the ages of 10, 13, and 16 from both middle- and lower-class families in Chicago. Later, boys and girls from other American cities and from other countries were added to his sample (1963, 1970).

Not really interested in whether the subject says "yes" or "no" to this dilemma, Kohlberg's interest is in the reasoning behind the answer—why the subject thinks Heinz should or should not have stolen the drug. The interview is conducted to ask new questions which helped researchers understand the child's reasoning. For example, the interview asks children if Heinz had a right to steal the drug, if he was violating the druggist's rights, and what sentence the judge should give him once he was caught. Once again, the main concern is with the reasoning behind the answers. The interview then continues to give more dilemmas in order to get a good sampling of a subject's moral thinking.

After he had classified the various responses into stages, Kohlberg wanted to check the reliability of his classification through *interrater reliability*. In particular, he wanted to know if others would score the protocols in the same way. Other judges independently scored a sample of responses, and he calculated the degree to which all raters agreed. Kohlberg found these agreements to be high, as he has in his subsequent

work, but whenever investigators use Kohlberg's interview, they also should check for interrater reliability before scoring the entire sample.

A lengthy interview (Moral Judgment Interview) is required to determine the moral reasoning stage of the respondent, which is problematic in many respects. One of the main problems with the MJI is that it depended on the respondent's ability to articulate their reasons for their decisions. This required a self-awareness that most people – especially children – do not possess. To correct the “verbal ability” problem and to make Kohlberg's stages more testable, Rest developed a pencil-and-paper Defining Issues Test, which was much easier to administer and did not require that the respondent verbalize the reasons for specific choices.

Defining Issues Test

The Defining Issues Test (DIT) (Rest, 1979; 1986), which is based on Kohlberg's (1975) interview method, has been extensively used as a surrogate measure of levels of principled moral reasoning. Based on Kohlberg's stages of moral development, DIT research is built on the assumption that “developmental stages of moral judgment involve distinctive ways of defining social moral dilemmas and of evaluating crucial issues in them” (Rest, 1979, p.85). The DIT has three versions—the long form which consists of six separate scenarios (Heinz and the Drug, Escaped Prisoner, Newspaper, Doctor's Dilemma, Webster, Student Take-over), the short form that includes three scenarios (Heinz and the Drug, Escaped Prisoner, and Doctor's Dilemma), and the newer version DIT-2 (Rest et al., 1998; 1999) with five vignettes (Famine, Reporter, School Board,

Cancer, and Demonstration), which is better-validated and more widely-used. The score on the DITs, which ranges from 0 to 95, measures the subject's reasoning level according to Kohlberg's cognitive moral development theory.

The Defining Issues Test (DIT) is an objective test, compared with traditional assessment of stages from cognitive development theories, like Kohlberg's, involving a clinical interview for the participants to be presented with a dilemma and to be asked to make a decision. In traditional assessments, the scoring depends largely on the nature of explanation, which makes it difficult to perform because it requires well-trained interviewers. This kind of assessment is very time-consuming and expensive. Compared with traditional assessment in the form of interview, The DIT is easier to use. Six dilemmas in the long form are similar to those used in Kohlberg's interview but printed on the page, along with 12 questions. Participants are asked to rate how important each question is in making their decisions, what their decision is, and then to rank the four most important questions. These four most important items are the only items that enter into the scoring. From the test the researcher gains a P score (percentage of principled thinking) and a D score (a composite needing computer scoring to calculate), as well as checks for consistency and the number of meaningless items the subject checks. These items are written as lofty and pretentious sounding but are meaningless. Too high a score indicates that the subject does not understand test directions. The test requires a reading age of approximately 12-13 years. The original DIT remained unchanged for over twenty years and is cited in over 400 published articles (Rest et al., 1999).

As found in a review of the DIT by Sutton (1992), the reliability of the DIT is good. Test-retest correlations range from .71 to .82 for the P index, and .67 to .92 for the

D index. For a shorter three-story test version test-retest correlations range from .58 to .77 for the P index, and .63 to .83 for the D index. The values for Cronbach's alpha are .77 for the P score and .79 for the D score. Alpha values for the shorter version are .76 for the P score and .71 for the D score. To establish criterion-group validity, mean scores for graduate students in moral philosophy and political science, college students, senior high school students, and ninth grade students were compared. Significant differences were found between the groups. Any developmental measure should show longitudinal change in the direction of higher stages. Significant upward trends over 6 years and four testings ($F = 17.6, p < .0001$) for the P score are reported. Research has indicated that individuals are unable to fake good on the DIT. Additional information in the manual may be found on validation studies related to experimental enhancement, and multidimensional scaling and latent trait analysis. Normative data provided in the manual are very extensive. These data are broken down by educational level—junior high, high school, college, professional school and graduates, and nonstudent adults. Scores on the DIT are correlated positively with education, IQ, and age (for student groups). Interestingly, no consistent relationship has been found with DIT scores and gender, socioeconomic status, and college major.

The Defining Issues Test (DIT-2) is an updated version of the DIT in which Rest and his colleagues (Rest, Narvaez, Bebeau, & Thoma, 1999) have used schema theory to interpret DIT-2 scores. It consists of five social problems to which participants respond.

- “Famine”- a father contemplates stealing food for his starving family from the warehouse of a rich man hoarding food- comparable to the Heinz dilemma in DIT-1.

- “Reporter”- a newspaper reporter must decide whether to report a damaging story about a political candidate- comparable to the prisoner dilemma in DIT-1.
- “School Board”- a school board chair must decide whether to hold a contentious and dangerous open meeting- comparable to the newspaper dilemma in DIT-1.
- “Cancer”- a doctor must decide whether to give an overdose of a painkiller to a frail patient-comparable to the doctor dilemma in DIT-1.
- “Demonstration”- college students demonstrate against U.S. foreign policy-comparable to the students’ dilemma in DIT-1.

The N2 measure was also developed by Rest et al. (1999) for calculating a moral developmental score. The DIT-N2 score is comparable to DIT1- P score or principled reasoning score. Rest et al. (1997) reported that the N2 index has superior performance in comparison to the traditional P index. In order to determine the DIT2’s validity, Rest et al., (1999) administered the DIT1 and the DIT2 to a sample of 200 participants representing four different age and educational levels. The results indicate that the DIT2-N2 measure has higher validity characteristics on the three criteria compared to the DIT1-P-score. The results also indicate a high correlation (.71) between the DIT-1 and DIT-2.

The DIT-1 and DIT-2 also use different methods to ensure participant reliability checks. The DIT1 contains four standard checks to assess participants’ responses. These checks are designed to address the following problems commonly found when using the DIT-1 in empirical research: 1) random responding, 2) missing data, 3) alien test-taking sets, and 4) nondiscrimination of items. Although the DIT2 performs the same standard checks, Rest et al., (1999) incorporated cut-off points for weighted rank-rate inconsistencies to decrease the number of unreliable participants. Rest et al., (1999)

reports a loss of 8 (4%) participants using the new checks in the DIT-2 compared to a loss of 46 (23%) participants using the standard checks in the DIT1.

Overall, the increased validity and reliability results are attributed to the DIT-2's new methods of analyzing the data. Rest et al., (1999) emphasizes the practical research advantages that the DIT2 has by reducing the number of purged participants compared to the DIT-1. As previously mentioned, the DIT-2 updates the dilemmas and issue statements, shortens the test, and has clearer instructions compared to the DIT-1. The results from this study may contribute to existing ethics research by providing further information on the usefulness of the DIT-2 in accounting ethics research.

Critique of the DIT

The problems with this test are associated with its age. Two of the dilemmas in the test involve real issues surrounding the Vietnam war. To high school and college students, these are obviously not completely hypothetical dilemmas, but they are not part of their personal memory (or, perhaps, interest). One dilemma is the classic case of whether Heinz should steal to get money for drugs to save his wife's life. This dilemma has been summarized and reprinted so widely that it may be difficult to find a group of naive college graduates, or even undergraduates. The lack of norms and discussion of moral reasoning for U.S. ethnic minority groups, always a serious omission, appears more glaring in the 1990s because of the increased number of minorities in the country. Cognitive developmental theory, which assumes that a stage reflects a level of reasoning that can be generalized across situations and content, is challenged with recent work. In

particular, researchers are more likely to assume that reasoning or problem solving is domain specific. While the test developer, Rest, takes a “soft” stage position, his test gives a summary score of principled thinking, not separate scores within domains. In contrast, separate moral developmental histories have been proposed in rights versus conventional rules (Turiel, 1983) or friendship, justice, fairness, obedience and authority, and social rules and conventions (Damon, 1977). However, easy-to-use tests are not available for these newer approaches. In summary, in many aspects this test is a model of instrument development in social sciences. It has good psychometric properties, a full and informative manual, is easy to administer, is inexpensive, and was based on an established theory. There are a wealth of data on the use of the DIT including two detailed books by Rest (Rest, 1979, 1986). However, the test is dated and so should be used with caution, especially with ethnically diverse groups.

The Development of Epistemological Beliefs

The Historic Views of Epistemological Beliefs

Epistemology, the study of knowledge and knowing, according to Buehl and Alexander (2001), has been one of the cornerstones of philosophy. The term, derived from Greek *episteme* (i.e. knowledge) and *logos* (i.e. explanation), has remained a taproot of philosophical inquiry for centuries. Plato, in his *Theaetetus*, explored the elemental components of knowledge as truth, belief and justification. Kant (1781) differentiated between a priori knowledge (i.e. what we know prior to experience) and a posterior knowledge (i.e. what we know based on experience), distinguishing the rational knowledge from the empirical knowledge. He argued that a prior knowledge is 1) logical and necessary, 2) not derivable from particular sensations and experiences, 3) presupposed in all our experiences, and 4) contributed by our mind. James (1890), Peirce (1877), Dewey (1916), and Whitehead (1967) indicated in their writings a psychological turn in issues related to knowledge and knowing.

The Models of Studying Epistemological Beliefs

Development Model. The contemporary study of personal epistemology began with the groundbreaking work of Perry (1970), whose research was based on his team interviewing Harvard undergraduates for four years. Using the open-ended and nondirective longitudinal interviews and a paper-and pencil instrument—the Checklist of

Educational Views (CLEV), they explored each individual's beliefs about knowledge and learning and how they change over time. At the beginning of their college years, students are dualistic in holding a right or wrong, absolute view and belief that truth can be known and the role of the teacher is to communicate it. Students believe that simple and unchangeable facts are handed down by omniscient authority. By the time they reach their senior year, students turn to more realistic in believing that complex and tentative knowledge is derived from reason and empirical inquiry. Therefore, Perry hypothesized nine developmental positions classified into four categories that serve as the path from being a dualistic thinker in early college years to being a committed relativistic thinker at the end of the four-year college experience.

Critique of the Development Model. The territory of epistemological beliefs long has been of interest to philosophers, but its paradigm shift owes much to the interest of current psychologists' empirical research. The work of Perry and his research team, in their interviews, identified the nine positions of students' epistemological development that were classified into four categories. His work suggested that college students changed their beliefs in simple, unchanging knowledge that is handed down by authority into their beliefs in complex, tentative knowledge coming from reasoning and empirical evidence as these students reach their senior year. Although the focus of the Perry scheme is on understanding epistemology in the situated context of learning, his is not on studying epistemological beliefs per se (Moore, 2002). Glenberg and Epstein (1987) failed to find Perry's conceptualization useful in that Perry's epistemic scheme is a unidimensional measure linked with students' cognition. Additionally, Schommer and Walker (1997) believed that unidimensional approach to epistemological beliefs does not

adequately capture the nature of personal epistemology. Hofer (2001) indicated that Perry's sample had been predominately male and from an elite institution.

Reflective Judgment Model. Building on Perry's unidimensional intellectual development model, Kitchener and King (1981) described the Reflective Judgment Model to trace young people and adult intellectual development (King and Kitchener, 1994). They proposed a three-level cognitive processing model: cognition, metacognition, and epistemic cognition and later modified as a general approach to the study of epistemology—the Reflective Judgment Model (RJM) with seven stages in three levels (King and Kitchener, 2002). The first level is Pre-reflective Thinking (Stage 1, 2 and 3); in this level, individuals are unlikely to perceive that problems exist for which there may be no correct answer. For example, in Stage 1, knowledge is expected to exist absolutely and correctly, and it can be obtained with certainty by direct observation. “I know what I have seen.” In Stage 2, knowledge is viewed as absolutely certain or certain but not immediately available, and it can be obtained through sense or via authority figures. “If it is on the news, it has to be true.” And in Stage 3, knowledge is assumed to be temporary uncertain, and only personal beliefs can be known. “When there is evidence that people can give to convince everybody one way or another, then it will be knowledge; until then, it's just a guess.” The second level is Quasi-reflective Thinking (Stage 4 and 5), and in this level one has a growing realization that she cannot know with certainty, for example, in Stage 4, knowledge becomes uncertain and knowledge claims idiosyncratic. “I'd be more inclined to believe evolution if they had proof. It's just like the pyramids: I don't think we'll ever know. Who are you going to ask? No one was there.” and in Stage 5, knowledge is contextual and subjective. “People think differently and so they attack the

problem differently. Other theories could be as true as my own, but based on different evidence.” The third level, Reflective Thinking, includes Stage 6 and Stage 7 in which knowledge is actively constructed and must be understood contextually. “It’s very difficult in this life to be sure. These are degrees of sureness. You come to a point at which you are sure enough for a personal stance on the issue”, (Stage 6) and, “One can judge an argument by how well thought-out the positions are, what kinds of reasoning and evidence are used to support it, and how consistent the way one argues on this topic is as compared with other topics” (Stage 7). “Reflective judgment delineates the development of the process of knowing and reasoning.”(Hofer, 2001, p. 358). The later stages of knowing are regarded as more mature, because they allow individuals to use more alternatives to solve different kinds of problems.

Critique of the Reflective Judgment Model. Unlike Perry whose model focuses primarily on the nature of knowledge, the reflective judgment model developed by King and Kitchener (1994) delineates the development of the process of knowing and reasoning. The model adopts a developmental approach to understand the epistemic assumptions that are related to individuals’ judgments about ill-structured problems (Hofer, 2004a). Yet, many questions about the internal coherence of the reflective model of epistemic cognition remain unanswered. For example, Dove (1990) independently examined scores of the reflective model and found the predicated consistency across stages. However, the issue has not been independently explored in the later stages. Similarly, Scott’s (1994) work suggests that there may be stylistic differences in individuals’ approaches to epistemic assumptions within levels. Furthermore, Wood’s (1997) extensive secondary analysis and findings from DeBord’s (1993) study suggest

that there may be a context effect for some dilemmas for some individuals. Again, these data should be verified and extended to other stages.

Embedded System Model. By extending the work of Perry (1970) and Spiro (1989), Schommer (1990, 1994) developed an “embedded system model” to describe the basic elements of the epistemological belief system. Previous researchers conceptualized epistemological beliefs as a highly complex yet unidimensional entity or focused on unique aspects under a rubric of personal epistemology. As an alternative, Schommer (1990) proposed that epistemological beliefs would better be reconceptualized as a system of more-or-less independent beliefs. System of belief means that epistemological beliefs are multidimensional, and there is more than one belief to consider. A five-belief taxonomy that Schommer created includes beliefs about 1) simple knowledge (i.e., knowledge consists of discrete facts), 2) certain knowledge (i.e., absolute knowledge exists and will eventually be known), 3) omniscient authority (i.e., authorities have access to otherwise inaccessible knowledge), 4) quick learning (i.e., learning occurs in a quick or not-at-all fashion), and 5) innate ability (i.e., the ability to acquire knowledge is endowed at birth). These original hypothesized beliefs included beliefs about the following: (a) the structure of knowledge (ranging from isolated bits and pieces to integrated concepts), (b) the stability of knowledge (ranging from unchanging to continually changing), (c) the source of knowledge (ranging from handed down by authority to derived from empirical evidence and reasoning), (d) the speed of learning (ranging from quick all-or-none to gradual), and (e) the ability to learn (ranging from fixed at birth to improvable over time and experience). “More-or-less independent” refers to the assumption that all beliefs may not develop at the same rate and are sometimes

inconsistent. For example, at some point in time an individual may hold extreme beliefs of isolated knowledge and certain knowledge. As development occurs, an individual may come to believe that knowledge is highly interrelated, yet still maintain the notion of certainty of knowledge. The most important point of Schommer's theory is that one cannot simply assume that epistemological beliefs are in sync. This is particularly true when individuals are changing their epistemological beliefs.

Epistemological Reflection Model. Based on intensive interviews with young adults ranging from age of 18 to 30, Baxter Magolda (1992, 2001) developed the epistemological reflection model, used widely for understanding the development of college students. Baxter Magolda sees epistemology as focus on the nature of learning as situated in the college classroom context and less on assumptions about knowledge (Hofer & Pintrich, 1997, p. 98). Describing her model based on assumptions as socially constructed and context bounded (Baxter Magolda, 2002, p.91), Baxter Magolda identified this sequence of four ways of knowing: 1) absolute knowing—receiving or mastering knowledge (knowledge is certain and obtained from authorities), 2) transitional knowing—interpersonal and impersonal patterns (knowledge is partially certain and requires understanding), 3) independent knowing—interindividual and individual patterns (knowledge is uncertain and requires independent thinking or individual challenging), and 4) contextual knowing—integrating relational and impersonal knowing in the postcollege students (knowledge is judged on evidence with context). Gender perspectives also played a role in her study. She concluded that the overall pattern of development of the nature of knowledge for men and women may be similar, gender-related patterns of knowing may appear in early stages and then converge. Males adopted

more “impersonal” and “individualist” ways of knowing, and women more “personal” and “interindividualist” ways of knowing.

Critique of the Epistemological Reflection Model. Gender does play a role in Baxter Magolda’s epistemological study. Compared to earlier theories, Baxter Magolda’s study also provides more contextual information to inform instructional practices (Duell & Schommer, 2001), and Baxter Magolda’s approach concerning the role of the learner, role of peers, role of instructor, and evaluation enriches the study of personal epistemology. Yet, in the development and articulation of her model, Baxter Magolda addressed a number of beliefs that were not necessarily epistemological in nature, i.e., beliefs about the role of the learner, peers, and instructor, and beliefs about evaluation, although Baxter Magolda’s assessment of beliefs is the most academically focused. Rather than distill students’ beliefs about knowledge from these broad responses, Baxter Magolda includes beliefs about the role of the learner, peers, and instructor, and beliefs about evaluation in her overall descriptions of each way of knowing. Such beliefs are indeed important and informative, but according to Buehl and Alexander (2001), it seems misleading to use the term Epistemological Reflection Model when so many other belief systems are intertwined.

Metacognition Model. Hofer (2004b) has conceptualized personal epistemology in one of two primary ways—either as a cognitive developmental process or as a system of beliefs. Building on the work of Flavell (1979), Kitchener (1983), and Kuhn (1999b), the metacognition model conceives of epistemological understanding as a metacognitive process that activates epistemic theories, a multidimensional set of interrelated beliefs about knowledge and knowing. Epistemic understanding might be

understood best in its relation to metacognition (Flavell, 1979), defined in its broadest sense as knowing about knowing. According to Flavell (1979, 1987), metacognition consists of both metacognitive knowledge and metacognitive experiences or regulation. Metacognitive knowledge, which consists of person variables, task variables and strategy variables, refers to acquired knowledge about cognitive processes, knowledge that can be used to control cognitive processes. Kitchener (1983) developed this three-level model: 1) cognition, 2) metacognition, and 3) epistemic cognition, in which each level builds a foundation for the next. Level 1 includes cognitive processes such as computing, reading, and perceiving; Level 2 contains the metacognitive processes that permit knowledge about cognitive tasks, in particular the application of strategies and a monitoring of their use. Level 3, in conjunction with the first two, involves the monitoring of the epistemic nature of problem solving, including an awareness of the limits and certainty of knowing, and the criteria involved in the process of knowing. This process is particularly critical, according to Kitchener, in the solving of ill-structured problems. Developmentally, epistemic cognition emerges in late adolescence but continues to evolve during adult years.

Metaknowing, a developmental model provided by Kuhn (1999a, 1999b, 2000a, 2000b) includes these three levels: 1) metacognitive knowing, 2) metastrategic knowing, and 3) epistemological meta-knowing. Metacognitive knowing refers to knowing about declarative knowledge, or knowing about knowledge as a product. Metastrategic knowing refers to knowing about procedural knowing, or knowing about knowing as a process. The more abstract process of knowing about knowledge and knowing is classified as epistemological meta-knowing. Early epistemological meta-knowing begins in the

transition “from simply knowing that something is true to evaluating whether it might be” (Kuhn, 2000b, p. 317). In summary, viewing epistemological thinking as an advanced form of meta-knowing provides greater clarity and precision to the construct.

Critique of the Metacognition Model. Based on Kitchener’s (1983) epistemic cognition and Kuhn’s (1999a, 1999b) epistemological meta-knowing, both of which encompass “knowing about knowing,” Hofer (2004b) describes this approach as a process of epistemic monitoring and evaluation in addressing ill-structured problems (King & Kitchener, 1994), in argumentation about complex problems (Kuhn, 1991), and in the knowledge acquisition and construction process taking place in everyday learning, both in and out of school.

Epistemological Resources Model. Hammer and Elby (2002) developed an epistemological resources model to challenge both the levels and methods of analysis implied by the structure of existing models of personal epistemology, as well as the suggested intra-individual consistency across contexts. Beliefs might be consistent within a context, for example, within a certain subject, particular physics course (Hammer, 1994); but not across contexts, for example, a physics class and a psychology class, or, moreover, a physics class and interpersonal relationships.

Critique of the Epistemological Resources Model. Based on work of those who engaged in research on science instruction, this epistemological resources model offers a view of personal epistemology that is more situational and less stable or trait-like. More work is needed to test this model, which shows considerable promise in advancing the conceptions of personal epistemology and better integrating such conceptions with developing understanding of the situated nature of cognition (Brown et al., 1989). It is

likely that beliefs about each of the dimensions of knowledge and knowing might differ not only from a physics to a psychology class, but from one physics class to another physics class, depending on such things as the beliefs of the teacher and how these are instantiated in classroom tasks and pedagogy (Hofer and Pintrich, 1999).

Integrated Model. Although different areas of research have different well-articulated models that promote theory testing and discussion of educational implications, some researchers, like Schraw (2001), are concerned that “there is not a unified model of epistemological understanding to guide research, nor is there a single model that clearly articulates the relationship among epistemological world views, epistemological beliefs, and how those beliefs change and develop. As a result, little is known about the origin and development of individuals’ epistemological beliefs.” Schraw (2001) expected that “an integrated model of epistemological beliefs is necessary if research is to make the transition from descriptive to prescriptive accounts of epistemology.”

By synthesizing a collection of articles that addresses several of the important issues in research on personal epistemology, Bendixen and Rule (2004) propose a more integrated model that elaborates on the following fundamental elements of personal epistemology: (a) a mechanism of change (i.e., epistemic doubt, epistemic volition, and resolution strategies), (b) dimensions of beliefs, (c) advanced beliefs, (d) metacognition, (e) conditions for change (i.e., dissonance and personal relevance), (f) affect, (g) cognitive abilities and environment, and (h) reciprocal causation. In developing this model, they seek to integrate the diverse models of personal epistemology to guide and inform future research and educational practice.

Critique of the Integrated Model. One of the contributions Bendixen and Rule (2004) provided is their effort in developing an integrative approach as a guiding model by integrating the diverse models of personal epistemology to guide and inform future research and educational practice. Considering the complicity—the diversity and dynamics of the nature of epistemology in terms of its dimensions and domains, it seems a difficult task to develop a comprehensive and all-embracing model; rather, a guiding principle for further research in future is more in demand.

Table 4. Epistemological Study Models

Model	Nature	Assumptions or Descriptions	Instruments	Educational Implications
Developmental model (Perry)	Developmental approach, unidimensional	Dualism (Positions 1-2), Multiplicity (P3-4), contextual relativism (P5), commitment within relativism (P6-9)	Interviews & the Checklist of Educational Views (CLEV), a paper-and-pencil instrument	Students will develop from dualistic thinkers into relativistic thinkers
Epistemological reflection model (Baxter Magolda)	Developmental approach; unidimensional, Epistemological transformations as part of the act of meaning-making	1) absolute knowing, 2)transitional knowing, 3) independent knowing, 4) contextual knowing	Measure of Epistemological Reflection (MER)—a standardized open-ended questionnaire with a standardized protocol	Widely used in higher education for understanding the development of college students
Reflective judgment model (King & Kitchener)	Developmental approach, unidimensional	3 Levels: 1. Pre-reflective (stage 1,2, and 3), 2. Quasi-reflective (stage 4 and 5), 3. Reflective (stage 6 and 7)	Reflective Judgment Interview	To understand the epistemic assumptions that are related to individuals' judgments about ill-structured problems
Embedded systemic model (Schommer)	Describes basic elements of the epistemological belief system as multidimensional	1) Stability of knowledge, 2) Structure of knowledge, 3) Speed of Learning, 4) Ability to Learn, 5) source of knowledge	1. Schommer's 5-point Likert-scale questionnaire 2. Schraw's Epistemic Belief Inventory (EBI)	Includes cultural relational views and addresses issues of reciprocal interaction

Epistemic metacognition model (Kitchener & Kuhn)	Views epistemological awareness as a metacognitive process, multidimensional	Metacognition: 1) Cognition, 2) metacognition, 3) epistemic cognition Meta-knowing: 1) metacognitive knowing, 2) meta-strategic knowing, 3) epistemological meta-knowing	More commonly activated in the knowledge acquisition and construction process that takes place in everyday learning, both in and out of school
Epistemological resources model (Hammer & Elby)	An alternative ontological approach that is contextual and finer grained	Beliefs might be consistent within a context, but not across context	
Guiding model (Bendixen & Rule)	An integrative theoretic approach, multidimensional	Elaborates fundamental elements of personal epistemology: 1) a mechanism of change, 2) dimensions of beliefs, 3) advanced beliefs, 4) metacognition, 5) conditions for change, 6) affect, 7) cognitive abilities and environment, and 8) reciprocal causation	Helps further understand the complexities of the epistemological growth and conceptual change of students; further clarifies the role of teachers in such a process and how their own views of the nature of knowledge and knowing impacts their teaching; and supports the views that even young students would benefit from more constructivist climate in and out of the classroom

Source: Moore, 2002; Hofer, 2004b

Epistemological Beliefs: Its Cross-Cultural Context

One of the major research problems that has been ignored in the epistemological beliefs literature is based on the fact that there exists potential cross-cultural variability in epistemological beliefs (Chan & Elliot, 2004; Schraw, 2001). Most recent studies on epistemological beliefs have been conducted in North American contexts where independent, democratic and pluralistic values are dominated and individualism is highly valued in the society. In contrast to this epistemological orientation in these pluralistic academic and social communities, a few authors have speculated on the potential differences in epistemological beliefs in other cultural contexts (Ballard & Clanchy, 1991; Lee, 1995; Qian & Pan, 2002).

Youn et al. (2001) investigated the nature of epistemological beliefs about learning by analyzing the type of factors involved in the epistemological development of South Korean high school students. In literature reviews they found that previous studies on the epistemological development of American high school students suggested that American students' learning beliefs are related positively with their age, amount of formal education, and academic achievement. By multiple regression analysis, their study, however, showed that no such relationships were identified in the South Korean sample except between students' beliefs and their academic achievement. These results reconfirmed the culture-specific nature of epistemological beliefs, which was identified from previous comparative studies with South Korean and American college students (Youn, Kim, & Yang, 1999; Youn, 2000).

In one of the first studies of the relationship between cultural relational views and epistemological beliefs, Tasaki (2001) found that whether students' endorsement of 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 nonwestern cultures who approach educational experiences with a unique culturally-based epistemology.

With respect to the epistemological development in a Chinese culture, Chan (2003a) 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, 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 (2003a) 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 (Marton & Saljo, 1976; Chan, 2003). 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 (2003a) 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 Schommer (1990) and Chan (2003) studies identified the dimensions of *innate/fixe*d ability and *certainty of*

knowledge. However, Chan (2003a) 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 (2003a) 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, 2003a, p. 45)

In summary, current research on culture and epistemological beliefs (Youn, 2000; Chan, 2003a; Chan & Elliot, 2003) 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 that in Hong Kong context students are exposed to the interactive influences of both traditional Chinese Confucian-heritage culture and Western philosophies, research exploring cultural differences in mainland Chinese samples' epistemological beliefs is needed.

Epistemological Beliefs Measurement

Various methods have been used to measure an individual's epistemological beliefs ranging from a personal interview method to questionnaires. For example, Perry and his colleagues (1968) devised a 90 (later reduced to 46) Likert-type-item Checklist of Educational Views, a paper-and-pencil instrument, followed by an open-ended and nondirective interview, to measure "the degree of (students') preference for black-white, right-wrong thinking in an authority-oriented outlook as against their preference for contingent, relativistic thinking in an outlook of greater individual judgment" (Perry, 1968, p. 101). The Reflective Judgment Interview was developed by King (1986), later paper-and-pencil measures recently developed by Kitchener et al. (1999), to measure individuals' level within the seven stages of the Reflective Judgment Model. The Measure of Epistemological Reflection (MER), which is a standardized open-ended questionnaire with a standardized rating protocol (Baxter Magolda, 1992; Baxter Magolda & Porterfield, 1988) was developed to capture the patterns of epistemological thinking that are related to, but not determined by, gender. This instrument is helpful in comparing across groups. However, the open-ended questions require careful interpretation, which can be a time consuming and challenging task.

Among the instruments that have been developed to measure multi-dimensional aspects of a person's beliefs about the nature of knowledge and knowing, the most reliable questionnaires are reported to be the Epistemological Questionnaire (EQ) developed by Schommer (1990) and the Epistemic Beliefs Inventory (EBI) conducted by Bendixen et al. (1998). The Epistemological Questionnaire (EQ) is comprised of 63 items,

representing twelve subscales or epistemological orientations. Initially, Schommer (1990) proposed five beliefs pertaining to Certain Knowledge (i.e., absolute knowledge exists and will eventually be known), Simple Knowledge (i.e., knowledge consists of discrete facts), Omniscient Authority (i.e., authorities have access to otherwise inaccessible knowledge), Quick Learning (i.e., learning occurs in a quick or not-at-all fashion), and Innate Ability (i.e., the ability to acquire knowledge is endowed at birth). These original hypothesized beliefs included beliefs about the following: 1) the structure of knowledge (ranging from isolated bits and pieces to integrated concepts), 2) the stability of knowledge (ranging from unchanging to continually changing), 3) the source of knowledge (ranging from handed down by authority to derived from empirical evidence and reasoning), 4) the speed of learning (ranging from quick all-or-none to gradual), and 5) the ability to learn (ranging from fixed at birth to improvable over time and experience). Four of these five dimensions have been validated empirically as factors within the EQ (Schommer, 1990; Schommer, Crouse, & Rhodes 1992; Schommer & Dunnell, 1994). The fifth dimension, source of knowledge, hypothesized by Schommer (1990), has not yet been validated. This exclusion is important, given that researchers have postulated a relationship between beliefs about authority and skilled reasoning (Curtis, Billingslea, & Wilson, 1988; Damon, 1988; Jehng et al., 1993; Perry, 1970; Presley, 1985). The biggest contribution of Schommer's EQ, as reviewed by Buehl and Alexander (2001), is that by devising a paper and pencil measure, it becomes possible to permit the efficient testing of large samples, allowing the application of more advanced statistical techniques in analyzing and modeling beliefs, and providing researchers the

ability to examine epistemological beliefs in relation to other cognitive processes and learning outcomes.

In an effort to improve on Schommer's questionnaire, Schraw et al. (1995) developed a 32-item instrument, the Epistemic Beliefs Inventory (EBI), to capture all five beliefs hypothesized by Schommer (1990) and to generate factor analysis in items. Items were simple statements about knowledge and learning. Participants respond on a 5-point Likert scale from "*strongly disagree*" to "*strongly agree*." Some new items were created by Schraw and his colleagues with a small percentage of the items very similar to Schommer's. Later, the EBI was revised as a 25-item inventory by Bendixen et al. (1998) to measure five different factors regarding the nature of knowledge and the origins of individuals' abilities. The items were answered on a six-point Likert scale instead of on a five-point Liket scale. Scores for each of the five subscales could range from five to 30.

The EQ and EBI were analyzed in two ways (Schraw et al., 2002). The first was a principal factor analysis with oblique rotation (i.e., correlated factors). The second was a principal factor analysis with varimax rotation. Because both oblique and varimax rotations led to highly similar solutions in which none of the factors were correlated above the traditional .30 level (Gorsuch, 1983), Schraw et al. reported only the principal factor analysis with varimax rotation solutions. The findings suggested these four conclusions: 1) the EQ and EBI instruments differ with respect to the number of factors they yield and the degree to which these factors match theoretical predictions, 2) differences exist with respect to the proportion of sample variance explained by the two instruments, 3) the EBI had better predictive validity than the EQ when correlated with a

test of reading comprehension, and 4) the EBI had considerably better test-retest reliability than the EQ.

One of the problems in Schommer's EQ is that it consistently yields a large number of potentially interpretable factors, each accounting for a relatively small share of total sample variation. A second difference between the two instruments concerned the proportion of sample variation the two instruments explained. The first five factors on the EQ explained 35.5% of total variation, while the EBI explained 60% of total sample variation. A one-month replication led to values of 39% and 64%, respectively. A third difference concerned construct validity, or the degree to which the two instruments, and their individual factors, measured the hypothesized constructs. One interpretative problem of the EQ is that it generated two Certain Knowledge factors. In comparison, the EBI did not have any obvious interpretive problems, in that each of the factors was conceptually distinct and all of the items that loaded on individual factors were related logically to the relevant construct. The EBI also had better predictive validity than the EQ. Four of the five factors from the EBI were modestly, though significantly, related to the test of reading comprehension. In contrast, none of the EQ factors was significantly correlated with total reading comprehension scores. The final difference was that the EBI yielded a close replication of factors between the initial and replication analyses, while the EQ did not. This indicated the EBI is more reliable over time than the EQ. For these reasons described above, the Bendixen et al. (1998) modifications are accepted for this study, and their measurement instrument is utilized in this study.

Summary

Epistemology, as a philosophical concept, is concerned with the nature and justification of human knowledge. From a psychological and educational perspective, the focus of concern among those studying epistemological beliefs or epistemic cognition is how the individual develops conceptions of knowledge and knowing and utilizes them in developing understanding of the world. This concept includes beliefs about the definition of knowledge, how knowledge is constructed, how knowledge is evaluated, where knowledge resides, and how knowing occurs (Hofer, 2002; Hofer & Pintrich, 1997). Epistemological beliefs seem to develop with education from naive beliefs that certain, compartmentalized knowledge comes from a single source to beliefs that evolving, interrelated knowledge from multiple sources must be evaluated. Most research on epistemological beliefs centers on their development or the connection of students' epistemological beliefs to academic success. This study extends the work in this area by examining the relationship among epistemological beliefs and previously unmeasured outcome variables such as moral reasoning, in a cross-cultural context.

Studies on the Relationship between Epistemological Beliefs and Moral Reasoning

One of the groundbreaking studies on the relationship between epistemological beliefs and moral reasoning was done by Bendixen, Schraw and Dunkle (1998). These researches examined this by focusing on two questions overlooked by previous studies. The first was whether epistemic beliefs are related to moral reasoning over and above the effects of other critical variables such as age, education, gender, and basic reasoning skills. Bendixen, Schraw and Dunkle (1998) hypothesized that epistemic beliefs would explain a unique and significant proportion of variance beyond these other variables. The second question concerned the dimensionality of epistemic beliefs. The four predictions they made were: 1) gender, age, education, and syllogistic reasoning scores collectively would explain a significant proportion of the variance in principled moral reasoning scores using the P index from Rest's (1979) Defining Issues Test (DIT), 2) age and education would be related to epistemic beliefs, 3) several of the epistemic beliefs would explain a significant proportion of the variance in the DIT over and above the effects of social and personal variables, and 4) individuals who held a strong belief in omniscient authority would score lower on the DIT. The participants, 100 female undergraduates and 54 male undergraduates were given a 32-item Epistemic Beliefs Inventory (EBI), a 12-item test of syllogistic reasoning, a brief demographic variable information sheet, and the Defining Issues Test (Rest, 1979) to test these predictions.

The results of a regression analysis showed that 1) the gender variable reached significance, $F(1, 139) = 19.09$, $MSE = 242.89$, accounting for 12% of sample variation in P scores (i.e., $r = .35$); 2) neither the age nor the education variables reached

significance once gender was entered into the equation; 3) syllogistic reasoning was significant, $F(1, 136) = 6.86$, $MSE = 234.91$, accounting for 4% of additional sample variation; 4) all but one of the epistemic beliefs reached significance. The order of entry was simple knowledge, $F(1, 132) = 7.03$, $MSE = 224.94$; certain knowledge, $F(1, 132) = 5.48$, $MSE = 217.34$; omniscient authority, $F(1, 132) = 6.66$, $MSE = 208.89$; and quick learning, $F(1, 132) = 4.63$, $MSE = 203.33$. These variables accounted for 4%, 3%, 4%, and 2% of the sample variation, respectively (i.e., 13% combined), over and above the variation explained by other variables.

These results confirmed the above predictions that specific epistemic beliefs such as simple knowledge were related to P scores once the effects of other variables were removed. Collectively, the four beliefs explained more variation in P scores than either gender, age, education, or syllogistic reasoning considered separately. Scores high on the simple knowledge, omniscient authority, and quick learning dimensions were correlated negatively with P scores, indicating that higher levels of principled moral reasoning were associated with a more sophisticated, and presumably less conventional, epistemic belief system. These findings demonstrated that epistemic beliefs make a unique contribution to moral reasoning, complementing the role of other variables such as gender, education, and individual cognitive skills, suggesting that the relative sophistication of one's epistemic world view may impose a developmental constraint on one's moral reasoning. Another finding suggested that simple knowledge, certain knowledge, omniscient authority, and quick learning each explained a significant proportion of variance over and above other variables, suggesting that moral decisions are related to a number of epistemic beliefs that may be independent of each other. This is consistent with the study

of Schommer (1990, 1993), who found that ill-defined cognitive tasks were related to multiple epistemic beliefs.

Another similar study done by Jeong (2003) investigated cultural differences and similarities in the relationships between epistemological beliefs and moral reasoning, exploring whether cultural patterns existed in that relationships. The participants in Jeong's study included 267 Korean undergraduate students and 214 U.S. counterparts. Each participant was provided with a packet that included 32-item Epistemic Beliefs Inventory (EBI), a 12-item test of syllogistic reasoning, a brief demographic variable information sheet, and the Defining Issues Test (Rest, 1979) short form.

Jeong's (2003) study revealed similar results in the relationship between epistemological beliefs and moral reasoning between Korean and U.S. college students. First, the results indicated that the epistemological belief omniscient authority and GPA were the strongest predictors in Korean and U.S. college students' P scores. Also, the analysis revealed that variables from the five epistemological predictors explained a substantial proportion of the variance in P scores over and above the effects of gender, age, education, GPA, academic major, and syllogistic reasoning. With the U.S. sample, the combination of omniscient authority, simple knowledge, and quick learning accounted for about 17.7% of the variance in P scores. With the Korean sample, the combination of omniscient authority and certain knowledge accounted for about 17% of the variance in P scores. Second, with both Korean and U.S. college students, Gilligan's (1982) charge of gender-bias in Kohlberg's model was not warranted by the evidence. Male and female students did not differ significantly in terms of their P scores. Also, education, major, and syllogistic reasoning had no significant correlations with P scores.

With the Korean college students, age was significantly correlated with P score, but this correlation ($r = .14$) was very low.

Jeong's (2003) study also revealed differences between the two cultural groups. The results revealed that Korean college students who viewed the nature of knowledge as certain scored lower on the DIT, whereas U.S. students' beliefs about certain knowledge had no significant relationship with P scores and accounted for little variance in P scores. On the other hand, U.S. college students who endorsed simple knowledge produced lower principled moral reasoning scores, whereas Korean students' beliefs about simple knowledge had no significant relationship with P score and accounted for little variance in P scores.

Summary

Based on Bendixen's (1998) findings, Jeong's (2003) study has suggested that both cultural similarities and differences between U.S. and Korean college students exist in the relationships between epistemological beliefs and moral reasoning. Initially, Jeong's (2003) study was based on his literature review conclusions that 1) Epistemological beliefs are related to reasoning even when other variables are removed from the equation (Bendixen et al., 1998; Bendixen et al., 1994), 2) Some beliefs are reasonable predictors of the unique variation in skilled reasoning scores; beliefs about simple knowledge, certain knowledge, and omniscient authority played especially important roles in P scores (Bendixen et al., 1998; Walker et al., 1991); beliefs in fixed ability, simple knowledge, and quick learning accurately discriminated between higher

and lower reflective judgment (Bendixen et al., 1994); beliefs about certain knowledge played especially important roles in argumentative reasoning (Kuhn, 1991; King & Kitchener, 1994), and 3) There is a negative relationship between the acceptance of authority and P scores (Curtis et al., 1988; Presley, 1985; Rest et al., 1974).

Additional studies are needed among other cultural groups. As the author indicated earlier, the Chinese people, who comprise one-fifth of the world population, are thought to be unique for their traditions and their values, and it would be meaningful to explore a cross-cultural study of the relationships between epistemological beliefs and moral judgment of Americans and Chinese.

Variables of Interest

Gender as Related to Moral Reasoning and to Epistemological Beliefs

Gilligan's (1982) critique of Kohlberg's theory of moral reasoning and her assertion of dichotomy in moral reasoning (sense of justice by men and sense of care by women) have been the subject of debate within the field of psychology for more than 15 years. To date there is no evidence that there are two tracks of development, one for women and one for men. Those gender differences that do exist appear to be differences in mode or style rather than structure (Colby & Kohlberg, 1987). Furthermore, there is abundant evidence that girls' and women's responses to Kohlberg's hypothetical dilemmas are readily scorable by the Standard Issue Scoring System and that, when education and occupation are controlled, there are no sex differences in stages (Gibbs, Arnold, & Burkhardt, 1984; Walker, 1984).

Jaffee and Hyde (2000) conducted a meta-analysis to review quantitatively the work on gender differences in moral orientation. The meta-analysis revealed small differences in the care orientation favoring females ($d = -.28$) and small differences in the justice orientation favoring males ($d = .19$). Together, the moderator variables accounted for 16% of the variance in the effect sizes for care reasoning and 17% of the variance in the effect sizes for justice reasoning. These findings do not offer strong support for the claim that the care orientation is used predominantly by women and that the justice orientation is used predominantly by men.

A few researchers have investigated the relationship between personal epistemological beliefs and gender. 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), there has been little mention of gender as a variable in previous research. In Marrs' (2005) study in which the influence of gender on each of these variables was explored, 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, Eifenbein, & 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.

Baxter Magolda (1990), for example, performed a three-year longitudinal study of college students using the measure of epistemological reflection (MER) and interviewing techniques. She found that during the freshman year, there were no significant gender differences in epistemological beliefs. In the sophomore and junior years, however, more men than women moved from position 2 to position 3 in the MER scheme (i.e., became

more subjectivist). Baxter Magolda explains this by stating that, “Men viewed learning as a more active process than did women as indicated by men’s expectation of instructors, peers, and themselves, women’s expectations in these areas reflected a receiving mode of learning” (p. 559). Women, as a group, also were more concerned with the feelings of their peers than were men, wanting to create a relaxed atmosphere by talking to their peers and expressed a greater interest in working cooperatively with others and hearing their point of view. Men, by contrast, were more interested in debating with their peers and expressing their own opinions; rapport with the instructor was also more important to women than it was to men. The author, however, is quick to point out that “the patterns reported here were used more often by one gender but were not exclusive to one gender” (p. 560).

Schommer and Dunenll (1994), however, found the opposite to be true in their comparison of gifted and non-gifted high school students. Using the EQ, they found that boys were more likely to believe in fixed ability and quick learning than were girls, regardless of their level of giftedness.

Although Unger, Draper, & Pendergrass (1986) found no significant gender differences with regard to epistemological beliefs using the *attitudes about reality* scale (AAR) with college students, other researchers did. Walker, Rowland and Boyes (1991), in their study of the relationship between personality, personal epistemology, and moral judgment, found gender differences in the relationship between degree of objectivism as measured by the AAR and other variables. For women, objectivist epistemological beliefs were negatively correlated with sensation seeking, while for men, objectivist epistemological beliefs were negatively correlated with principled moral reasoning.

Sensation seeking is defined as “the need for varied, novel, and complex sensation and experiences and the willingness to take physical and social risks for the sake of such experiences” (Zuckerman, 1979, p.10). A person who scores low on this scale is generally thought to be rigid in attitude and cognition, and to be intolerant of ambiguity, which seems consistent with an objectivist epistemological belief system; it is not surprising then, that for women, the negative correlation between the AAR score and the sensation seeking scale reflects this relationship.

Moral reasoning is measured through the use of Rest’s (1979) Defining Issues Test (DIT), on which individuals rank a series of statements pertaining to several dilemmas. The statements are classified as either principled, based on ethical and humanitarian principles, or conventional, based on concrete rules. A “P” score, the ratio of principled to pre-principled items selected, is computed. It is thus expected that the “P” score would be negatively correlated with AAR scores. This was the case for the men in the sample, but not the women. The authors of the study explain this phenomenon by suggesting that women may respond differently to the AAR from men, perhaps because the AAR taps a personality domain as opposed to an attitudinal domain, which may explain the men’s responses.

Martin et al. (1994) measured epistemological beliefs using the Scale of Adult Intellectual Development (SAID), which identifies three distinct “epistemic strategies”: absolutism (more objectivist), evaluativism, and relativism (more subjectivist). Under this scheme, they found that men scored higher than women on both the Absolutism and Evaluativism strategies. No significant gender differences were found on the relativism measure.

Ethnicity as Related to Moral Reasoning and to Epistemological Beliefs

The role of culture, to a point, has been examined in a limited fashion in studies of students' epistemological beliefs. The only cultural perspectives examined have been upbringing or early home environment (Schommer, 1993a) and that of the classroom (Durkin, 1978-79), not ethnicity. This is unfortunate, because an individual's ethnic background is something that should be considered, especially to determine if students' epistemological beliefs vary as a function of ethnicity.

Pai (1990) did conduct some research that included ethnic groups. In the study it was stated that one of the reasons individuals from different cultural or ethnic groups have trouble with the school system in America is their different perceptions of learning. Pai claimed that the American school system is based on the belief that learning takes place through personal involvement and active communication. However, difficulty occurs for some ethnic groups, because these groups believe that learning takes place through observation and emulation.

Examination of the relationship between ethnicity and students' epistemological beliefs is confined to Pai's (1990) suggestions. Studies that have been conducted have not included ethnicity as a background factor to consider when addressing beliefs about the nature of knowledge and learning. Based on Pai's suggestions it is implied that the way in which individuals view learning and knowledge differ based on ethnic groups. However, this has not been studied in enough detail to make a distinction between ethnic groups nor to draw a substantial conclusion.

Since Kohlberg, researchers have continued to ask questions concerning cultural influences on moral reasoning. Do cultural influences have an effect on moral reasoning and judgment? Different studies have been launched to verify the universality versus the uniqueness of moral development. Longitudinal studies (e.g., Page, 1981; Colby, Kohlberg, Gibbs, & Lieberman, 1983; Walker, 1989) and cross-cultural research (Snarey, 1985; Rest, 1986; Edwards, 1987; Boyes & Walker, 1988; Gielen, 1990, 1991) support the validity and universality of Kohlberg's theory of moral development. Not surprisingly, however, some social scientists (Buck-Morss, 1975; Edwards, 1975, 1982; Bloom, 1977) dispute the hypothesis of the universality and permanence of the sequences of moral development. They consider that moral development would be culturally bound since different values are determined by the ideological and political principles of a culture, as well as the environment and other factors.

III. METHODOLOGY

The methodology design is based on the three research questions for this study to explore whether gender and ethnicity have effects on college students' moral reasoning and epistemological beliefs:

- 1) Are there differences in moral reasoning and epistemological beliefs between American and Chinese college students?
- 2) Does gender or ethnicity affect moral reasoning and epistemological beliefs between American and Chinese college students? and
- 3) Is there any interaction between gender and ethnicity in moral reasoning and epistemological beliefs?

Research Design

A survey was administered in this study in the spring semester of 2006 to investigate the influence of nationality and gender on college students' moral reasoning and epistemological beliefs. A factorial multivariate analysis of variance (MANOVA) was conducted to analyze the data collected from American and Chinese college students. The independent variables are 1) nationality with two levels—American college students and Chinese college students, 2) gender with two levels—male college students and female college students, and 3) ethnicity with two levels—majority group and minority group. The dependent variables are moral reasoning DIT scores—P scores and N2 index and the scores of the five epistemological beliefs—1) simple knowledge (i.e., knowledge

consists of discrete facts), 2) certain knowledge (i.e., absolute knowledge exists and will eventually be known), 3) omniscient authority (i.e., authorities have access to otherwise inaccessible knowledge), 4) quick learning (i.e., learning occurs in a quick or not-at-all fashion), and 5) innate ability (i.e., the ability to acquire knowledge is endowed at birth).

Participants

A total of 452 undergraduate college students from the United States and China participated in this study. The U.S. sample was composed of 149 college students who are enrolled in the education program of a university located in the eastern United States. The Chinese sample consists of 147 undergraduate students from a university in central China, a pre-service teacher training oriented institution, and of 156 undergraduate students from an ethnic university in northern China. 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 to ensure confidentiality of responses. For both samples, participation was voluntary, and responses were anonymous.

Instruments

The instruments that were administered to all the participants are a packet including the newer version of Defining Issues Test (DIT-2) (Rest et al., 1979, 1998, 1999, 1999a, 1999b), a 32-item Epistemic Beliefs Inventory (Bendixen et al., 1998; Schraw et al., 2002), and a brief demographic information sheet. With the permission of the designers, all the instruments were translated into Chinese from English for the Chinese sample.

According to Behling and Law (2000) and Harkness (2003), three are approaches commonly used to translate surveys: *simple direct translation*, *back-translation*, and the *committee approach*. A *simple direct translation* is conducted by a single bilingual individual who translates the questionnaire from the source language into the target language. The advantages of this method are its affordability and short time requirements, while the flaws of this method are apparent--it depends too much on a lone translator's skill and judgment. *Back-translation* is another technique with wide appeal, because it is relatively low cost and quick. Back-translation is an iterative process that entails these three basic steps: 1) translation of the source language instrument by a bilingual individual; 2) translation of the target language instrument back to the source language instrument by a second bilingual individual; 3) comparison of the original source instrument with the back translated source language instrument. The disadvantages, however, outweigh these benefits. Back-translation has several inherent flaws that preclude the production of data collection instruments with semantic, conceptual, and

normative equivalence that are also reliable, complete, accurate and culturally appropriate.

The third approach is the *committee approach*. The committee includes several translators, at least one adjudicator, translation reviewers, subject matter specialists, and someone with knowledge and experience in questionnaire design and pretesting. The committee approach is more comprehensive and collaborative than the other approaches discussed above, because the approach calls for the pretesting of the translated instrument and relies on input from a team whose members have skill sets that go beyond the skills of a translator (Behling & Law, 2000; Harkness, 2003).

For this study, the third approach is used for the translation of the instruments but the procedure is simplified. First, two translators who know both English and Chinese very well are asked to independently translate the instruments from source language to the target language—namely, from English into Chinese, and then both their translations will be sent to translator reviewers in the United States and in China. Through emails, the translated versions of the instruments are discussed, and a reconciled version of the translated instruments are produced which then goes to the adjudicator who makes final decision, and the data collection instrument is then pre-tested. After the pre-testing is complete, the adjudicator and other committee members convene again to decide on the final decisions that result in the final data collection instrument ready for the field.

The Defining Issues Test (DIT-2). To measure students moral reasoning, the Defining Issues Test (DIT-2) (see Appendix A), the most popularly-used test for measuring this variable, developed by Rest et al. (1979, 1990, 1998, 1999, 1999a, 1999b; Trevino, 1992) is used for this study. The DIT (Rest, 1979) assesses how people justify or

support their ethical decisions in terms of Kohlberg's (1969) levels of moral reasoning. According to Kohlberg, there are three levels of moral development, pre-conventional, conventional, and post-conventional. Pre-conventional morality involves deciding on ethical issues based on avoiding punishment and seeking rewards; conventional morality entails living up to the expectations of relevant others and upholding the law, and post-conventional morality focuses on making ethical decisions in accordance with ethical principles.

The long form DIT consists of six separate dilemmas (Heinz and the Drug, Escaped Prisoner, Newspaper, Doctor's Dilemma, Webster, Student Take-over). The short form DIT is identical to the full instrument, except that it contains three stories (Heinz and the Drug, Escaped Prisoner, and Doctor's Dilemma). In the DIT, participants read a total of six stories that describe a moral dilemma. After a given story, the participants are offered two courses of action that a character in the story could take. The participants are asked to indicate, by a check mark, which of these actions should be taken (the participant is also offered a choice of "Can't decide"). The choice of action is not used in determining the P score, because the purpose of the DIT is to determine the participants' stage of moral reasoning in making an ethical decision, rather than to evaluate the decision itself.

Once the participants have indicated the action they believe the character in the story should take, they are asked to read twelve considerations that might be important to the character in deciding what action to take. The participants rate each of the twelve considerations as having "great, much, some, little, or no" importance to the character when deciding a course of action.

Finally, the participants reread the twelve considerations, pick the four they believe are the most important, and rank those four as being the “most, second most, third most, and fourth most important” considerations. It is these rankings that are used to determine the P score. Rest (1979) explained how the P score is derived:

The item ranked as first importance in each story is given 4 points; the item ranked second, 3 points; the item ranked third, 2 points; and the item ranked fourth, 1 point. Since [sic] each dilemma has four ranks, each has 10 points to distribute among the stages. Points are totaled across the six stories for each stage. For instance, if a Stage 3 item was ranked in first place and another Stage 3 item was ranked in fourth place on the Heinz story, and if another Stage 3 item on the next story was ranked in second place, Stage 3 points would be $4 + 1 + 3$. Total points would be calculated for each stage. There are 60 points in all, and the total number of points at each stage is divided by .60 to yield a percent score (for the convenience of having a base of 100 instead of 60). This procedure yields scores for Stage 2, 3, 4, $4\frac{1}{2}$, 5A, [5B], 6, and M. The P index is calculated by adding together the scores of Stage 5A, 5B, and 6. The P index then represents the sum of weighted ranks given to “Principled” items, and is interpreted as the relative importance given to Principled moral considerations in making a moral decision (p. 100-101).

The DIT provides an internal consistency check called an “M-score” that is designed to identify “faked” responses. It is based on subjects’ endorsing certain response items that sound “lofty” and “pretentious” but which have no meaning. According to Rest (1990), selecting these items represents a subject’s tendency to choose items for their

pretentiousness rather than being an indication of any of Kohlberg's stages of moral reasoning. Thus, the DIT's scoring procedures call for invalidating the surveys of subjects with M-scores above a specified level.

A further internal validity test involves the consistency of a person's choices. The instrument requires the subject to rank 12 questions or statements in their relative order of importance. The subject is not being consistent if an item ranked as "little importance" is rated as a subject's first or second choice and selected ahead of items rated "very important." If there are inconsistencies on more than two stories, or if the number of inconsistencies on any one story exceeds eight, Rest (1990) recommends invalidation and exclusion of that person's protocol.

An additional inconsistency check regards a subject's lack of discrimination. When a test protocol shows most items ranked the same, there is a suspicion that the subject is not taking the test seriously. If a story has more than 9 items rated the same, e.g., "some importance," the authors recommend rejection of the entire protocol.

Rest et al. (1999) discussed validity and reliability of the DIT extensively and stated that both have been proven over hundreds of studies. In a mega-sample comprised of 45,856 DITs scored from 1989 through 1993, convincing evidence that validity and reliability are consistent across age, cultural background, and region is presented. In addition, the DIT significantly predicted to real-life moral behavior that is most important to this study (Rest et al., 1999). Cronbach alphas for the DIT are in the upper 0.70s and lower 0.80s and test/re-test reliability is commensurate (Rest & Narvaez, 1998).

The DIT2 (Rest et al., 1979, 1998, 1999, 1999a, 1999b) is a newer version of an objective test for moral reasoning based on Kohlberg's cognitive-developmental theory

of moral development (Rest, Cooper, Coder, Masanz, & Anderson, 1974; Rest, Narvaez, Thoma & Bebeau, 1999). On the DIT2, participants are presented with five separate dilemma scenarios (Famine, Reporter, School Board, Cancer, and Demonstration) that are similar to those originally used by Kohlberg (1976, 1981), and then asked to choose from a list of twelve items that represent prototypic statements of the stages of moral development. Participants are then asked to rate how important each question is in making a decision, what their decision is, and to rank the four most important questions. This process yields a DIT index score, called “N2”; a key feature of this index is that higher stage reasoning is prioritized and lower stage reasoning is rejected (Rest, Thoma, Narvaez, & Bebeau, 1997). The test accounts not only for ranked items that reflect postconventional moral reasoning, but also for rated items that reflect respondents’ preferences for higher versus lower stage reasoning.

The DIT2 does not sacrifice validity, but rather equates or may actually improve validity through its updated construction (Rest & Narvaez, 1998). The DIT2 correlates positively with the original DIT ($r = 0.79$). With the new scoring indexes (N2) and new subject reliability checks, the DIT2 demonstrates the same validity as the original DIT. Therefore, the DIT2 is chosen for this study on account of its shorter version, clearer instructions, stronger subject reliability checks, updated language and dilemma stories, and strong validity.

Epistemic Beliefs Inventory (EBI). To measure students’ epistemological beliefs, a 32-item Epistemic Beliefs Inventory (see Appendix B) is used (Bendixen et al., 1998). As previously discussed, Schraw et al. (2002) reported that the EBI had several advantages over an exploratory analysis of the Epistemological Questionnaire (EQ) developed by

Schommer (1990). First, Schommer's EQ yielded a large number of potentially interpretable factors, each accounting for a relatively small share of total sample variation. In comparison, the five factors identified by the EBI provided a close fit with the five epistemological dimensions hypothesized by Schommer (1990). The EBI did not have any obvious interpretative problems in that each of the factors was conceptually distinct and all of the items that loaded on individual factors were related logically to the relevant construct. Second, the first five factors on the EQ explained 35.5% of total variation, while the EBI explained 60% of total sample variation. A one-month replication led to values of 39% and 64% respectively. Third, the EBI had better predictive validity than the EQ. One explanation of these differences is that composite scores from the EBI were more variable and therefore more likely to increase the observed magnitude of r . Fourth, the EBI yielded a close replication of factors between the initial and replication analyses while the EQ did not, which indicated that the EBI is more reliable over time than the EQ.

The Epistemological Beliefs Inventory was acquired from Schraw before the initial conceptualization of this study. Each of the 32 items is written as a grammatically simple statement to which individuals responded using a five-point Likert-type scale ranging from "strongly disagree" (1) to "strongly agree" (5). Individuals will make their ratings by circling the number that most closely reflects their agreement with the statement.

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: 1) Omniscient Authority (coefficient $\alpha = .68$), 2) Certain Knowledge (coefficient $\alpha = .62$), 3) Quick Learning (coefficient $\alpha = .58$), 4) Simple Knowledge (coefficient $\alpha = .62$), and 5) 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).

For this study, the 32-item Epistemological Beliefs Inventory was checked for its reliability with the result in the Chinese group of $\alpha = .42$ for Simply Knowledge, $\alpha = .66$ for Certain Knowledge, $\alpha = .42$ for Quick Learning, $\alpha = .45$ for Omniscient Authority, and $\alpha = .52$ for Innate Ability. But the results were found higher with the American group with $\alpha = .49$ for Simply Knowledge, $\alpha = .63$ for Certain Knowledge, $\alpha = .52$ for Quick Learning, $\alpha = .54$ for Omniscient Authority, and $\alpha = .65$ for Innate Ability.

Demographic Questionnaire. Demographic questions (Appendix C) include: (a) age, (b) gender, (c) academic major, (d) current GPA, (e) ethnic background, and (f) educational level.

Data Collection Procedures

The following procedures were followed. An Informed Consent letter was attached with the survey to the participants in the United States outlining the goal of the research project, indicating approval and support from the University Human Subjects Committee of ODU (see Appendix D), and asking the student to participate (Appendix E). At the time the consent letter was signed by each participant, the researcher gathers

data for the independent variables, that is, age, gender, academic major, current GPA, ethnic background and educational level from the survey and then assign the student a code number. This unique code was written on the scoring sheet of each of the questionnaires to match the test scores with the variable data. Once a code was assigned, there was no further use of the participant's name. Further, any identifying information was shredded at the conclusion of the study. When students arrived for their information session, students were asked if they participate in the study. If willing, the students were asked to sign the consent form and then to complete the survey.

With the permission of Luoyang Normal University in China (see Appendix F) and the permission of Central University for Nationalities (see Appendix G), the research assistants were provided instructions for administering the instruments to Chinese students sampled by following the similar procedure as U.S. Sample Group does. Other information was restricted as much as possible to reduce the likelihood of any experimental bias.

Participants were asked to indicate the degree to which they agreed with each statement on the Epistemic Beliefs Inventory (EBI), using the 5-point scale. Mean completion time was approximately five minutes. After completing the brief demographic questionnaire, participants were given the newer version of the Defining Issues Test (DIT-2), for which the mean completion time was about 30-35 minutes.

Method of Data Analysis

A factorial multivariate analysis of variance of (MANOVA) was conducted with gender, ethnicity and nationality as independent variables and moral reasoning and the five epistemological beliefs as dependent variables to examine the influence of gender, ethnicity and nationality on moral reasoning and epistemological beliefs. When significant difference was found on omnibus MANOVA, analysis of variance (ANOVA) on each dependent variable was performed as follow-up tests to the MANOVA, using one of the Bonferroni approaches to control for Type I error across these multiple tests. When significant difference was found, pair-wise comparisons were conducted as post hoc to determine the effect of each of the independent variables on each dependent measure. In addition, interaction between the three independent variables—ethnicity, gender and nationality were examined.

To be specific, in conducting MANOVA by SPSS, the first step in interpreting the MANOVA results was to assess the Box's Test. If the homogeneity of variance-covariance was assumed, the Wilks's Lambda is utilized to interpret the multivariate tests. If the assumption of equal variance was violated, Pillai's Trace was referred to. After the multivariate test statistic had been identified, the significance (F ratios and p values) of factor interaction was examined, followed by the evaluation of the F ratios and p values for each factor's main effect. If multivariate significance was found, the univariate ANOVA results were interpreted to determine significant group differences for each dependent variable. If univariate significance was revealed, the post hoc results were examined to identify which groups are significantly different for each dependent variable.

IV. RESULT

The purpose of this study was to explore the cultural differences in epistemological beliefs and moral reasoning between American and Chinese college students. Therefore, the results were organized into three sections. In the first section, a series of factorial multivariate analyses of variance (MANOVA) were conducted to determine the overall effect of gender and ethnicity in both countries and then in each country on the seven dependent variables, the five EBI scores and two DIT scores. 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 variables in American culture and Chinese culture respectively and as a whole.

Descriptive Statistics

A total of 452 undergraduate college students from the United States and China participated in this study. The U.S. sample was composed of 149 college students who are enrolled in the education program of a university located in the eastern United States. The Chinese sample consists of 147 undergraduate students from a university in central China, a pre-service teacher training oriented institution, and 156 undergraduate students from an ethnic university in northern China. 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. For both samples, participation was voluntary and responses

were anonymous.

Table 5. Demographic Description of Participants

	American (<i>n</i> = 149)	Chinese (<i>n</i> = 303)
	Frequency (percent)	Frequency (percent)
Gender		
Male	24 (16.1)	83 (27.4)
Female	125 (83.9)	220 (72.6)
Ethnic Group		
Majority	117 (78.5)	235 (77.6)
Minority	32 (21.5)	68 (22.4)
Major		
Science	47 (31.5)	106 (35.0)
Social science	102 (68.5)	197 (65.0)
Age	Mean (Range) 24.7 (18-51)	Mean (Range) 20.9 (18-24)
GPA	Mean (SD) 3.14 (.607)	Mean (SD) 3.23 (.476)

In the U.S. sample, ten sets of responses were eliminated—two for failure to pass the internal check for consistency of responses on the Defining Issues Test. Of the remaining 149 participants, 125 (83.9%) were female and 24 (16.1%) male; 117 (78.5%) were White and 32 (21.5%) were minority students; 102 (68.5) were in social science majors and 47 (31.5) in science majors; participants' ages ranged from 18-51, averaging 24.7 years. The average GPA was 3.14.

In the Chinese sample, ten sets of responses were eliminated—nine for failure to pass the internal check for consistency of responses on the Defining Issues Test. Of the remaining 303 participants, 220 (72.6%) were female and 83 (27.4%) male; 235 (77.6%) were Han and 68 (22.4%) were minority students; 197 (65.0) were in social science majors and 106(35.0) in science majors; participants' ages ranged from 18-24, averaging 20.9 years. The average GPA was 3.23.

Prior to the MANOVA analysis, simple independent t-tests were used to estimate the differences between Chinese and U.S. college students in all variables. The results indicated that Chinese college students tended to believe, more strongly than U.S. college students, that knowledge is simple, $t(450) = -5.54, p = .001$, ability to learn is innate, $t(450) = -4.02, p < .001$, and learning process happens quickly, $t(450) = -10.11, p < .001$. U.S. students believed more strongly than their counterparts that authorities have access to otherwise inaccessible knowledge, $t(450) = 19.62, p < .001$, and that knowledge is certain, $t(450) = 5.62, p < .001$. The analyses indicated that the Chinese college students obtained significantly higher P scores ($M = 40.68, SD = 14.29$) and N2 scores ($M = 40.15, SD = 14.03$) in comparison to the U. S. students' P scores ($M = 31.41, SD = 14.23$) and N2 scores ($M = 31.92, SD = 19.26$). Table 6 summarizes the means and standard deviations for all variables and results of the t-tests.

As recommended by Cohen (1988), effect sizes with respect to each of the independent variables were computed. Cohen's criteria for evaluating the effect sizes suggest that the effect size pertaining to omniscient authority and quick learning was quite large, and that simple knowledge and certain knowledge indicated a medium effect size. Also, the effect sizes pertaining to P scores and N2 scores approached moderate

levels, whereas those pertaining to innate ability were small.

Table 6. Means and Standard Deviations for American and Chinese College Students

Variables	American (<i>n</i> = 149)		Chinese (<i>n</i> = 303)		<i>t</i>	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Epistemological Variables						
Simple Knowledge	2.79	0.47	3.04	0.39	-5.54	-.59
Certain Knowledge	2.36	0.65	2.00	0.60	5.62	.58
Innate Ability	2.71	0.58	2.93	0.54	-4.02	-.39
Omniscient Authority	3.41	0.63	2.22	0.59	19.62	1.95
Quick Learning	1.94	0.51	2.47	0.52	-10.11	-1.03
P Scores	31.41	14.23	40.68	14.29	-6.50	-.65
N2 Scores	31.92	19.26	40.15	14.03	-4.65	-.49

* $p < .001$, two-tailed.

The Factor Structure of the Epistemic Beliefs Inventory

The five epistemological dimensions hypothesized by Schommer (1990) and Schraw, Bendixen, and Dunkle's (2002) findings were labeled Innate Ability, Quick Learning, Omniscient Authority, Simple Knowledge, and Certain Knowledge (see Table 7). Each factor included at least three items with loadings in excess of .30.

Table 7. Factor Structure of the Epistemic Beliefs Inventory

Factor 1: Omniscient Authority (Eigenvalue = 1.63; $\alpha = .68$)

People should not question authority. (.73)

Children should be allowed to question their parents' authority. (.66)

When someone in authority tells me what to do, I usually do it. (.62)

Factor 2: Certain Knowledge (Eigenvalue = 1.63; $\alpha = .62$)

The moral rules I live by apply to everyone. (.72)

What is true today will be true tomorrow. (.63).

Parents should teach their children all there is to know about life. (.50)

Factor 3: Quick Learning (Eigenvalue = 1.47; $\alpha = .58$)

Working on a problem with no quick solution is a waste of time. (.71)

If you haven't understood a chapter the first time through, going back over it won't help. (.53)

If you don't learn something quickly, you won't ever learn it. (.49).

Factor 4: Simple Knowledge (Eigenvalue = 1.43; $\alpha = .62$)

Instructors should focus on facts instead of theories. (.78)

Too many theories just complicate things. (.57)

Most things worth knowing are easy to understand. (.44)

Factor 5: Innate Ability (Eigenvalue = 1.36; $\alpha = .62$)

How well you do in school depends on how smart you are. (.76)

Smart people are born that way. (.56)

Really smart students don't have to work as hard to do well in school. (.30)

From Schraw et al., "Development and validation of the epistemic belief inventory (EBI)" (pp. 261-275). In B. K. Hofer & P. R. Pintrich (Eds.), *Personal epistemology*, 2002, Mahwah, NJ: Erlbaum.

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 32-item Epistemological Beliefs Inventory was checked for its reliability with the result in the Chinese group of $\alpha = .42$ for Simply Knowledge, $\alpha = .66$ for Certain Knowledge, $\alpha = .42$ for Quick Learning, $\alpha = .45$ for Omniscient Authority, and $\alpha = .52$ for Innate Ability. But the results were found higher with the American group with $\alpha = .49$ for Simply Knowledge, $\alpha = .63$ for Certain Knowledge, $\alpha = .52$ for Quick Learning, $\alpha = .54$ for Omniscient Authority, and $\alpha = .65$ for Innate 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. 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.

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 ($N = 440$), 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.

Data Analysis

The methodology design, a factorial multivariate analysis of variance (MANOVA), was based on the three following research questions for this dissertation to explore whether ethnicity and gender have effects on college students' moral reasoning and epistemological beliefs:

1. Are there differences in moral reasoning and epistemological beliefs between American and Chinese college students?

2. Does gender or ethnicity affect moral reasoning and epistemological beliefs between American and Chinese college students?
3. Is there any interaction between ethnicity and gender in moral reasoning and epistemological beliefs?

The following specific questions address the MANOVA analysis, univariate ANOVA analysis, and post hoc analysis:

- Are there significant mean differences in the combined dependent variable of moral reasoning and epistemological beliefs for males and females?
- Are there significant mean differences in the combined dependent variable of moral reasoning and epistemological beliefs for the students in different ethnic groups?
- Are there significant mean differences in the combined dependent variable of moral reasoning and epistemological beliefs for different groups—American and Chinese college students?
- Is there a significant interaction between gender, ethnicity and country on the combined dependent variable of moral reasoning and epistemological beliefs?
- Are there significant mean differences on moral reasoning between males and females?
- Are there significant mean differences on moral reasoning between students from different ethnic groups?

- Are there significant mean differences on moral reasoning between students from the United States and China?
- Is there a significant interaction between gender, ethnicity and country on moral reasoning?
- Are there significant mean differences on epistemological beliefs between males and females?
- Are there significant mean differences on epistemological beliefs between students from different ethnic groups?
- Are there significant mean differences on epistemological beliefs between students from the United States and China?
- Is there a significant interaction between gender, ethnicity and country on epistemological beliefs?
- Is there a relationship between moral reasoning and epistemological beliefs? Are there differences in the relationship between moral reasoning and epistemological beliefs between American College students and Chinese counterparts?

A three-way multivariate analysis of variance (MANOVA) was conducted on these seven dependent variables: Simple Knowledge, Certain Knowledge, Innate Ability, Omniscient Authority and Quick Learning for the source of epistemological beliefs, and P score and N2 index for moral reasoning. The independent variables were student

ethnicity (majority and minority), student gender (male and female) and student group (American and Chinese).

Twelve extreme scores or univariate outliers were observed for moral reasoning measure and were eliminated from the analysis, leaving a total of $N = 440$ college students. Student group was distributed as American college students (33.2%) and Chinese college students (66.8%) (See Figure 1). Student gender was distributed with 23.6% male students and 76.4% female students (See Figure 2). Student ethnicity was distributed as majority group, White Americans in the U.S. sample and Han (汉族) Chinese in the Chinese sample (78.4%) and minority group (21.6%) from both countries (See Figure 3). The minority in the ethnicity variable was transformed from African American ($n = 18$), Asian American ($n = 5$), Hispanic or Latino American ($n = 6$) and Other ($n = 3$) from the American group, and Hui Chinese (回族) ($n = 21$), Tujia Chinese (土家族) ($n = 10$), Manchu Chinese (满族) ($n = 10$), Zhuang Chinese (壮族) ($n = 8$), Yao Chinese (瑶族) ($n = 4$), Korean Chinese (朝鲜族) ($n = 3$), Miao Chinese (苗族) ($n = 3$), Dong Chinese (侗族) ($n = 2$), She Chinese (畲族) ($n = 2$), Jin Chinese (金族) ($n = 2$), Mongolian Chinese (蒙古族) ($n = 1$), Tahir Chinese (达斡尔族) ($n = 1$) and Japanese Chinese (和族) ($n = 1$) from the Chinese group.

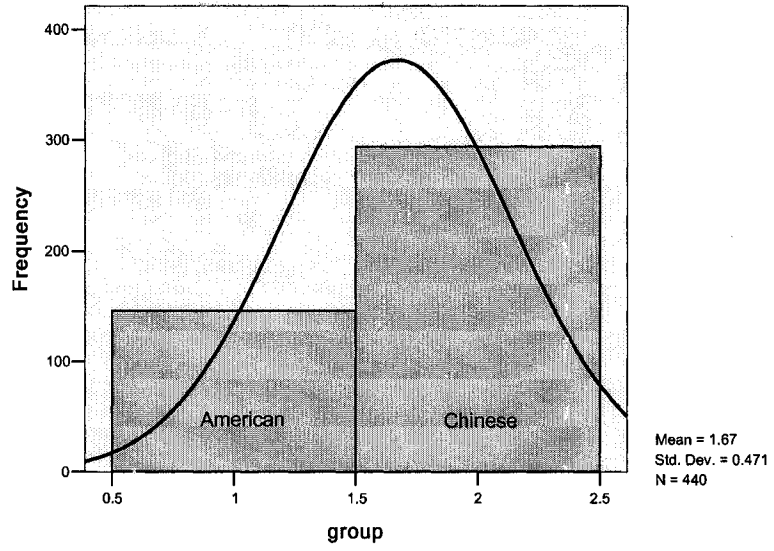


Figure 1. Frequency of the Group

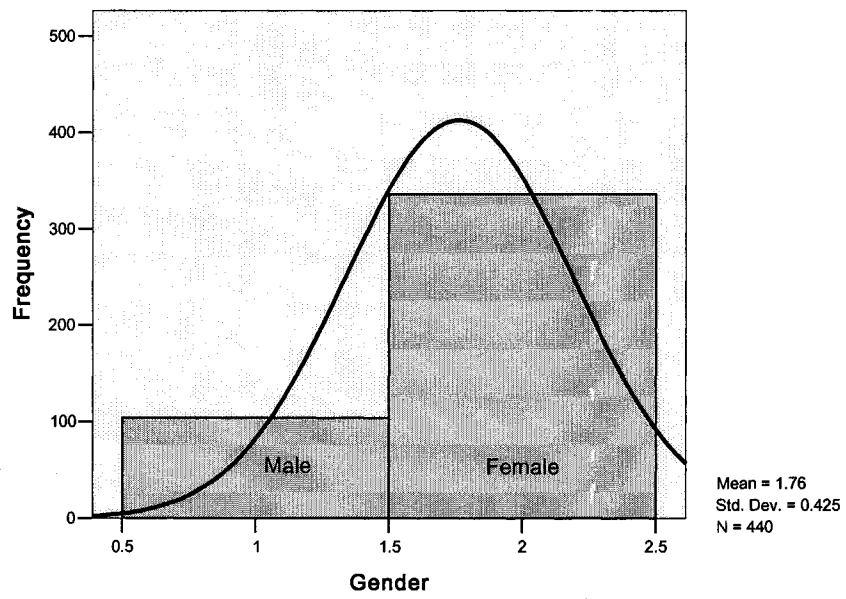


Figure 2. Frequency of the Gender

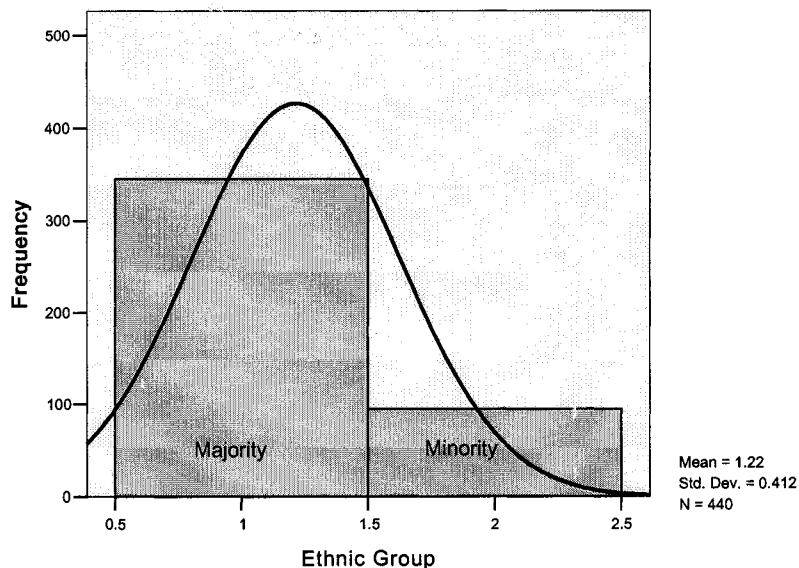


Figure 3. Frequency of the Ethnic Group

A statistically significant Box's M test ($p < .0001$) indicated unequal variance-covariance matrices of the dependent variables across levels of student ethnicity, student gender and student group, and thus necessitated the use of Pillai's trace in assessing the multivariate effects.

Table 8. Test of Equality of Covariance Matrices and Equality of Error Variances

	<i>Overall</i>		<i>SK</i>		<i>CK</i>		<i>IA</i>		<i>OA</i>		<i>QL</i>		<i>P</i>		<i>N2</i>	
	<i>F</i>	<i>p</i>	<i>F</i>	<i>p</i>	<i>F</i>	<i>p</i>	<i>F</i>	<i>p</i>	<i>F</i>	<i>p</i>	<i>F</i>	<i>p</i>	<i>F</i>	<i>p</i>	<i>F</i>	<i>p</i>
Box's M	2.55	.000														
Levene's Test			1.99	.07	1.70	.11	.88	.52	1.25	.27	.77	.61	1.30	.25	3.91	.000

Table 9. Levene's Test of Equality of Error Variances

	<i>F</i>	<i>df1</i>	<i>df2</i>	<i>p</i>
Simple Knowledge	1.899	7	432	.068
Certain Knowledge	1.703	7	432	.106
Innate Ability	.879	7	432	.523
Omniscient Authority	1.253	7	432	.272
Quick Learning	.770	7	432	.613
P Score	1.293	7	432	.252
N2 Score	3.915	7	432	.000

- Tests the null hypothesis that the error variance of the dependent variable is equal across groups.
- Design: Intercept+ sex + ethnic + group + sex × ethnic + sex × group + ethnic × group + sex × ethnic × group

Using Pillai's trace (see Table 10), the dependent variate was significantly affected by the main effects of student group, Pillai's trace = .22, $F(7, 426) = 16.73$, $p < .001$. The multivariate η^2 based on Pillai's trace was strong, .22, indicating that 22% of multivariate variance of the dependent variables was associated with the group factor.

Neither the multivariate interaction effects of Ethnicity × Gender, Gender × Group, Ethnicity × Group, Gender × Ethnicity × Group, nor the multivariate main effects of gender and ethnicity were statistically significant.

Table 10. Multivariate Analysis of Variance for Epistemological Beliefs and Moral Reasoning

<i>Effect</i>	<i>Value</i>	<i>F</i>	<i>p</i>	<i>Partial η^2</i>
Gender	.022	1.396(a)	.205	.022
Ethnicity	.010	.613(a)	.746	.010
Group	.216	16.732(a)	.000*	.216
Gender \times Ethnicity	.019	1.168(a)	.320	.019
Gender \times Group	.025	1.545(a)	.150	.025
Ethnicity \times Group	.015	.925(a)	.487	.015
Gender \times Ethnicity \times Group	.020	1.256(a)	.271	.020

- Multivariate f-ratios were generated from Pillai's trace.
- Design: Intercept + sex + ethnic + group + sex \times ethnic + sex \times group + ethnic \times group + sex \times ethnic \times group.
- Multivariate $df=7, 426$.
- $P < .0001$

In order to confirm the above results that the multivariate interaction effect of Ethnicity \times Gender and their main effects were not significant, the data was split into two groups—the American college students and the Chinese college students, where the group was not considered as a factor. A second two-way multivariate analysis of variance (MANOVA) was conducted to determine the effect of gender and ethnicity in both the American and Chinese groups—on the seven dependent variables, the five EBI scores and two DIT scores. A non-significant Box's M test ($p = .019$) in the American group

indicated equal variance-covariance matrices of the dependent variables across levels of student ethnicity, student gender and student group, and thus Wilks' Lambda (Λ) was used to assess the multivariate effects. A statistically significant Box's M test ($p < .0001$) in the Chinese group indicated unequal variance-covariance matrices of the dependent variables across levels of student ethnicity, student gender and student group, and thus necessitated the use of Pillai's trace in assessing the multivariate effects.

No significances were found among gender and ethnicity on the dependent measures in either group. In the American group, Wilks' $\Lambda = .95$, $F(7, 136) = 1.09$, $p = .38$. The multivariate η^2 based on Wilks' Λ was not strong, .05 (see Table 11). In the Chinese group, Pillai's trace = .01, $F(7, 284) = .26$, $p = .95$. The multivariate η^2 based on Wilks' Λ was not strong, .01 (see Table 12). The multivariate main effects of gender, ethnicity and the interaction between gender, ethnicity were confirmed not significant.

Table 11. Multivariate Analysis of Variance for Epistemological Beliefs and Moral Reasoning in American Group

<i>Effect</i>	<i>Value</i>	<i>F</i>	<i>p</i>	<i>Partial η^2</i>
Gender	.947	1.083(a)	.378	.053
Ethnicity	.963	.737(a)	.641	.037
Gender \times Ethnicity	.947	1.090(a)	.373	.053

- Multivariate f-ratios were generated from Wilk's Lambda.
- a Exact statistic
- b Design: Intercept+sex+ethnic+group+sex * ethnic+sex * group+ethnic * group+sex * ethnic * group
- Multivariate $df=7, 136$.
- $P < .0001$

Table 12. Multivariate Analysis of Variance for Epistemological Beliefs and Moral Reasoning in Chinese Group

<i>Effect</i>	<i>Value</i>	<i>F</i>	<i>p</i>	<i>Partial η^2</i>
Gender	.029	1.204(a)	.300	.029
Ethnicity	.034	1.440a)	.189	.034
Gender \times Ethnicity	.006	.263(a)	.968	.006

- Multivariate f-ratios were generated from Pillai's Trace.
- a Exact statistic
- b Design: Intercept+sex+ethnic+group+sex * ethnic+sex * group+ethnic * group+sex * ethnic * group
- Multivariate $df=7, 284$.
- $P < .0001$

A third one-way multivariate analysis of variance (MANOVA) was conducted to determine the main effect of the group on the seven dependent variables, the five EBI scores and two DIT scores. Significances were found among the country as a group on the dependent measures, Wilks' $\Lambda = .39$, $F(7, 432) = 98.51$, $p < .001$. The multivariate η^2 based on Wilks' Λ was very strong, .62 indicating that 62% of multivariate variance of the dependent variables was associated with the group factor.

Univariate ANOVAs were conducted on each dependent variable as follow-up tests to the first MANOVA to determine the locus of the statistically significant multivariate main effect of student group. Using the Bonferroni method, each ANOVA was tested at the .007 level. The ANOVA on the Simple Knowledge scores was

significant, $F(1, 444) = 9.39, p < .007, \eta^2 = .02$. The ANOVA on the Certain Knowledge scores was significant, $F(1, 444) = 10.70, p < .007, \eta^2 = .02$. The ANOVA on the Omniscient Authority scores was significant, $F(1, 444) = 49.32, p < .001, \eta^2 = .10$. The ANOVA on the Quick Learning scores was significant, $F(1, 444) = 25.32, p < .001, \eta^2 = .05$. (See Table 13)

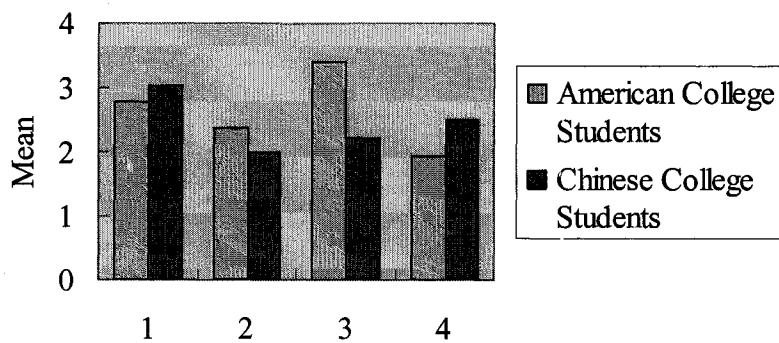
Post hoc analysis was not performed, in that all the independent variables had two levels. The American college students tended to believe more than their Chinese counterparts that knowledge comes from the source of omniscient authority and knowledge is certain. The Chinese college students tended to believe more than their American counterparts that knowledge consists of discrete facts (simple knowledge), and that learning occurs in a quick or not-at-all fashion (quick learning).

Table 13. Univariate Analysis of Variance for Epistemological Beliefs and Moral Reasoning

<i>Source</i>	<i>Dependent Variable</i>	<i>F</i>	<i>p</i>	<i>Partial η^2</i>	<i>MS</i>	<i>MSE</i>
Group	Simple Knowledge	9.808	.002	.022	1.698	.173
	Certain Knowledge	10.645	.001	.024	4.137	.389
	Innate Ability	5.894	.016	.013	1.806	.306
	Omniscient Authority	50.238	.000	.104	18.085	.360
	Quick Learning	26.140	.000	.057	6.886	.263
	P Score	2.916	.088	.007	525.736	180.293
	N2 Score	4.050	.045	.009	800.419	197.623

Table 14. Means Scores and Standard Deviations for Measures of the Epistemological Beliefs as a Function of Group

Epistemological Beliefs	<u>American</u>		<u>Chinese</u>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Simple Knowledge	2.79	0.47	3.04	0.39
Certain Knowledge	2.36	0.65	2.00	0.60
Omniscient Authority	3.41	0.63	2.22	0.59
Quick Learning	1.94	0.51	2.50	0.52



1 = Simple Knowledge, 2 = Certain Knowledge, 3 = Omniscient Authority, 4 = Quick Learning

Figure 4. Mean Differences of Epistemological Beliefs

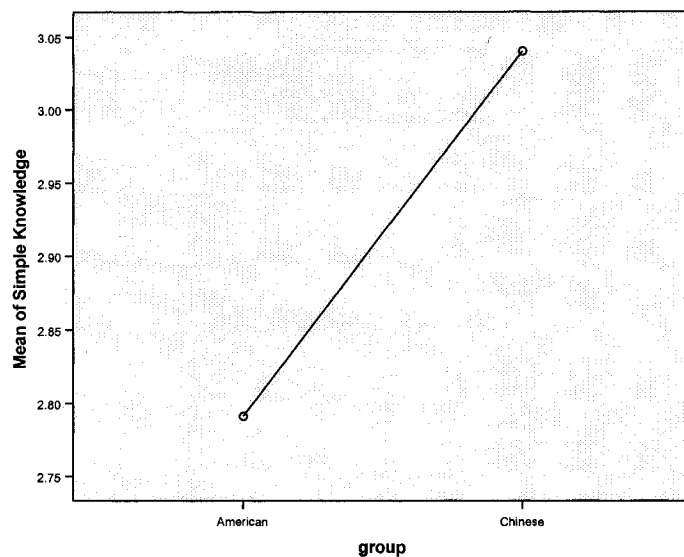


Figure 5. Mean Differences of Simple Knowledge

These findings indicated that American college students tend to believe less than their Chinese counterparts that knowledge consists of discrete facts.

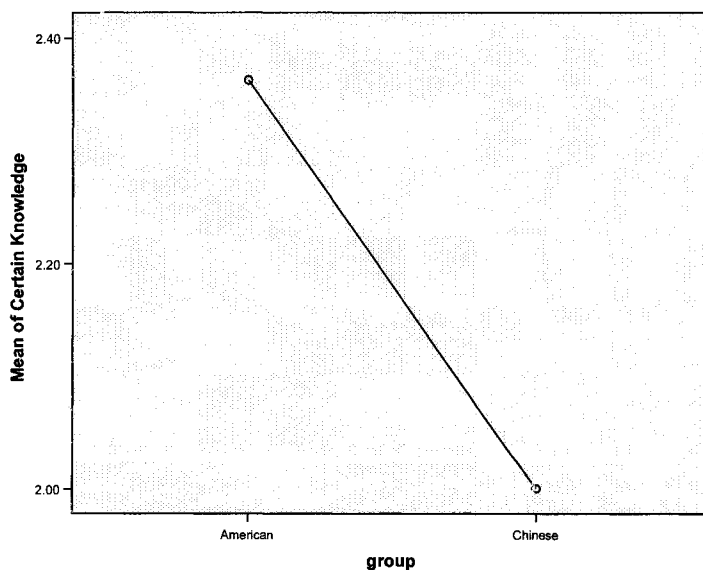


Figure 6. Mean Differences of Certain Knowledge

The “certainty of knowledge” portion of these findings is consistent with cultural differences in “uncertainty avoidance” proposed by Hofstede (1980), who found that both the United States and China are low in uncertainty avoidance. To this point, China is much lower than the United States. Particularly in learning situations, students from high uncertainty avoidance cultures are often comfortable with well-structured instruction that has clear goals and elaborated, step-by-all the answers (Hofstede, 1986).

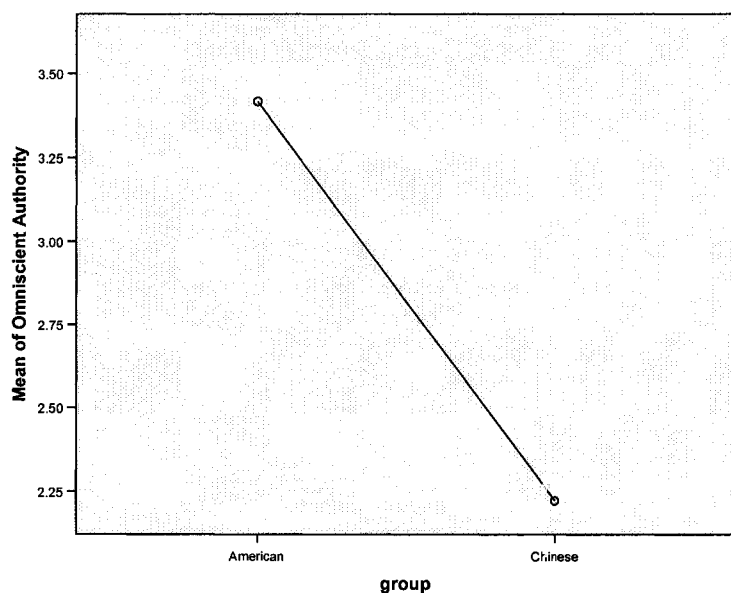


Figure 7. Mean Differences of Omniscient Authority

The source of knowledge findings are contradictory with Hofstede’s (1980, 2001) findings that the United States is in a low power distance culture where authority is less respected, and knowledge is developed from individuals’ own reasoning and experiences, while China is high in power distance culture where authority is highly respected and knowledge handed down by an authority who has access to otherwise inaccessible knowledge (Schommer, 1993; Schommer et al., 1992; Schommer et al., 1997).

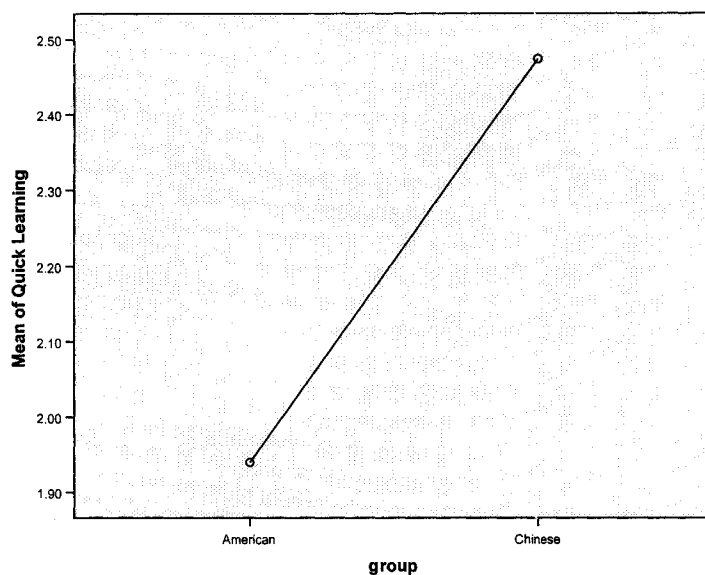


Figure 8. Mean Differences of Quick Learning

The Speed of Learning factor represents students' beliefs about the speed of knowledge acquisition. Chinese college students tend to believe more than their U.S. counterpart that learning should occur quickly or not at all rather than gradually over time.

Correlation Analysis for Epistemological Beliefs and Moral Reasoning

The American Group

Of the five epistemological beliefs variables, three were significantly related to P scores (See Table 15). Those variables, statistically significant and indicative of an inverse relationship, were simple knowledge ($r = -.20, p < .01$), omniscient authority ($r = -.30, p < .01$), and quick learning ($r = -.20, p < .01$), in which quick learning ($r = -.20,$

$p < .01$) was confirmed to be related with N2 score. Scores high on those dimensions were correlated negatively with P scores or N2 scores, indicating that higher level of principled moral reasoning were associated with a more sophisticated and presumably less conventional, epistemological belief system.

These findings were consistent with those of previous studies, the results of which had shown a negative relationship between the acceptance of authority and P scores (Bendixen et al., 1998; Curtis et al., 1988; Haan, Smith, & Block, 1968; Presley, 1985); the findings also were consistent with those of Walker et al. (1991), who reported that the DIT scores increased as epistemological beliefs measured on a unidimensional scale became more sophisticated.

Table 15. Correlation Matrix for the Measure on American College Students

	Simple Knowledge	Certain Knowledge	Innate Ability	Omniscient Authority	Quick Learning	P Score	N2 Score	Gender	Ethnic Group
Simple Knowledge	—								
Certain Knowledge	.199*	—							
Innate Ability	.148	.103	—						
Omniscient Authority	.301**	.238**	.217**	—					
Quick Learning	.297**	.252**	.352**	.082	—				
P Score	-.196*	-.148	-.077	-.301**	-.195*	—			
N2 Score	-.133	-.043	-.088	-.158	-.204*	.706**	—		
Gender	.090	-.040	-.070	.221**	.027	-.034	.032	—	
Ethnic Group	.072	.015	-.017	.057	.022	.076	.215**	.185*	—

* $p < .05$, two-tailed. ** $p < .01$, two-tailed.

The Chinese Group

Correlations among all variables in the Chinese sample were not significant (see Table 16). King and Kitchener (1994) also claimed that the development of epistemological cognition (in this case, reflective judgment) may be a necessary but not sufficient condition for moral judgment.

Table 16. Correlation Matrix for the Measure on Chinese College Students

	Simple Knowledge	Certain Knowledge	Innate Ability	Omniscient Authority	Quick Learning	P Score	N2 Score	Gender	Ethnic Group
Simple Knowledge	—								
Certain Knowledge	-.110	—							
Innate Ability	.053	.048	—						
Omniscient Authority	-.040	.574**	.229**	—					
Quick Learning	.062	.339**	.436**	.345**	—				
P Score	-.021	-.053	.077	-.060	.061	—			
N2 Score	-.054	-.081	.083	-.035	.041	.903**	—		
Gender	-.008	-.086	-.015	-.069	-.129*	.099	.116*	—	
Ethnic Group	-.009	-.057	.128*	.021	.043	.069	.103	-.048	—

* $p < .05$, two-tailed. ** $p < .01$, two-tailed.

Summary

A series of factorial multivariate analyses of variance (MANOVA) were conducted to determine the overall effect of gender and ethnicity in both countries and then in each country on the seven dependent variables, the five EBI scores and two DIT scores. The results indicated that there were no interactions between gender and ethnicity and no main effects of gender and ethnicity on moral reasoning and epistemological beliefs. There were no significant differences in moral reasoning and epistemological beliefs between male and female college students. Gilligan's (1982) charge of gender-bias in Kohlberg's model was not warranted by the present evidence. The role of gender in Baxter Magolda's (1992, 2001) epistemological reflection model was not supported by the findings from this study. In Baxter Magolda's model, she claimed that males adopted more "impersonal" and "individualist" ways of knowing, and women more "personal" and "interindividualist" ways of knowing. There were no significant differences in moral reasoning and epistemological beliefs between ethnical majority group students and ethnical minority students. No significant difference in moral reasoning was found between American college students and Chinese college students. These findings may provide evidence in support of Kohlberg's model of cognitive and moral development in the debate between cultural psychologists and Kohlbergians.

The significant differences found between American college students and Chinese college students were in the following epistemological beliefs: simple knowledge, certain

knowledge, omniscient authority and quick learning. This might result from other factors rather than gender and ethnicity.

In addition, the relationship found between moral reasoning and epistemological beliefs in the American group was consistent with the findings of the previous studies (Perry, 1970; Kohlberg, 1971a, 1971b; Bendixen, Schraw, & Dunkle, 1998; King & Kitchener, 1994, 2002; Jeong, 2003) and no significant correlation found between moral reasoning and epistemological beliefs in the Chinese group has provided an interesting topic for discussion.

V. DISCUSSION

Differences in Epistemological Beliefs and Moral Reasoning Between American College Students and Chinese College Students

By investigating the influence of the independent variables gender, ethnicity and nationality on dependent variables of DIT scores for moral reasoning and EBI scores for epistemological beliefs from both American and Chinese college students, the purpose of this study was to explore the cultural differences in epistemological beliefs and moral reasoning between American and Chinese college students. The MANOVA results indicated that there were no interactions between gender and ethnicity and no main effects of gender and ethnicity on moral reasoning and epistemological beliefs. The significant differences found between American college students and Chinese college students were in the epistemological beliefs: simple knowledge, certain knowledge, omniscient authority and quick learning, that is, American college students had higher mean scores than their Chinese counterparts in certain knowledge and omniscient authority, and had lower mean scores than Chinese college students in simple knowledge and quick learning. This might result from other factors rather than gender and ethnicity.

In addition, a correlation, though weak, between moral reasoning and epistemological beliefs was found in the American group. No significant correlation was found between moral reasoning and epistemological beliefs in the Chinese group.

As discussed in the literature review, Schommer (1990) initiated a line of research focusing more on how students' epistemological beliefs are related to their academic

cognition and performance. She described personal epistemology as a system of more or less independent beliefs, conceptualized as beliefs about the simplicity, certainty, and source of knowledge, as well as beliefs about the control and speed of knowledge acquisition. The first three dimensions fall under the more generally accepted definition of personal epistemology as beliefs about the nature of knowledge (simplicity, certainty) and knowing (source) (Hofer & Pintrich, 1997; Pintrich, 2002), although the two last dimensions in Schommer's (1990) conceptualization have been more controversial (see Table 17). Both these last dimensions may be derived from Dweck's (1999; Dweck, Chiu, & Hong, 1995; Dweck & Leggett, 1988) research on students' implicit theories of intelligence. In that research, some students have been found to favor an incremental theory and conceive of intelligence as a malleable, increasable, and controllable quality, while other students seem to construct an entity theory and believe that intelligence is a fixed and uncontrollable trait. In addition, students who believe that intelligence is fixed and uncontrollable seem more likely to believe that learning occurs quickly or not at all, in accordance with their intellectual gift.

Table 5. Five Dimensions of Epistemological Beliefs (Schommer, 1990)

Epistemological beliefs	Low end of continuum	High end of continuum
Certainty of knowledge	Knowledge is unchanging.	Knowledge is evolving.
Omniscient authority	Knowledge is handed down by authority.	Knowledge is acquired through reason and evidence.
Simple knowledge	Knowledge is organized as isolated bits and pieces.	Knowledge is organized as highly interrelated concepts.
Innate ability	The ability to learn is inherited and unchangeable.	The ability to learn can improve over time.
Quick learning	Learning is a quick process.	Learning is a gradual process.

In her study in 1994, Schommer changed some of the factor labels. The new labels include: 1) certainty of knowledge, 2) source of knowledge, 3) organization of knowledge, 4) control of learning, and 5) speed of learning.

The findings of my study indicated that Chinese students tended to believe more simple knowledge and quick learning than their American counterparts. This finding seemed to support the perception of Chinese students as surface learners rather than deep learners, due to rote memorization.

In the process of acquiring knowledge, two common approaches are “surface” and “deep” processing (Beatie, Collins, & McInnes, 1997; Chan, 2003a). Students using “surface” approach focus on the substance of knowledge and emphasize rote learning and memorization techniques (Biggs, 1989; Tagg, 2003). An intention to reproduce the material to be learned and avoid failure through regurgitating information and using rote learning techniques characterizes the ‘surface’ approach. In contrast, a ‘deep’ approach is

indicated by an intention to understand the material to be learned, using strategies such as reading widely, combining a variety of resources, discussion, reflection, relating parts to a whole, and applying knowledge in real world situations (Biggs, 1987, 1989, 1997; Entwistle, 1981; Ramsden, 2003; Tagg, 2003).

With relation to Chinese students, much of this work has centered on what has been referred to as “the paradox of the Chinese learner” (Marton et al. 1993, pp.15-16; Watkins & Biggs, 1996). This notion is based on the following premises: most Chinese students see knowledge acquisition as a simple and quick process and are categorized as rote learners, and rote learning is known to lead to poor learning outcomes; therefore, Chinese students should exhibit poor academic performance. In contrast, the evidence is that Confucian heritage students from Hong Kong, Singapore, Taiwan, and Mainland China tend to outperform Western students in international comparisons of educational progress and as international students at Western universities (Stevenson & Lee, 1996; Chan, 2003a).

Students bring into the learning system some epistemological beliefs that are learning-related, such as prior knowledge, abilities, values and expectations, ways of learning. These learning-related characteristics are referred to as the student presage factors that have a direct impact on the ways students choose to process academic tasks.

However, learning process is contextual in which the environment is set by the instructor and the institution through the course structure, curriculum content, methods of teaching and assessment. Students perceive and interpret this knowledge acquisition context and adopt a study approach that they think will help them to meet the demands of the instructors and the courses. As discussed earlier, epistemological beliefs are

multidimensional, and these will be reflected in individuals' approaches when acquiring knowledge. For example, the same student may take a deep approach in a humanities class, where it seems to be demanded, and a surface approach in a science class where just grabbing the facts and formulae seem to equal academic success. Biggs (1997; p.137) even argues that "memorizing is not surface learning", and "memorizing through repetition is an essential, a deep strategy in many tasks" (Biggs, 1997, p.7). Biggs (1996) describes the Chinese as "docile" students, who are "teachable". Chinese students enter the classroom with the beliefs that their teachers are their friends and moral guides who have valuable knowledge and that it is their duty as students to learn (Chan, 2003a). Thus solved "the paradox of the Chinese learner" (Marton et al. 1993, pp.15-16; Watkins & Biggs, 1996).

Another finding in this study is that American college students had higher mean scores than their Chinese counterparts in certain knowledge and omniscient authority, which is somewhat beyond the researchers' expectation. According to Perry (1970), in higher level of epistemological beliefs, "knowledge is seen as increasingly conjectural and uncertain, open to (and requiring) interpretation. This central epistemology about knowledge and learning triggers parallel shifts in the learners' view about the role of the teacher—moving from an Authority as the source of 'Truth' to an authority as resource with specific expertise to share, as well as the role of the student—moving from a passive receptor of facts to an active agent in defining arguments and creating new knowledge" (Moore, 2002, p.22). One of cultural dimensions that Hofstede (1991) used to distinguish people's relationship with their authority is *power distance*.

Power distance is defined as “the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally” (p. 28). Power distance is often reflected in the hierarchical organization of companies, the respect expected to be shown by the students towards their teacher, the political forms of decentralization and centralization, by the belief in society that inequalities among people should be minimized, or that they are expected and desired. In educational settings, he noted, the larger the power distance, the more students become dependent on teachers; the smaller the power distance, the more students become independent of teachers. He pointed out that in large power distance situations, there exists a teacher-student inequality that “caters to the need for dependence well established in the student’s mind” (p.34). In such a situation, the teacher-centered mode of teaching becomes the norm of the educational process in which “teachers outline the intellectual paths to be followed” and “the quality of one’s learning is virtually exclusively dependent on the excellence of one’s teachers” (p.35). Source of knowledge is believed to be at or close to the lower end of the continuum (see Table 17), that is, knowledge is handed down by teachers, authority or experts and that knowledge is certain and permanent. In contrast, in small power distance situations, teachers and students are expected to assume an equal position, and “the educational process is student-centered, with a premium on student initiative; students are expected to find their own intellectual paths” (p.34). Source of knowledge is expected to be at or close to the higher end of the continuum where knowledge is acquired through reason and evidence (see Table 17).

Scholars (Scollon & Scollon, 1994) found the following fundamental differences in the interpretations of authority by Asians and Westerners, “the Asian focuses on the

care, nurture and benevolence (or their absence) of the person in authority while the Westerner tends to focus on the restriction, limitation and dependence of the person over which the authority is exercised” (p.21).

These differences were reflected in educational settings as the teacher-student relationship affecting students’ epistemological beliefs. For instance, Szalay et al. (1994) found that, Chinese students, rather than the North American students, viewed their teacher as mediator or transmitter of knowledge and “an idealized role model, a resource for solving all types of human problems, and a model for lifestyle as well” (p.245). The teacher was in an idealized role endowed with a great deal of authority, esteem, and respect. The students themselves were recipient of knowledge and were described as naive and of simple moral character. In such a socio-cultural context, students are expected to show respect for, and be obedient to authority figures including their teachers and elders, and both students and teachers are expected to live up to the criteria and norms of Chinese society.

However, the findings of my study indicated that the situation discussed above is changing: Chinese college students tended to believe less than their American counterparts that knowledge was certain and handed down from authority. Authority figures such as teachers are not considered as a sole source of knowledge. Stigler and Stevenson (1991) found in their study that the classrooms in Taiwan, China and Japan are becoming more and more student direct, which is contrary to the beliefs that teachers in Asia are thought to be authoritarian and what they create is a teacher directed learning environment. Chinese students are benefited more from the interaction with their teachers

who are available after class for students who have questions (Volet & Pears, 1994; Volet & Renshaw, 1995; Kelly & Ha, 1998).

With the influence of information technology, the open policy adopted in China, and economic reforms at different levels, there have been changes nowadays in Chinese classrooms that have been exposed to both Chinese and Western cultures and philosophy. Confucianism may be too narrow a focus in understanding Chinese culture (Chan, 2003b). Today's students may not abide to authority figures as much as their elder generation. The parenting style has gradually changed from authoritative to liberal. Children are not forced to follow what their parents say. The educational reforms such as Quality Education and Creativity Education in China drive school and university teaching to encourage students to do more reflective thinking instead of mere memorization work. The existing traditional Chinese culture and philosophy and the interaction with increasing influence of Western culture and philosophy might be an explanation for the relatively lower mean scores in the belief of authority knowledge from the Chinese sample.

In probing the relationship between moral reasoning and epistemological beliefs, a big difference was found in the two groups—American college students and Chinese college students. The findings indicating a negative relationship between the acceptance of authority and DIT scores in the American sample were consistent with previous studies (Bendixen et al., 1998; Curtis et al., 1988; Haan, Smith, & Block, 1968; Presley, 1985); the findings were also consistent with those of Walker et al. (1991), who reported that the DIT scores increased as epistemological beliefs measured on a unidimensional scale became more sophisticated. Likewise, the negative correlation between simple

knowledge, certain knowledge, and quick learning indicated that scores high on those dimensions were correlated negatively with DIT scores, suggesting that higher levels of principled moral reasoning were associated with a more sophisticated, and presumably less conventional, epistemological belief system.

In the survey administered to the Chinese students, participants had trouble determining who the protagonist was, and this confusion may help explain the inconspicuous correlation between moral reasoning and epistemological beliefs in the Chinese group. With many Chinese students, this was the first time that they had been exposed to such a survey. Therefore, they were not very certain whether they should speak for themselves or for the expectations of the society—their parents and their teachers. That confusion might come from the tendency of individuals to overestimate moral reasoning for themselves in the Chinese sample. As reported in a large scale investigation, Chinese Citizens Humanistic Quality Survey (Yuan & Shen, 2006) indicated the existence of individuals' misperception of level of moral reasoning for others—individuals tend to view themselves as possessing higher levels of moral reasoning than others in the Chinese society. For example, in the survey there are five choices for the questions, “What will you do when you are sitting in the bus and see a lady with a baby in her arm standing beside you? What do you think the young man sitting next to you will do?” A) offer the seat to her, B) pretend not to see her, C) offer her the seat after the busman says so, D) offer the seat after the lady asks, and E) do not offer the seat under any circumstances. The results of the survey indicated that 82.3% of the respondents chose A (offering the seat) and 2.6% of the respondents chose B (pretending not to see) for themselves. While referring to the young man who had a seat

on the bus, only 31.8% of the respondents thought that he was willing to offer the seat (A) and 20.5% of the respondents thought that he would pretend not to see her (B). The tendency of people to underestimate the others' willingness to help, a misperception of the others' level of moral reasoning, might account for the weak and disjointed correlation between moral reasoning and epistemological beliefs in the Chinese sample.

Another explanation for the weak relationship between moral reasoning and epistemological beliefs might be found in the fact that Chinese moral education is now shifting its focus away from ideological education to citizenship education, a shift which requires both Chinese educators and students are facing the challenges for moral education reform. Traditional Chinese moral education developed from its ideological aspects in ancient China, according to Li et al. (2004), with the traditions of first equating politics with morality, phrasing them both in the same language, and then of encouraging correct moral and political relations and behaviors through education. This trend dates back three thousand years to Zhou Gong and continued through Confucius and his followers. From 1949 through the Cultural Revolution and the present transition to a market economy, a similarly unified approach to political, ideological and moral education has gone into effect through the organizational medium of moral education (Sautman, 1991; Li et al., 2004). This reflects important changes in core values to include individualism, economic initiative and consumerism, all of which confront Chinese society and education with distinct challenges and opportunities and suggest even further reform of moral education during the 21st century. Contemporary moral education in China as a concept is very comprehensive with its twofold aspects. One is through subject-based moral education, while the other is supposed to be by means of all kinds of

extra-curricular activities (Zhu & Liu, 2004). A great effort has been made by the Chinese educational authority to promulgate some moral education guidelines such as “Regulation of the Work of Moral Education in Primary and Secondary Schools”, “Outline for Moral Education in Primary and Secondary Schools” and the “Outline for Moral Education in Secondary Schools” to provide the basic foundation for moral education in primary and secondary schools, and “Code of Conduct of Primary School Pupils”, the “Code of Conduct of Secondary School Students”, the “Norms of Daily Behaviors for Primary School Pupils” have been formulated for setting basic requirements for the behaviors of primary and secondary school students to be observed by all students. In reality, however, moral education through extra-curricular activities is much ignored due to examination oriented school curriculum design. Consequently, this may account for problems such as the separation of moral education from children’s lives, the moralizing and memorization used as the basic methods of teaching and learning, and the overlaps between courses on society and ideological moral character (Lu & Gao, 2004). “Virtue lies in practice” and “lifelong moral education” (Wang, 2004) concepts through implementation and practice of “quality-oriented education” (Zhan & Ning, 2004) are still challenges for Chinese moral educators, particularly in this transitional era when Chinese society is transforming itself through widespread modernization efforts in every area.

Limitations of the Study

Difficulty of Measuring Moral Reasoning and Epistemological Beliefs

The third explanation for the unobtrusive correlation between moral reasoning and epistemological beliefs in the Chinese sample is that measuring moral reasoning and epistemological beliefs is difficult. As discussed in the first three chapters, since Perry (1970) developed his unidimensional intellectual development model, educationalists and psychologists have attempted to implement different models (Hofer, 2004a) to examine personal beliefs about the nature of knowledge that may influence comprehension (Schommer, 1990), cognitive processing (Kardash & Howell, 2000), and conceptual change learning (Qian & Alverman, 2000). Different approaches are used in the conceptualization and investigation of personal beliefs, for example, the reflective judgment model (King & Kitchener, 1994), the embedded systemic model (Schommer-Aikins 2004), the epistemological reflection model (Baxter Magolda, 1992, 2001), the epistemic metacognition (Kichener 1983; Kuhn, 1999b), and the “epistemological resources” (Hammer & Elby, 2000, 2002). Bendixen and Rule (2004) synthesized findings from a variety of studies to propose a more integrated model in an attempt to provide a guiding framework for addressing some of the key issues raised by diverse models. To confirm and measure their models, different instruments were developed. Perry (1970) and his colleagues devised a paper-and-pencil instrument, the *Checklist of Educational Views* (CLEV) to confirm the model developed from the initial interviews.

King (1986) developed the Reflective Judgment Interview to measure individuals' level within the seven stages of the Reflective Judgment Model. Boyes and Chandler (1992) measure epistemic development by the Epistemic Doubt Interview. Baxter Magolda developed the Measure of Epistemological Reflection (MER), a standardized, open-ended questionnaire with a standardized rating protocol (Baxter Magolda, 1992; Baxter Magolda and Porterfield, 1988). Galotti et al. (1999) developed the Attitudes Toward Thinking and Learning Survey (ATTLS). Schommer developed a 63-item questionnaire to assess the five beliefs among college students. Similar to Schommer's questionnaire, Jehng et al.'s questionnaire (Jehng et al., 1993) presents statements about learning and knowledge. In an effort to improve on Schommer's questionnaire, Schraw et al. (1995) constructed the Epistemic Belief Inventory, which was found to be a better instrument to measure individuals' epistemological beliefs. As discussed in detail in Chapter Three, it is for EBI's better predictive validity and considerably better test-retest reliability that EBI was utilized in this study. However, there exist similar limitations in this instrument to those found in the other instruments used for measuring individuals' epistemological beliefs; to be specific, the internal consistency of the epistemological belief questionnaire used for this study was found to be low in the Chinese group. The limitations as Duell and Schommer-Aikins (2001) concluded:

An important issue that may be more obtuse is a potential limitation of all of the instruments that presently exist. Although the instruments presented may have satisfactorily captured epistemological beliefs within a culture (e.g., among men, among women, among U.S. citizens), the approaches may not be open to the

discovery of new patterns across cultures (e.g., between countries, between ethnic groups, between genders). Indeed, it is likely that there are patterns of epistemological beliefs not yet fathomed by any of the extant epistemological belief researchers (pp. 445-446).

Use of Convenience Samples

This study utilized available college students from three different universities, one from the United States and the other two from China. Of the two Chinese universities, Luoyang Normal University is a pre-service teacher training institution and Central University for Nationalities is a university mainly for minority students. The students from Old Dominion University in the United States are teacher education students from various majors. There is an age difference as well as educational level difference between the Chinese sample and the American sample. This study's American sample, including both undergraduates and postgraduates, were between the ages of 18 and 51, while the Chinese sample clustered between 18 and 24 year olds, mainly sophomores. Although both the American sample and the Chinese college students from LNU were teacher education students, the Chinese students from CUN were from different majors ranging from Journalism to Computer Science. In addition, the course size ranged from 30 to over 200 students. Although students included in this study may be fairly representative of their respective universities' typical population, it is possible that systematic differences between students enrolled in the various courses existed.

Use of the Cross-sectional Data

The findings and the interpretations thereof in this study were based on the cross-sectional data from the survey. A richer perspective would be established by using the data from a longitudinal investigation, assessing college students' moral reasoning and epistemological beliefs at several points in time, rather than merely comparing two groups at one point in time, as was done in the present study. Individuals' moral reasoning and epistemological beliefs do change over time (Piaget, 1965; Kohlberg, 1973, 1975, 1987; Schommer, 1998, 2002; Narvaez et al., 1999; Bendixen & Rule, 2004), and a longitudinal study could better capture such moral and epistemological change. It is hoped that this study could be extended as a longitudinal study for further and deeper exploration.

Other Possible Factors Affecting the Differences in Epistemological Beliefs Between American College Students and Chinese College Students

Educational Level and Age

According to Perry's study, higher educational level was related to higher stage thinking, from freshman to senior year. Baxter Magolda (2002) had similar findings in her longitudinal study of college students; for example, transitional knowing, the dominant mode of knowing, was used by 32% of first-year students, 53% of sophomores, 83% of juniors, and 80% of the seniors. In one of the few studies of individuals across a larger age span, with 169 participants ranging from teenagers to 60-year olds,

epistemological level and educational background were positively correlated. Evaluative reasoning, the highest level, was exhibited only by those with advanced education (Kuhn, 1991).

This study's American sample, including both undergraduates and postgraduates, were between the ages of 18 and 51, while the Chinese sample clustered between 18 and 24 year olds, mainly sophomores. This might explain the findings that American college students had lower mean scores in simple knowledge and quick learning than Chinese college students.

However, some researchers reported from their studies that certain age groups or educational backgrounds did not affect individuals' epistemological beliefs or moral reasoning. For example, Moore's (1991) Measure of Intellectual Development (MID) indicated that there was little change between 18- and 21-year olds. When comparing junior college students' degree of belief in simple knowledge, certain knowledge, innate ability, and quick learning to that of university students, Schommer (1993a) found that junior college students were more likely to believe in simple, certain knowledge, and quick learning. University students were more likely to believe in innate ability. Background variables, such as age, gender, and parental education also contributed to differences between groups. Bendixen et al. (1998) examined the relationship among age, education, gender, syllogistic reasoning skill, epistemological beliefs, and moral reasoning in undergraduate students ($n = 154$). Results of the regression analysis indicated that neither the age nor the education variables reached significance once gender was entered into the equation.

Kohlberg's (1984) theory of moral development proposed that moral reasoning ability increases over time, and both theory and research confirm that age is positively correlated to increasing moral reasoning scores through adolescence. This study, however, concerns college students, adults who are 18 years of age or older. Research involving college students has produced contradictory results (Maclean, 2001). There is evidence that moral reasoning abilities increase in college and at a rate faster than the general population, with older students scoring higher than younger students (Kurtines, 1982; Rykiel, 1995). However, in this study, although there were graduate students and elder students in the American sample, with their mean age 24.7 ranging from 18 years old to 51, their DIT mean scores were lower than the Chinese college students who were mostly sophomores, with their mean age 20.9 ranging from 18 years old to 24. This is consistent with Duckett, Rowan, Ryden, and Krichbaum (1997)'s findings on changes in moral reasoning between entry and exit from a baccalaureate nursing program ($n = 348$). These researchers found that age did not contribute significantly to explaining DIT measured moral reasoning score variance. Also, in a study of 143 graduate and undergraduate students from two universities in Florida, Bateman (1999) found no significant effect of age on moral development.

In a dissertation investigating ethical decision making in federal managers, Gentle (1997) did not find a significant correlation between either age or education and moral reasoning scores. When age and education and their interaction were combined, she found that age and education combined are positively related with moral reasoning and result in higher P scores from the DIT. These results suggest an age-education interaction

effect. Similarly, in Rykiel's (1995) study, a significant age-work interaction occurred in that older students who worked less scored highest in moral reasoning scores.

Additionally, a number of large-scale secondary analyses of several thousand subjects each indicate that age-education differences account for about 40% to 50% of the variance in moral reasoning scores (Rest, 1986). As previously discussed, years in college or professional school are very powerful in promoting development of moral reasoning (Rest, 1994).

Academic Major

In a comparative study between technological science majors and social science majors on their degree of belief in simple knowledge, certain knowledge, innate ability, and quick learning, Schommer (1993a) found that technological science majors were more likely to believe in quick learning. Background variables, such as age, gender, and parental education, also contributed to differences between groups. But in the two related studies of college students (n=95 and 114) who completed an epistemological questionnaire with a specific domain in mind (social sciences or mathematics), read a passage, answered a passage test, and completed another epistemological questionnaire, Schommer and Walker's report (1995) supported the idea that individuals' epistemological beliefs tended to be domain independent.

Paulsen and Wells (1998) examined the differences in the epistemological beliefs of college students across major fields of study. College students (n=290) were assessed for their epistemological beliefs in fixed ability, simple knowledge, quick learning, and

certain knowledge. Academic majors were classified as hard-soft and pure-applied dimensions, a classification of Biglan's typology of academic fields (Biglan, 1973a, 1973b). Their results indicated that students majoring in pure fields were less likely than those in applied fields to hold naive beliefs in simple knowledge, quick learning, and certain knowledge, and students majoring in soft or pure fields were less likely than others to hold naive beliefs in certain knowledge. The results of this study suggest that students' beliefs about the nature of knowledge and learning are related to the disciplinary contexts in which students select and experience their specialized coursework in college. Gender, age, and GPA also were found related to students' beliefs.

In exploring the domain specificity of students' beliefs about academic knowledge in three related studies, Buehl et al. (2002) found that students possess certain domain-specific beliefs about knowledge in mathematics and history. Further, a significant moderate relationship between the DSBQ and Schommer's questionnaire provided some evidence of domain-generalities in undergraduates' epistemological beliefs. In Study I, these items were administered to 182 undergraduates, and the psychometric properties and underlying factor structure were examined via exploratory factor analysis. In Study II, the modified instrument, the Domain-Specific Beliefs Questionnaire (DSBQ), was administered to 633 students, and a confirmatory factor analysis was conducted. A subsample of participants' responses on the DSBQ also was compared to responses on Schommer's epistemological questionnaire. Study III involved a second confirmatory factor analysis using data from a new sample ($n = 523$). Those data were examined for potential gender differences.

The DIT has been used to measure differences in the moral reasoning of college students across academic disciplines (Zeidler & Schafer, 1984; St. Pierre, Nelson, & Gabbin, 1990; Icerman, Karcher, & Kennelley, 1991; Paradice & Dejoie, 1991; Jeffrey, 1993; Ponemon & Gabhart, 1994; Snodgrass & Behling, 1996; Cummings et al., 2001; King & Mayhew, 2002). Variability of moral reasoning scores within certain disciplines has also been observed (Icerman et al., 1991; Paradice & Dejoie, 1991; Jeffrey, 1993).

Several other studies also have attempted to measure differences in moral reasoning between academic disciplines (St. Pierre et al., 1990; McNeel, 1994; Snodgrass & Behling, 1996), yielding inconclusive results. McNeel's research (1994) indicated very strong college effects on moral reasoning. This impact is particularly strong in liberal arts colleges and in disciplines that explore people and values. Students in more vocationally oriented disciplines such as business and education have shown considerably lower DIT score growth over their college experience. St. Pierre et al. (1990) found that accounting majors and students majoring in other business disciplines (i.e., finance, information systems, hotel/restaurant management, management, marketing and international business) showed lower levels of postconventional moral reasoning than did students in psychology, math and social work. Snodgrass and Behling (1996), by contrast, found no significant differences in the moral reasoning levels between business and non-business majors (i.e., arts and humanities, social sciences, natural sciences and undeclared).

Religious Beliefs

Another factor contributing to the differences in epistemological beliefs between American and Chinese college students might be individuals' religious beliefs. As discussed in the first chapter, the United States is considered as a multiracial country built on Judeo-Christian principles while China has been influenced traditionally by Confucianism, Taoism and Buddhism. Although not taught in school in either country, religion is undoubtedly an integrated part of people's lives that might affect individuals' epistemological beliefs and moral reasoning. In a study exploring the relationship between psycho-epistemological styles and three religious dimensions, Desimpelaere et al. (1999) used Wilkinson and Migotsky (1994)'s three factors (naive realism, logical inquiry and skeptical subjectivism) and Perry (1970)'s dualism, relativism and commitment as psycho-epistemological items. The religious dimensions were orthodoxy, historical relativism and external criticism (Hutsebaut, 1996; 1997). Results show that dualism relates to both orthodoxy and external criticism, and that relativism and commitment relate to historical relativism.

In another study investigating the relationship between the religiosity dimensions and both moral attitudes and moral competence, Duriez and Soenens (2006) used the Post-Critical Belief Scale (Duriez, Fontaine, & Hutsebaut, 2000) as a measure of Wulff (1991)'s religiosity dimensions (Exclusion versus Inclusion of Transcendence and Literal versus Symbolic), and the Moral Judgment Test (Lind, 1998) as a measure of both moral

attitudes and moral competence. Results from a middle adolescent sample ($N = 338$), a university sample ($N = 336$) and an adult sample ($N = 336$) suggested, that whereas the Literal versus Symbolic dimension shows substantial relations with moral attitudes and moral competence, the Exclusion versus Inclusion of Transcendence dimension is related to neither of them. The findings indicated that, although there was no intrinsic relationship between religiosity and morality, the way people process religious content was predictive of the way they deal with moral issues.

Because of the difficulties inherent to classification of religions, this study did not examine religious background as a factor to affect individuals' epistemological beliefs and moral reasoning. Very little research was found in this area, and the validation of Hutsebaut's religious dimensions needs support from more research, especially the research to investigate religious background or beliefs as a factor affecting individuals' epistemological beliefs and moral reasoning in different cultures. Complexity of religious beliefs and their influence as a factor to affect individuals' epistemological beliefs and moral reasoning are worth a new line of research (Berger, 1997), as are the economic system and political system in which an individual is living.

In summary, the results of the present investigation indicate that cross-cultural similarities and differences in epistemological beliefs and moral reasoning exist between American and Chinese college students. Because this study determined no interaction between either gender or ethnicity and moral reasoning and epistemological beliefs, and, likewise, no difference in epistemological belief in innate ability between the two groups, this study may provide evidence that seems to support the similarities and universal aspects of psychological development. The significant differences in epistemological

beliefs in simple knowledge, certain knowledge, omniscient authority and quick learning, and in the relationships between moral reasoning and epistemological beliefs in the American and Chinese sample can be accounted for by differences in cultural context.

Conclusion, Suggestions and Implications

The results of the current investigations lend some support to the validity and universality of Kohlberg's theory of moral development and previous studies on cultural differences of college students' epistemological beliefs. That is, differences in gender and ethnicity are not dependable predictions of differences in epistemological beliefs and moral reasoning in either American or Chinese college students. Different from the previous studies (Belensky et al. 1986; Baxter Magolda, 1990; Schommer & Dunenll, 1994; Knight, Elfenbein, & Martin, 1997; Galotti et al., 1999; Knight et al., 2000; Galotti et al., 1999; Marrs, 2005), the findings of the present study are consistent with other research in which there were no significant differences found between male and female participants in moral reasoning (Gibbs, Arnold, & Burkhardt, 1984; Walker, 1984; Jaffee & Hyde, 2000) and epistemological beliefs (Unger, Draper, & Pendergrass, 1986; Martin, et al. 1994). Gilligan's (1982) charges of Kohlberg's gender-bias in Kohlberg's model were not substantiated by the present study.

The findings of the present investigation found no effect of ethnicity in college students' moral reasoning and epistemological beliefs, inconsistent with those previous studies (Pai, 1990; Schommer, 1993a). The differences in epistemological beliefs between American and Chinese college students were cross-cultural, or rather, cross-

national. This cultural comparison of moral reasoning and epistemological beliefs between American and Chinese college students provided findings in an area that has not been addressed in any previous investigation.

However, caution must be used to ensure that the results and conclusions of this study are not generalized to elementary or secondary school level in that the samples used in this study were drawn from American and Chinese college students. Future research is needed to further examine the meaning of these findings and to add to our knowledge base regarding epistemological beliefs and moral reasoning.

The epistemological belief research on psychological basis has been undertaken mostly in North America and the instruments used for measuring epistemological beliefs were developed originally for white middle-class adults (Schommer, 1998), and clearly grounded in the culture of Western higher education. There is a need for future research to adapt or develop some instruments by taking into account the subjects' cultural, educational, and social background. With similar problems to those found by Jeong (2003), the internal consistency of the epistemological belief questionnaire used for this study was found low in the Chinese group of $\alpha = .42$ for Simply Knowledge, $\alpha = .66$ for Certain Knowledge, $\alpha = .42$ for Quick Learning, $\alpha = .45$ for Omniscient Authority, and $\alpha = .52$ for Innate Ability, although the results were found higher with the American group, with $\alpha = .49$ for Simply Knowledge, $\alpha = .63$ for Certain Knowledge, $\alpha = .52$ for Quick Learning, $\alpha = .54$ for Omniscient Authority, and $\alpha = .65$ for Innate Ability.

From a methodological perspective, this study used samples available to the researcher, and the sampling data was cross-sectional in nature, it is suggested that more longitudinal and multidimensional studies are needed to track students' epistemological

and moral development. Because random sampling was not possible in the present study, a large random sample chosen from different colleges and universities (public and private) would provide more information about the actual moral development of university students and the influence of more social and personal factors. In addition, if combined with in-depth interviews (Brownlee, 2002) to complement quantitative data, a qualitative investigation may provide a more trustworthy study for epistemological beliefs and moral reasoning.

Of the three universities sampled for this study, the two groups of the sample students were education majors, and these students are likely to become teachers after their graduation. Previous studies indicated that moral reasoning ability could improve at the collegiate level (Burwell, 1997; McNeel, 1992; King & Matthew, 2002). Such collegiate effect was reflected in epistemological beliefs as well (Perry, 1970; Baxter Magolda, 1993). It will be of interest to conduct a longitudinal study to follow up these students' epistemological and moral development after they change their role from college students to teachers. Different from their roles as students, as teachers they will need increasingly to work with diverse students in their teaching career. "They need to manage and interact with a broad range of students, parents, colleagues and administrative personnel, often in order to address a range of ill-defined problems" (Brownlee, 2002). Therefore, "the way teachers perceive their practice recasts their knowing from formal reasoning and reflection upon action to a complex set of ways of thinking about what it means to a teacher" (Terri et al., 1999). In return, such a longitudinal study will provide for information for teacher education courses to address epistemological beliefs and moral reasoning to prepare perspective teachers for complex,

demanding teaching roles, more able to deal with ill-defined problems and, likewise, more able to recognize the importance of sophisticated beliefs and higher levels of reasoning for themselves as learners and for the students they teach.

Despite the limitations, the present study identified cultural differences significantly related to students' use of higher-stage moral reasoning and "sophisticated" views of knowledge. The study of American and Chinese students' epistemological beliefs and moral reasoning will open a new avenue allowing for examination of the relations among their unique cultural, educational, and social backgrounds, their development of beliefs about knowledge and knowing, and moral judgment development. The findings of this research may have some educational implications.

First, through uncovering the epistemological beliefs and moral reasoning held by the college students from different cultures, the findings of this study may enable educational policy makers, curriculum developers, teachers and students to understand college students' epistemological beliefs and moral reasoning so that appropriate curriculum, teaching pedagogies and learning approaches may be developed. This new curriculum will promote students' more sophisticated epistemological beliefs and higher stages of moral reasoning. The findings also will be conducive to the developers of cultural exchange programs with the awareness of cultural differences when developing such programs, particularly between the United States and China.

Second, the results of the present study have implications for the development of a comprehensive program of character education in public schools that would strengthen students' moral and intellectual development, balancing developmental psychology and cultural differences that exist among nations. Successful character education programs

designed for students to be “good and smart” (Allen & Cosby, 2000) may be shared and disseminated among different nations with a full awareness of both universal and particular aspects of epistemological and moral development across cultures.

Third, the results of this study should invoke more discussion addressing the erroneous beliefs and conceptions of Western scholars that Asian students hold their beliefs on simple knowledge and quick learning and rely on rote learning and surface study approach, which was referred to as “the paradox of the Chinese learner” (Marton et al. 1993, pp.15-16; Watkins & Biggs, 1996). Biggs’ argument was introduced in this study for the explanation of the misperception of Western scholars on the study approach of Chinese students (Watkins & Biggs, 1996).

Fourth, knowledge learning and moral education are the two pillars for character education that enable students to develop both intellectually and morally. In moral education, a fundamental principle has been “knowledge and action going hand in hand” and the integration of learning and doing (Zhou, 2006, pp. 163-167). By understanding students’ beliefs and reasoning, a new curriculum focusing on academic and moral education can be integrated in college classes. This new curriculum will enhance students’ learning through active involvement in school and community projects. To educating people to be good and smart is a life-long process and to promote it in a sustainable way warrants additional research. Conducting and incorporating such research through the lens of epistemological and moral development provides a means to promote high quality education for individuals throughout the world.

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APPENDIX A. DIT-2 Instructions

This questionnaire is concerned with how you define the issues in a social problem. Several stories about social problems will be described. After each story, there will be a list of questions. The questions that follow each story represent different issues that might be raised by the problem. In other words, the questionnaire/issues raise different ways of judging what is important in making a decision about the social problem. You will be asked to rate and rank the questions in terms of how important each one seems to you.

This questionnaire is in two parts; one part contains the INSTRUCTIONS (this part) and the stories presenting the social problems; the other part contains the questions (issues) and the ANSWER SHEET on which to write your responses.

Here is an illustration case and sample questionnaire.

Presidential Election

Imagine that you are about to vote for a candidate for the Presidency of the United States. Imagine that before you vote, you are given several questions, and asked which issue is the most important to you in making up your mind about which candidate to vote for. In this example, 5 items are given. On a rating scale of 1 to 5 (1=Great, 2=Much, 3=Some, 4=Little, 5=No) please rate the importance of the item (issue) by filling in with a pencil one of the bubbles on the answer sheet by each item.

Assume that you thought that item #1 (below) was of great importance, item #2 had some importance, item #3 had no importance, item #4 had much importance, and item #5 had much importance. Then you would fill in the bubbles on the answer sheet as shown below.

IMPORTANCE: Great Much Some Little No

- 1. Financially are you personally better off now than you were four years ago?
- 2. Does one candidate have a superior personal moral character?
- 3. Which candidate stands the tallest?
- 4. Which candidate would make the best world leader?
- 5. Which candidate has the best ideas for our country's internal problems, like crime and health care?

Further, the questionnaire will ask you to rank the question in terms of importance. In the space below, the numbers at the top, 1 through 12, represent the item number. From top to bottom, you are asked to fill in the bubble that represents the item in first importance (of those given to you to choose from), then second most important, third most important, and fourth most important. Please indicate your top four choices. You might fill out this part, as follows:

 1 Most Important 4 Second Most Important 5 Third Most Important 3 Fourth Most Important

Note that some of the items may seem irrelevant to you (as in item #3) or not make sense to you—in that case, rate the item as “no” importance and do not rank the item. Note that in the stories that follow, there will be 12 items for each story, not five. Please make sure to consider all 12 items (questions) that are printed after each story.

In addition you will be asked to state your preference for what action to take in the story. After the story, you will be asked to indicate the action you favor on a seven-point scale (1= strongly favor some action, 7=strongly oppose the action).

In short, read the story from this booklet, then fill out your answers on the answer sheet. Please use a #2 pencil. If you change your mind about a response, erase the pencil mark cleanly and enter your new response.

[Notice the second part of this questionnaire, the Answer Sheet. The Identification Number at the top of the answer sheet may already be filled in when you receive your materials. If not, you will receive instructions about how to fill in the number. If you have questions about the procedure, please ask now. Please turn now to the Answer Sheet]

Famine (Story 1)

The small village in northern India has experienced shortages of food before, but this year’s famine is worse than ever. Some families are even trying to feed themselves by making soup from tree bark. Mustaq Singh’s family is near starvation. He has heard that a rich man in his village has supplies of food stored away and is hoarding food while its price goes higher so that he can sell the food later at a huge profit. Mustaq is desperate and thinks about stealing some food from the rich man’s warehouse. The small amount of food that he needs for his family probably wouldn’t even be missed.

What should Mustaq Singh do? Do you favor the action of taking the food (Mark one)

_____ Should take the food _____ Can’t decide _____ Should not take the food

Rate the following 12 issues in terms of importance (1-5)

IMPORTANCE: Great Much Some Little No

- 1. Is Mustaq Singh courageous enough to risk getting caught for stealing?
- 2. Isn’t it only natural for a loving father to care so much for his family that he would steal?
- 3. Shouldn’t the community’s laws be upheld?
- 4. Does Mustaq Singh know a good recipe for preparing soup from tree bark?
- 5. Does the rich man have any legal right to store food when other people are starving?
- 6. Is the motive of Mustaq Singh to steal for himself or to steal for his family?
- 7. What values are going to be the basis for social cooperation?
- 8. Is the epitome of eating reconcilable with the culpability of stealing?
- 9. Does the rich man deserve to be robbed for being so greedy?
- 10. Isn’t private property an institution to enable the rich to exploit the poor?

- 11. Would stealing bring about more total good for everybody concerned or wouldn't it?
- 12. Are laws getting in the way of the most basic claim of any member of a society?

From the list above, select the four most important:

_____ Most Important _____ Second Most Important _____ Third Most Important _____ Fourth Most Important

Reporter (Story 2)

Molly Dayton has been a news reporter for the *Gazette* newspaper for over a decade. Almost by accident, she learned that one of the candidates for Lieutenant Governor for her state, Grover Thompson, had been arrested for shop-lifting 20 years earlier. Reporter Dayton found out that early in his life, Candidate Thompson had undergone a confused period and done things he later regretted, actions which would be very out-of-character now. His shop-lifting had been a minor offense and charges had been dropped by the department store. Thompson has not only straightened himself out since then, but built a distinguished record in helping many people and in leading constructive community projects. Now, Reporter Dayton regards Thompson as the best candidate in the field and likely to go on to important leadership positions in the state. Reporter Dayton wonders whether or not she should write the story about Thompson's earlier troubles because in the upcoming close and heated election, she fears that such a news story could wreck Thompson's chance to win.

Do you favor the action of reporting the story? (Mark one.)

_____ Should report the story _____ Can't decide _____ Should not report the story

IMPORTANCE: Great Much Some Little No

- 1. Doesn't the public have a right to know all the facts about all candidates for office?
- 2. Would publishing the story help Reporter Dayton's reputation for investigative reporting?
- 3. If Dayton doesn't publish the story wouldn't another reporter get the story anyway and get the credit for investigative reporting?
- 4. Since the voting is such a joke anyway, does it make any difference what reporter Dayton does?
- 5. Hasn't Thompson shown in the past 20 years that he is a better person than in his earlier days as a shop-lifter?
- 6. What would best serve society?
- 7. If the story is true, how can it be wrong to report it?
- 8. How could reporter Dayton be so cruel and heartless as to report the damaging story about candidate Thompson?
- 9. Does the right of "habeas corpus" apply in this case?
- 10. Would the election process be more fair with or without reporting the story?
- 11. Should reporter Dayton treat all candidates for office in the same way by reporting everything she learns about them, good and bad?
- 12. Isn't it a reporter's duty to report all the news regardless of the circumstances?

From the list above, select the four most important:

_____ Most Important _____ Second Most Important _____ Third Most Important _____ Fourth Most Important

School Board (Story 3)

Mr. Grant has been elected to School Board District 190 and was chosen to be Chairman. The district is bitterly divided over the closing of one of the high schools. One of the high schools has to be closed for financial reasons, but there is no agreement over which school to close. During his election to the School Board, Mr. Grant had proposed a series of "Open Meetings" in which members of the community could voice their opinions. He hoped that the dialogue would make the community realize the necessity of closing one high school. Also he hoped that through open discussions, the difficulty of the decision would be appreciated, and that the community would ultimately support the school board decision. The first Open Meeting was a disaster. Passionate speeches dominated the microphones and threatened violence. The meeting barely closed without fist-fights. Later in the week, school board members received threatening phone calls. Mr. Grant wonders if he ought to call off the next Open Meeting.

Do you favor calling off the next Open Meeting? (Mark one.)

_____ Should call of the next open meeting _____ Can't decide _____ Should have the next open meeting

IMPORTANCE: Great Much Some Little No

1. Is Mr. Grant required by law to have Open Meetings on major school board decisions?
2. Would Mr. Grant be breaking his election campaign promises to the community by discounting the Open Meetings?
3. Would the community be even angrier with Mr. Grant if he stopped the Open Meetings?
4. Would the change in plans prevent scientific assessment?
5. If the school board is threatened, does the chairman have the legal authority to protect the Board by making decisions in closed meetings?
6. Would the community regard Mr. Grant as a coward if he stopped the open meetings?
7. Does Mr. Grant have another procedure in mind for ensuring that divergent views are heard?
8. Does Mr. Grant have the authority to expel troublemakers from the meetings or prevent them from making long speeches?
9. Are some people deliberately undermining the school board process by playing some sort of power game?
10. What effect would stopping the discussion have on the community's ability to handle controversial issues in the future?
11. Is the trouble coming from only a few hotheads, and is the community in general really fair-minded and democratic?
12. What is the likelihood that a good decision could be made without open discussion from the community?

From the list above, select the four most important:

_____ Most Important _____ Second Most Important _____ Third Most Important _____ Fourth Most Important

Cancer (Story 4)

Mrs. Bennett is 62 years old, and in the last phases of colon cancer. She is in terrible pain and asks the doctor to give her more pain -killer medicine. The doctor has given her the maximum safe dose already and is reluctant to increase the dosage because it would probably hasten her death. In a clear and rational mental state, Mrs. Bennett says that she realizes this, but wants to end her suffering even if it means ending her life. Should the doctor give her an increased dosage?

Do you favor the action of giving more medicine? (Mark one.)

_____ Should give Mrs. Bennett an increased dosage to make her die _____ Can't decide _____ Should not give her an increased dosage

IMPORTANCE: Great Much Some Little No

1. Isn't the doctor obligated by the same laws as everybody else if giving an overdose would be the same as killing her?
2. Wouldn't society be better off without so many laws about what doctors can and cannot do?
3. If Mrs. Bennett dies, would the doctor be legally responsible for malpractice?
4. Does the family of Mrs. Bennett agree that she should get more painkiller medicine?
5. Is the painkiller medicine an active heliotropic drug?
6. Does the state have the right to force continued existence on those who don't want to live?
7. Is helping to end another's life ever a responsible act of cooperation?
8. Would the doctor show more sympathy for Mrs. Bennett by giving the medicine or not?
9. Wouldn't the doctor feel guilty from giving Mrs. Bennett so much drug that she died?
10. Should only God decide when a person's life should end?
11. Shouldn't society protect everyone against being killed?
12. Where should society draw the line between protecting life and allowing someone to die if the person wants to?

From the list above, select the four most important:

_____ Most Important _____ Second Most Important _____ Third Most Important _____ Fourth Most Important

Demonstration (Story 5)

Political and economic instability in a South America country prompted the President of the United States to send troops to "police" the area. Students at many campuses in the U.S.A. have protested that the United States is using its military might for economic advantage. There is widespread suspicion that big oil multinational companies are pressuring the President to safeguard a cheap oil supply even if it means loss of life. Students at one campus took to the streets in demonstration, tying up traffic and stopping regular business in the town. The president of the university demanded that the students stop their illegal demonstrations. Students then took over the college's administration building, completely paralyzing the college. Are the students right to demonstrate in these ways?

Do you favor the action of demonstrating in this way?

_____ Should continue demonstrating in these ways _____ Can't decide _____ Should not continue demonstrating in these ways

IMPORTANCE: Great Much Some Little No

1. Do the students have the right to take over property that doesn't belong to them?
2. Do the students realize that they might be arrested and fined, and even expelled from school?
3. Are the students serious about their cause or are they doing it just for fun?
4. If the university president is soft on students this time, will it lead to more disorder?
5. Will the public blame all students for the actions of a few student demonstrators?
6. Are the authorities to blame by giving in to the greed of the multinational oil companies?
7. Why should a few people like Presidents and business leaders have more power than ordinary people?
8. Does this student demonstration bring about more or less good in the long run to all people?
9. Can the students justify their civil disobedience?
10. Shouldn't the authorities be respected by students?
11. Is taking over a building consistent with principles of justice?
12. Isn't it everyone's duty to obey the law, whether one likes it or not?

From the list above, select the four most important:

_____ Most Important _____ Second Most Important _____ Third Most Important _____ Fourth Most Important

APPENDIX B. Epistemic Beliefs Inventory

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

Strongly **Disagree** ①← ②← ③→ ④→ ⑤ Strongly **Agree**

1. It bothers me when instructors don't tell students the answers to complicated problems.
2. Truth means different things to different people.
3. Students who learn things quickly are the most successful.
4. People should always obey the law.
5. Some people will never be smart no matter how hard they work.
6. Absolute moral truth does not exist.
7. Parents should teach their children all there is to know about life.
8. Really smart students don't have to work as hard to do well in school.
9. If a person tries too hard to understand a problem, they will most likely end up being confused.
10. Too many theories just complicate things.
11. The best ideas are often the most simple.
12. People can't do too much about how smart they are.
13. Instructors should focus on facts instead of theories.
14. I like teachers who present several competing theories and let their students decide which is best.
15. How well you do in school depends on how smart you are.
16. If you don't learn something quickly, you won't ever learn it.
17. Some people just have a knack for learning and others don't.
18. Things are simpler than most professors would have you believe.
19. If two people are arguing about something, at least one of them must be wrong.
20. Children should be allowed to question their parents' authority.
21. If you haven't understood a chapter the first time through, going back over it won't help.
22. Science is easy to understand because it contains so many facts.
23. The moral rules I live by apply to everyone.
24. The more you know about a topic, the more there is to know.

- 25. What is true today will be true tomorrow.
- 26. Smart people are born that way.
- 27. When someone in authority tells me what to do, I usually do it.
- 28. People who question authority are troublemakers.
- 29. Working on a problem with no quick solution is a waste of time.
- 30. You can study something for years and still not really understand it.
- 31. Sometimes there are no right answers to life's big problems.
- 32. Some people are born with special gifts and talents.

APPENDIX C. Demographic Questionnaire

Please answer each of the following questions.

1. Gender _____ Female _____ Male

2. Age _____

3. Class Status

_____ Freshman _____ Sophomore _____ Junior _____ Senior _____ Graduate

4. Your Current Major _____

5. Current GPA at the University _____

6. Ethnic Background

Note: The definitions and explanations of ethnic origin are based on the Current Population Survey (CPS) by the Census Bureau.

___ White

___ Black or African American

___ American Indian and Alaska Native

___ Asian/Pacific Islander

___ Hispanic or Latino

___ Others

APPENDIX D. Approval Letter from Human Subjects Committee of College of Education at ODU

From: Alice Wakefield/ESSE/EDUC/ODU
12/06/2005 02:07 PM
To: Zhongtang Ren/ECI/EDUC/ODU@ODU
cc: Alice Wakefield/ESSE/EDUC/ODU

Subject: HSR#11/2

Dear Zhongtang,

The Human Subject Review Committee for the College of Education has reviewed your study and found it to be exempt under 6.3. Exempt studies are not required to obtain informed consent letters. You may proceed with your investigation. Thank you for your submission and good luck with your research.

All the best,

Alice Wakefield, HSR Chair

Alice P. Wakefield
www.odu.edu/awakefie

Early Childhood Teacher Educator
Old Dominion University
Norfolk, VA 23529

APPENDIX E. Informed Consent

Dear Participant,

The following survey is part of a research project undertaken to fulfill the doctoral requirements at Old Dominion University in Virginia, USA. The purpose of this study is to investigate the relationships among epistemological beliefs and moral reasoning between Chinese and U.S. college students. While there are no direct benefits to you from participating in this survey, the results will be useful in future research in human behavior. It is expected that completing the questionnaires will take less than 45 minutes. Your participation is entirely voluntary and very much appreciated and you can withdraw at any time without retribution. There will not be a penalty or any negative effect on your grade if you choose not to participate. Your personal information will not appear in the data analysis or in any papers to be published. We will only use completed questionnaires. Questions regarding the study may be addressed to Zhongtang Ren at (757) 839-0927 or at zren@odu.edu. Your signature indicates your willingness to participate in the study. Please read the statement of this survey, preview the survey and then sign your name below.

Thank you very much for your participation.

Sincerely

Zhongtang Ren

Print Your First Name _____ Last Name _____

I am willing to complete Zhongtang Ren's research questionnaires.

Your Signature _____ Date _____

APPENDIX F. Approval Letter by Luoyang Normal University for the Survey

Letter of Authorization

December 12, 2005

Dear Mr. Ren,

You are granted the permission to collect data necessary for conducting a study on “A Cross-cultural study of Epistemological Beliefs and Moral Reasoning between American and Chinese college students”. Please let me know if you need any further cooperation and assistance.

Hu Lingmin

Director

Education Research Center

Luoyang Normal University

71 Luolong Road, Anle

Luoyang, Henan 471022

China

**APPENDIX G. Approval Letter by Central University for Nationalities for the
Survey**

Letter of Authorization

January 12, 2006

Dear Mr. Ren,

Please accept this letter as the permission for you to collect data necessary for conducting a study on “A Cross-cultural study of Epistemological Beliefs and Moral Reasoning between American and Chinese college students”. Please feel free contact me if you need any further assistance.

Yingjian Guo, Ph.D.

Dean

Professor of English

School of Foreign Studies

Central University for Nationalities

27 South Street, Zhongguan Cun, Haidian District

Beijing, 100081

China

VITA

Zhongtang Ren

Education

- Ph. D. Urban Studies in Education. 2006, Old Dominion University, Norfolk, VA, USA
 M. S. Secondary Education. 2001, Old Dominion University, Norfolk, VA, USA
 B. A. English Linguistics and Literature. 1984, Henan Normal University, Xinxiang, Henan, China

Professional Experience

- AUG 2000–PRESENT Old Dominion University, Norfolk, VA, USA
 Teaching Assistant for Social and Cultural Foundation of Education
 Project Evaluator of ACCT of PT3 sponsored by US Department of Education
 Selected Member of ODU Responsible Conduct of Research Task Force
- SEP 1996–AUG 2000 Luoyang Normal University, Henan, China
 Assistant Professor, teaching Social Studies, English Grammar and Literature
 Deputy Chief of Education Research Center
 Director of Academic Affair Office
- AUG 1995–SEP 1996 Old Dominion University, Norfolk, VA, USA
 Visiting Scholar, doing research for American education
- FEB 1993–AUG 1995 Foreign Investment and Loan Office, Ministry of Education, Beijing, China
 Project Officer and Translator, working with the United Nations Development
 and Planning (UNDP), the World Bank and other international agencies for
 educational projects in China
- JUL 1984–FEB 1993 Luoyang Normal University, Henan, China
 Lecturer & Assistant Professor, teaching English, Literature and Cultural Studies

Major Publications

- Allen, D. & Z. Ren. (2005). *Values and ethics in higher education*. Paper presented at National Academy of Educational Administration (NARA). Beijing, China, September 2005.
- Ren, Z. et al (2005). *How moral sense in different cultures might influence the education system*. Full paper presented in the Third Global Ethical Symposium & Youth Summit, co-sponsored by the PRIDE, a NGO in ECOSOC of the United Nations and the Chinese Academy of Social Sciences (CASS). Beijing, China, July 7-11, 2005.
- Ren, Z. et al. (2004). *Moral sense and culture: a conceptual inquiry and preliminary study*. Full paper presented at International Forum on Integrated Education and Educational Reform, Santa Cruz, CA, October 28-31, 2004.
- Ren, Z & Wang, J. (2001). *Saving faith* (Translation of David Baldacci's novel). Nanjing: Yilin Press.
- Ren, Z. (2000). A new approach for studying English grammar. *Journal of Luoyang Normal University*, 4, 129-130.
- Ren, Z. (1999). 2+2 teacher's performance appraisal. *Journal of Luoyang Normal University*, 1, 102-114.
- Ren, Z. et al. (1994). *A New Practical English Grammar*. Zhengzhou: Henan People's Press.