

An Analysis of the Nature of Epistemological Beliefs: Investigating Factors Affecting the Epistemological Development of South Korean High School Students

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The purpose of this study is to investigate the nature of epistemological beliefs about learning (or learning beliefs) by analyzing the type of factors involved in the epistemological development of South Korean high school students (N=455). Learning beliefs are implicit assumptions held by learners about the source and certainty of knowledge and the ways to obtain knowledge. Previous studies on the epistemological development of American high school students showed that American students learning beliefs are positively related with their age, amount of formal education, and academic achievement. Multiple regression analysis of this study, however, showed that no such relationships were identified from the present South Korean sample except between students beliefs and their academic achievement. In addition, the present study showed that South Korean students learning beliefs were related with their independent-self construal (individualistic self-view) but not with their interdependent self-construal (collectivistic self-view). 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). The differences between the present results and previous findings with South Korean college students will be further discussed in terms of the sub-cultural variations between South Korean young generations.

Introduction

The growing body of research evidence indicates that students epistemological beliefs about learning have influence on their various learning processes and problem solving behaviors (Schommer, 1994). Epistemological beliefs about learning (or learning beliefs) are defined as *socially shared intuitions about the nature of knowledge and the nature of learning* and involve *knowledge about the limits of knowing, the certainty of knowing, and the*

criterion of knowing (Jehng, Johnson, and Anderson, 1993, p. 24). According to Jehng, Johnson, and Anderson (1993), learning beliefs consist of the following five dimensions:

- (a) Certainty of knowledge: Knowledge is more likely to be certain and unchanging rather than tentative and unpredictable.
- (b) Omniscient authority: Knowledge is handed down by teachers and other experts rather than formed by independent reasoning.
- (c) Orderly process: The learning process tends to be regular rather than irregular.
- (d) Innate ability: The ability to learn is innate rather than acquired.
- (e) Quick learning: Learning is an immediate rather than a slow process of accumulating knowledge (labeled from naive perspective, Jehng, et al., 1993, p. 26).

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The first three dimensions (*certainty of knowledge, omniscient authority, and orderly process*) are beliefs about knowledge and the last two (*innate ability and quick learning*) represent beliefs about learning. The research shows that learning beliefs affect the degree of students' active involvement and persistence in learning, and play an important role in reading comprehension, mathematical problem solving, formation of conceptual

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understanding, and coping with ill-structured questions or tasks (Schommer, 1994). Research findings suggest that students' naive beliefs hinder critical aspects of learning, whereas sophisticated beliefs facilitate higher level learning and critical thinking (Schommer, 1994). Sophisticated believers are portrayed as active, independent, persistent, flexible, and open-minded learners in the research.

Previous research also showed that different factors are involved in the development of different aspects of students' beliefs. That is, students' beliefs about knowledge were predicted by the amount of formal education students received (Jehng, Johnson, and Anderson, 1993), whereas their beliefs about learning were related with their personal experiences, such as upbringing style and age (Schommer, 1989; 1992).

Until recently learning beliefs research was conducted only within the United States and some of the US findings suggested that students epistemological development is a function of the surrounding culture. For example, Jehng, Johnson, and Anderson (1993) attributed the development of learning beliefs to school ethos as well as the direct impact of instructions and they made a conclusion that learning beliefs are a *product of the activity, the culture, and the context in which they are cultivated* (p. 23). In his study on the development of students' epistemological beliefs, Perry (1968) also attributed the developmental pattern of learning beliefs, which progresses from reliance on authority to individual choice, commitment, and responsibility, to the influence of American liberal arts education.

In order to examine whether the nature of learning beliefs are culture-bound as suggested by such US studies, the first author of this study conducted cross-cultural studies (Youn, 1997; Youn, Kim, & Yang, 1999; Youn, 2000). The purpose of the studies was comparative analyses of both epistemological model and the type of factors involved in the epistemological development of college students across two countries, the United States and South Korea (henceforth abbreviated as Korea) which differ in emphasis on individualism and collectivism (Hofstede, 1991).

The results of the previous cross-cultural comparative studies showed that not only the factor model but also the influences of the same developmental factors (i. e., age, the amount of formal education, and academic achievement) were different between the two college student groups of

the US and Korea. The studies also showed that regardless of students nationality, it was students independent self-construal (individualistic self-view) that was positively related with their beliefs. The interdependent self-construal, however, did not show any kind of relations with students beliefs. Thus, these findings showed culture specific nature of epistemological beliefs - it is individualistic and not collectivistic orientation or emphasis that has positive influences on students epistemological development. These results empirically affirmed the implication of the previous US research by Jehng et al. (1993) and Perry (1968) that epistemological beliefs are the product of the surrounding cultures. Such previous findings suggested that further analyses of learning beliefs in a broader social and cultural context or with more diverse populations would be necessary for a better understanding of the nature of learning beliefs.

Purpose of the Study

The previous cross-cultural studies on epistemological beliefs were all conducted with college students only, the purpose of this study, therefore, was to explore whether the findings of the previous research, especially with Korean college students, can be replicated with Korean high school population. The investigation of the nature of epistemological beliefs with Korean high school students was necessary because of the following reasons.

First, Korean society is undergoing a rapid social and cultural change in response to external influences, especially those of Western societies. A simple consideration of Korean high school classroom situation may allow us to have a glimpse of the impact of such changes on Korean adolescents. Recently, increasing number of high school teachers complain about their students changing attitudes toward their teachers and other students. That is, they would say that their students become more individualistic and they tend to show no respect for their teachers or no concern for other classmates, etc. Such attitudinal change may be a reflection of the so-called school collapse phenomena syndrome which is one of the most controversial issues not only for Korean society but for several other Asian countries.

Due to such a rapid and radical change of Korean society, cultural variation may exist even between high school teenagers and college students. Such popular terms as X-generation or N-generation, to name a few, seem to

reflect the very existence of somewhat subtle but indisputable and rapidly changing socio-cultural variations among young generations. Considering the current situation, it may be possible that the results from the first authors previous studies with Korean college students may not be replicated from this study employing Korean high school students.

Secondly, Schommer (1994) suggested that the need for a better understanding of the nature of epistemological beliefs would increase as a society becomes highly industrialized where high level learning and critical, independent, and creative thinking of individuals become increasingly more important. Korean society is becoming more technologically advanced and informationally-oriented. The transition to a highly industrialized society through technological advances would be a key for Korean society's survival from increased international competition in the near future. In order to lead such a transition successfully, education may need to take a more important role, due to the limited natural resources available to Korea.

As mentioned already, if Schommer's suggestion (1994) turn out to be true in the near future, and if Korean society is to be more highly industrialized and more informationally-oriented, it may be necessary for Korean educators to understand better the nature of epistemological beliefs. Also they may need to find ways to facilitate the development of Korean students learning beliefs. If learning beliefs are to be developed from early on, that is, while students mind habit or brain function is more plastic and flexible, then the development could be accelerated or achieved with more ease.

Research Questions

The purpose of this study is to investigate the nature of epistemological beliefs by analyzing the type of developmental factors involved in the epistemological development of Korean high school students. Since the nature of learning beliefs with Korean high school population has never been analyzed, the validation of the epistemological model and the scale with Korean high school students should be the preceding step over the analyses of the relations between students beliefs and their developmental factors. Jehng, Johnson, and Andersons (1993) epistemological beliefs model was adopted in this study. The first research question was

- 1) What is the nature and the number of factors that comprise learning beliefs of Korean high school students?

And the second research question was

- 2) What are the relationships between Korean high school students learning beliefs and their age, educational level, academic achievement (grade point average, GPA), gender, and the two aspects of their self-construal, the independent self-construal and the interdependent self-construal?

Characteristics of Korean Culture

According to Hofstede's study (1991) of multinational corporation from which the four cultural dimensions were empirically derived, cultural makeup of Korean society can be described in terms of the following four dimensions of large *power-distance*, strong *uncertainty avoidance*, *femininity*, and *collectivism*. On the other hand, that of the United States was characterized as small *power-distance*, weak *uncertainty-avoidance*, *masculinity*, and *individualism*. As indicated already, among the four dimensions, Korea showed the most prominent difference from the United States in *individualism-collectivism*. That is, Hofstede (1991) showed that the United States ranked top in *individualism*, whereas South Korea ranked 11th on the *collectivism* pole, from among over 50 plus countries.

Collectivistic cultures such as those of China, Japan, Korea, South-east Asia, Africa, and South America emphasize collective identity, emotional dependency, primacy of in-group goals over personal goals, in-group cohesiveness and harmony, duties and obligations, behavior regulation by in-group norms, and strong in-group and out-group distinction. People from these cultures tend to see themselves in terms of specific relationships with other and the social context, rather than autonomy and dispositional qualities. Markus and Kitayama (1994) termed such self-view as the interdependent self-construal.

From this perspective, the self is differently instantiated within each specific social context, therefore sometimes elusive and unreliable, as well as flexible and malleable (Singelis, 1994). It does not mean, however, that an interdependent self does not possess and express internal

attributes such as abilities, opinions, and personality characteristics. It means that an individual's internal attributes tend to take a secondary role in many aspects of social life - they must instead be constantly under an individual's voluntary control and regulation to come to terms with the primary task of the interdependence. And such voluntary control of the inner attributes comprises a central core of the cultural ideal of maturity (Markus & Kitayama, 1994).

On the other hand, individualistic cultures, such as those of Western Europe and North America, emphasize autonomy, individual identity, emotional independence, primacy of personal goals over in-group goals, a right to privacy, and behavior regulation by personal attitudes or beliefs (Triandis, 1994). These cultural emphases tend to lead people to see themselves in terms of autonomy and dispositional qualities which are stable over time and context (Singelis, 1994). Such self-view, termed as the independent self-construal by Markus and Kitayama, gives rise to such cultural emphasis on self-actualization or self realization, and expression of one's unique configuration of needs, rights, and capacities (Singelis, 1994).

Differences in Teacher-Student Interactions between the US and South Korea

The Characteristics of the US Teacher-Student Interaction

Based on Hofstede's (1986) analysis of the nature of expected teacher-student interactions which vary along the subdivisions of the four cultural dimensions, the US teacher-student interaction can be summarized as a *student-centered* approach, where the relationship between the two tends to be *freeing* and *impersonal*.

Teachers tend to allow students to initiate and control their learning experiences as well as respect their independent and innovative learning approaches. However, the two parties are not supposed to be emotionally involved. Emotional uninvolvement or independence between individuals is also a characteristic aspect of individualistic interpersonal relationship (Triandis, 1994). Such an impersonal interaction may be instrumental for the achievement of a learning objective which stresses impartment of objective "truth" to students from any competent persons, including teachers (Hofstede, 1986).

In a weak-uncertainty avoidance culture like the US teachers tend to allow students to contradict or criticize teachers, and teachers interpret such intellectual disagreement

as a stimulating exercise. That is, confrontation in learning situations is salutary, and conflict can be brought into the open. It may be because, in a learning context where the teacher-student relation tends to be freeing and impersonal, students may freely challenge or criticize teachers, and teachers may not take them personally, for the two parties are not personally or emotionally involved. Implicit in the above discussion is that the development of students' critical thinking may be facilitated in the US, where not only the power-distance is small but also the spirit of criticism and challenge are more acceptable and encouraged.

In addition, Hofstede's observation indicated that students of the weak uncertainty-avoidance culture tend to expect and thrive on uncertainty and complexity. More specifically, uncertainty-oriented people are open-minded, try to reduce uncertainty, and integrate new and old ideas and change their belief systems accordingly (Rokeach, 1960, as cited in Gundykunst and Matsumoto, 1996). They also tend to evaluate ideas and thoughts on their own merit rather than compare them with others. The teacher-student interaction of the US thus seem to be related to the development of such qualities as *open-mindedness*, *flexibility*, *activeness*, and *critical or independent thinking*, qualities also central to the sophisticated epistemological beliefs.

The Characteristics of Korean Teacher-Student Interaction

Korean teacher-student interaction can be characterized as a teacher-centered approach where the teacher-student relationship tends to be *binding* and *personal*. That is, students are expected to follow orders or instructions from the teacher, who is thought to be omniscient. In other words, it is the teacher and not the student who initiates and controls students learning experiences. Students need to learn, therefore, how to do, instead of how to learn by precisely following instructions. Such learning practices would inevitably lead to students feeling uncomfortable, as Hofstede (1986) also indicated, when they are faced with unstructured or uncertain tasks or situations. Certainty-oriented people tend to be closed-minded, try to avoid uncertainty rather than reduce it, like to hold on to traditional beliefs and have a tendency to reject ideas that are different (Rokeach, 1960, as cited in Gundykunst and Matsumoto, 1996).

The Korean teacher-student relation is also likely to be personal in that both parties are allowed to interact emotionally (Hofstede, 1986). Also such personal interactions between the two parties may be central to the achievement of the learning objective which stresses transference of personal wisdom from particular teachers to students.

In a learning situation where the teacher-student relation tends to be binding and personal and obedience to teachers instructions is emphasized, students criticisms or challenges directed at teachers may be interpreted by teachers as a reflection of students personal disloyalty to teachers or students unwillingness to learn. The Korean interaction style thus seems to place more emphasis on the development of such student qualities as accuracy or punctuality, passiveness, closed-mindedness, and uncritical acceptance of teachers instructions, the qualities unrelated or contradictory to the sophisticated epistemological beliefs.

The Epistemological Model Adopted in the Present Study

In this study Jehng, Johnson, and Andersons (1993) model that has been discussed at the beginning of this paper was adopted. Since their model is an extension and elaboration of previous models, it is necessary to review for a while the history of the development of epistemological models.

In his classic study of epistemological development, Perry (1968) showed that college education affects the development of student's beliefs about the nature of knowledge. Perry identified college students' epistemological cognition progressing through three dimensions from *dualistic thinking* to *multiplistic reasoning* and finally reaching *relativistic reasoning with commitment*.

Perry theorized that students progress through a series of nine intellectual stages. In the early stages students see knowledge as either right or wrong with authority figures knowing the answers (dualism). As students progresses through college, they encounter conflicting opinion among experts. In time, they come to recognize different points of view, yet persist in searching for the right answer. Eventually students conclude that one point of view is as good as another (multiplicity). As students enter new stage of development they begin to perceive knowledge as correct relative to various contexts (relativism). The right/wrong belief is now subordinate to relativistic thinking. According to Perry, when students reach the final stage of development, they realize that there are multiple possibilities for knowledge and that there are times when one must make a strong, yet tentative

commitment to some ideas (commitment) (as cited in Schommer, 1994, pp. 26-27).

Schommer (1989) found that the research utilizing Perry's one-dimensional model of epistemological beliefs showed inconsistent results. She thought that Perry's model might be too restrictive to capture more fine-tuned relationships between students' learning beliefs and different aspect of their learning. So she reconceptualized epistemological beliefs. That is, she extended Perry's model and differentiated epistemological beliefs into five dimensions: *Certain knowledge*, *Omniscient authority*, *Simple knowledge*, *Innate ability*, and *Quick learning*.

Jehng, Johnson, and Anderson (1993) adopted Schommer's model by replacing the *Simple knowledge* with *Orderly process*, arguing that *Orderly process* is a broader concept than *Simple knowledge*. *Orderly process* involves not only the content but also the acquisition process of simple or complex knowledge. The framework used in Jehng et al.'s model, therefore, consists of the following five dimensions of *Certainty of knowledge*, *Omniscient authority*, *Orderly process*, *Innate ability*, and *Quick learning*, as defined in the introduction.

The findings of Jehng et als study with Illinois college students of the US showed that learning beliefs are comprised of the five dimensions. Their study also showed that learning beliefs are a function of students age, educational level, and the field of study. That is, students studying in soft fields (social science and arts/humanities) tend to have more sophisticated beliefs about knowledge than those in hard fields (engineering and natural science). US graduate students also tend to hold more sophisticated beliefs about knowledge than undergraduate students.

In the previous cross-cultural studies (Youn, 1997; Youn et al., 1999; Youn, 2000) with college students in the United States and Korea, instead of Jehng et als five-factor model, the two-factor model was identified from the respective samples. The previous study (Youn, 2000) also showed that the factor structure identified from the US sample was conceptually consistent with the model proposed by Jehng, Johnson, and Anderson (1993). However, the Korean factor model showed significant variation from the US models. The Korean model reflected collectivistic values of Korean society. The differences between the two models were interpreted in terms of cultural variations between the two countries. The interpretation was confirmed by the findings of the same study (Youn, 2000) which showed that American

students epistemological development was related with their individualistic self-view (i. e. the independent self-construal) but not with their collectivistic self-view (i. e. the interdependent self-construal). The same relationship patterns between Korean students beliefs and the two aspect of their self-construal were also observed (Youn et al., 1999).

In addition, the study showed that, like American students, Korean college students studying in soft fields also tend to have more sophisticated beliefs than those in hard fields. The two developmental factors, the amount of formal education and age, which have been identified as significant factors affecting American students epistemological development, however, did not show any significant relations on Korean college students development. In fact, slight negative relations, though insignificant, existed between the two developmental factors and Korean students beliefs. In other words, no significant differences in learning beliefs appeared between Korean graduate students and undergraduate students. These previous findings (Youn et al., 1999; Youn, 2000) thus indicated the culture-specific nature of epistemological beliefs which may vary not only as functions of the academic atmosphere as identified by Jehng et al. (1993), but also as of a societys overarching cultural values of *individualism-collectivism*.

Method

Participants

A group of Korean high school students participated in this study. They were recruited from two high schools located in Seoul area by using a two-stage stratified convenience sampling method. That is, the target population was stratified into three educational levels from 10th to 12th grades and two gender categories of boys and girls.

Materials

The questionnaire package consisted of the Korean version of epistemological scale developed by Jehng et al. (1993) and the Korean version of self-construal scale by Singelis (1994). The package also included a survey sheet collecting demographic information on age, gender, educational level, GPA, social economic status (family income, parents educational level, etc.), and religion. Both scales which were originally made for college population

were used with minor change in wording, such as from professor to teacher. For the respective Korean version of the questionnaires, translation-back-translation and retranslation procedures were utilized in previous research (Youn, 2000), therefore, the procedure was not repeated this time.

The Korean version of epistemological scale consists of 61 items representing the five factors of Jehng et als model. The items are to be checked on a six-point Likert-type format. The internal consistency reliability (alpha) of the original epistemological scale was .83 and the Korean version was .78 in the previous study (Youn, 2000).

The self-construal scale developed by Singelis (1994) which was based on Markus and Kitayamas (1994) self-construal theory consists of 30 items (15 independent items and 15 interdependent items) placed on a seven-point Likert-type format. The original internal consistency reliability (alpha) of the independent subscale was .69 and the interdependent subscale was .73. The internal consistency reliabilities from the previous study (Youn, 2000) with Korean college sample ranged between .62 - .64.

Design and Procedure

The data was collected during the extra-study hours from two high schools. Since epistemological scale consists of 61 items, while self-construal scale contains only 30 items, the sample size of at least 305 (61×5) was required for factor analysis of the epistemological scale.

After screening for incomplete and erroneous surveys, a total of 455 surveys were used for analysis. Two hundreds and sixty one male students and 194 female students participated. One hundred and forty two students were 10th graders, 135 were 11th, and 178 were 12th. Students average age was 16.85 (SD = .93). The age range was 15-19.

For the validation of epistemological model, exploratory factor analyses (EFA) using Principal Axis method was conducted utilizing SPSS package. Before the analysis of the factor structure, each items reliability (Cronbach alpha) and discrimination power were analyzed. Items with negative item-total correlation or items with item-total correlation lower than .10 were dropped from analysis. For the investigation of the analysis of the relation between learning beliefs and the predictors of age, educational level, gender, GPA, and the two aspects of self-construal, multiple regression was employed.

Results

Analysis of the Factor Structure

Cattells scree test obtained from the varimax solution of EFA produced the two factors which accounted for 24.58% of the known variances of the sample. The first factor was labeled *Learning* and the second, *Knowledge*. *Learning* factor consisted of the items straightly from the two learning factors (*innate ability* and *quick learning*), and *Knowledge* items were also from knowledge factors (*certainty of knowledge*, *omniscient authority*, and *orderly process*). The internal consistency reliability (alpha) of the final 25 items was .79, the 12 item *Learning* factor was .75, and the 13 item *Knowledge* factor was .67.

Thus, in this study, two factors instead of the five were identified, which indicates that Jehng et als (1993) five-factor model was not replicated with Korean high school students. On the other hand, the factor structure identified from the present study was conceptually consistent with Jehng et als model in that all *Learning* items were from learning factors and all *Knowledge* items were also directly from knowledge factors. From the first authors previous studies (Youn, 1997; Youn et al., 1999; Youn, 2000) with Korean college students, the two factors instead of the five were also identified. However, the previous Korean college factor models differed from the present model. That is, in the previous model, *Learning* factor was consisted of the items from the two learning factors plus one knowledge factor, *omniscient authority*, which deals with teacher-student interaction, while *Knowledge* items were from the rest two knowledge factors of *certainty of knowledge* and *orderly process*. This factor model difference between the two Korean groups of high school and college students will be further discussed later.

The Relationship between Developmental Factors and Learning Beliefs

Multiple regression was employed for the analysis of the relationship between the two learning belief factors, *Learning* and *Knowledge*, and the six developmental factors of age, educational level, academic achievement (GPA), gender, and the two aspects of the self-construal, the independent self-construal (IDSC) and the interdependent self-construal (ITSC).

Table 1. Pearson Correlation between the Two Epistemological Factors and the Six Developmental Factors

	Learning	Knowledge
Age	-.125**	-.013
Educational Level	-.111**	-.03
Gender	.072	.070
GPA	.036	.185**
Independent Self-Construal	.018	.138**
Interdependent Self-Construal	.063	-.036

Note: ** : $p < .01$

Table 2. The Results of the Analysis of Multiple Regression between the Two Epistemological Factors and the Six Developmental Factors

	Learning	Knowledge
Age	- 1.25**	
Educational Level		
Gender		
GPA		.185**
Independent Self-Construal		.138**
Interdependent Self-Construal		
R ²	.016	.052
F	7.212**	15.982**

Note: ** : $p < .01$. Only significant values are presented.

Of the 30 self-construal items, seven items were eliminated after reviewing the item-total correlation analyses. The reliability of the remaining 23 items was .68. The reliability of 11-item independent sub-scale was .61, while that of 12-item interdependent sub-scale was .63.

Table 1 and 2 show the relationship patterns between the two epistemological beliefs (*Learning* and *Knowledge*) and the six developmental factors. The correlation analysis of the table 1 shows significant negative relation between Korean high school students educational level and their beliefs about learning (*Learning*). However, table 2 does not show such significant relation between the two. This is because the relation between the two predictors, the age and the educational level, is so strong that the variances that can be accounted for by the educational level has been all accounted for by age. As a result no unique variances were left that can be accounted for by the educational level alone.

Table 2 shows that Korean high school students age is negatively related with their beliefs about learning. On the

other hand, students academic achievement (GPA) and the independent self-construal are positively related with their beliefs about knowledge (*Knowledge*). It shows, however, that there is no significant or a negative relation between students beliefs and their educational level, gender, or the interdependent self-construal.

Discussion

Validation of Factor Model with Korean High School Students

The results of this study showed that the factor model identified from the present sample resembled the US model instead of the Korean model of the previous cross-cultural studies (Jehng et al., 1993; Youn et al., 1999; Youn, 2000). Specifically, factor analyses of the previous Korean college samples showed that one of the knowledge factors, *omniscient authority*, was factorized with learning factors instead of knowledge factors. On the other hand, from the previous US sample and the present Korean sample, omniscient authority was factorized with knowledge factors. The factor model difference between the two previous college samples of the US and Korea (Youn, 2000) was explained by considering following observations by Schommer (1994) and Hofstede (1986).

According to Schommer (1994), the three knowledge dimensions, *certainty of knowledge*, *omniscient authority*, and *orderly process*, are impersonal dimensions, that perceivers think distant from themselves. On the other hand, the two learning dimensions, *innate ability* and *quick learning*, are personal dimensions that students perceive as dimensions intimately involving themselves.

Based on Hofstede's study (1986) it was discussed in the introduction that the Korean teacher-student interaction is *personal* and *binding*, and such relational style would be instrumental for the achievement of learning goals that emphasize the transference of wisdom from a particular teacher to students. In contrast, the US teacher-student relationship was discussed as being *impersonal* and *freeing* and such impersonal interaction may be instrumental for the achievement of learning goals that stress the impartment of objective truth to students from any competent persons, including teachers (Hofstede). The *omniscient authority*, therefore, could have been factorized with other *personal* learning dimensions instead of *impersonal* knowledge

dimensions in South Korean college samples.

On the other hand, in the factor analysis of the present sample, *omniscient authority* was not factorized with the *personal* learning dimensions. Instead it was factorized with *impersonal* dimensions of knowledge factors, as was originally identified from the US models of the previous studies (Jehng, et al., 1993; Youn et al., 1999; Youn, 2000). This indicates that unlike Korean college students, Korean high school students attitude toward teachers tends to be *impersonal*. Thus, while Korean traditional or personal attitude of teacher-student interaction was identified from Korean college students, from the present Korean high school students, impersonal or western individualistic attitude was identified. The following explanations were considered in order to account this discrepancy between the two Korean student groups.

First, Korean high school students are not yet fully enculturated into a mainstream Korean society. A previous study (Kim, 1995) showed that enculturation process of young generations into a mainstream Korean society is in proportion to the students age. Or it is facilitated when they face life situations that force them to adjust, such as joining workforce for the first time after graduation from high school or college. According to this explanation, compared with the Korean college samples of the previous studies, the current Korean high school sample may feel less acculturation pressure into mainstream cultural milieu of Korean society, since most of them were college-bound students.

Secondly, such difference may actually reflect the sub-cultural differences between the two young generations as discussed in the introduction. With globalization, Korean society has been exposed to external influences, especially those of western societies since 1990s. And it seems to be Korean adolescent subculture that is most sensitive to and therefore affected the most by such sweeping trends of Westernization under the name of globalization.

Finally, nowadays, Korean adolescent culture can not be discussed separate from the influence of computers. Perhaps, compared with other generations, Korean adolescents are most deeply involved in computers. Computer can help young kids to take care of most of their activities. With the help of computers, they can do their homework, play games, make friends, exchange information, and even communicate with total strangers. Thus, since most of their needs are met through computers, they usually spend hours on computers. As a result, time spent for the interpersonal relationships even

with the family may often sharply reduced and the cultivation and maintenance of personal relations with others may also become relatively less important to them. This can be another reason for why today's South Korean youngsters compared with older generations become more individualistic (Kim, 1995) or egoistic. Such popular jokes as prince or princess syndrome seem to reflect such egoistic tendencies of Korean youngsters. When considering such rapid cultural change among the youngsters, their individualistic or egoistic attitudes can be perceived as being rude or disobedient and indifferent from older generations perspectives as indicated from recent Korean teachers complain toward their students attitudes.

The second (globalization) and the third explanation (influence of computers) together seem to be more compelling when considering the current Korean high school situation including the *school collapse phenomena*. Therefore, the findings of this study that Korean high school students attitudes toward their teachers tend to be *impersonal* may actually reflect the changing reality of the sub-cultural differences among Korean young generations.

Factors Affecting the Epistemological Development of Korean High School Students

The results of this study showed that among the six developmental factors, the three factors of the educational level, gender, or the interdependent self-construal showed no significant relation with Korean high school students beliefs. On the other hand, age had a significant negative relation with their beliefs about learning (*Learning*), but not with their beliefs about knowledge (*Knowledge*). Beliefs about learning (*Learning*) involve students attitudes toward speed and control of learning. This indicates, therefore, that as Korean high school students get older, they tend to become less persistent and feel less self-control in their approaches to learning. This may be related with the difficulties of entering into a college in Korea. Due to a limited college admission quota of Korean higher education systems, even a great number of highly qualified students fail to get admissions from colleges. Under such educational system, passing entrance exam or entering into a decent college itself often becomes the only goal for Korean high school students. As a result, it may be difficult for them to maintain intrinsic motivation toward school learning. When they lose a sense of intrinsic motivation or self-control, it may be difficult for them to be persistent learners.

In addition to such a Korean educational system it may also be related with the Korean teachers teacher-centered teaching style as discussed in the introduction. In teacher-centered learning, it is the teacher and not the student who initiates and controls students learning experiences. Students need to learn, therefore, how to do, instead of how to learn, by precisely following instructions. Nowadays, while Korean high school students tend to be less compliant to their teachers as previously discussed, teachers may still expect them to be obedient and teach them with a traditional teacher-centered approach.

The academic achievement and the independent self-construal showed significant positive relations with Korean high school students beliefs about knowledge (*Knowledge*) but not with their beliefs about learning (*Learning*). In the previous studies with Korean college students, only the independent self-construal was identified as having a positive relation with students beliefs and GPA showed an insignificant negative relation. The implication of these results is that Korean high school students with more individualistic self-view or with higher GPA tend to be more open-minded, independent, critical, and flexible learners in their view of knowledge.

The positive relation between Korean high school students GPA or the independent self-construal and their beliefs may be a reflection of strong parental influences of Korean parents on their high school children. A previous Korean study (Kim, 1995) which examined Korean high school students value system showed that parents with higher social economic status tend to be more individualistic and their offsprings also tend to be more individualistic and show higher academic achievement. In Korea, parents influence on their childrens education arrives at its peak during childrens high school years, especially during the 12th grade, when their children prepare college entrance examination, the *Sooneung* test. Even though once children enter into a college, parental influence is sharply declined.

The positive relation between Korean high school students GPA and their beliefs may also reflect the changing reality of Korean high school educational system. Nowadays, since around the mid 1990s, more emphasis is placed than before on the achievement of Korean high school students higher level learning such as application, analysis, synthesis, transference, etc. Achievement of such high level learning is not only closely related with but also critical for students learning beliefs (Schommer, 1994). Such emphasis on high level learning in Korean

Table 3. The Relationships between the Six Developmental Factors and Epistemological Beliefs

	Epistemological Beliefs			
	South Korea		The United States	
	High School (present study)	College (Youn et al., 1999; & Youn, 2000)	High School (Schommer, 1992; Schmidt, 1985)	College (Jehng et al., 1993; Schommer 1989 ; Youn, 2000)
Age	.*	-	.*	.*
Educational Level	no	-	.*	.*
Gender	no	no	no	no
GPA	.*	-	.*	.*
Independent SC	.*	.*	?	.*
Interdependent SC	no	-	?	-

Note: * : statistically significant relation at alpha = .05. +: positive relation. -: negative relation
no: no significant relation. ?: no studies conducted

high schools may be reflecting the very emphasis of the *Sooneung* test. The *Sooneung* is the Korean nation-wide college entrance examination and the test score is directly related to college admission.

Conclusion and the Implication of the Study

For the conclusion and a better understanding of the implication of the present findings, it may be necessary for a while to review the findings from the previous studies conducted in the US and Korea. Table 3 compares the findings of the research which analyzed the relations between the six developmental factors and epistemological beliefs.

Table 3 shows that the distinctive difference between the present study and the previous studies with Korean college students (Youn et al., 1999; Youn, 2000) appears in the relationship between the GPA and learning beliefs. That is, the relationship is positive in Korean high school sample, however, though insignificant, it is negative in Korean college samples. In addition to this difference, the factor model of this study was qualitatively different from those of Korean college samples. The differences between the two Korean student groups were discussed in terms of the sub-cultural variations between young generations that may result from the rapidly changing socio-cultural and educational systems of Korean society.

As in the previous studies with Korean college students table 3 shows that the two developmental factors, age and the education level, were having negative or no relation with Korean high school students beliefs. The two factors were identified as the most important factors

having significant positive relations with American students epistemological development (Jehng, et al., 1993; Schmidt, 1985; Schommer, 1989 &1994).

Table 3 also shows that while gender or the interdependent self-construal has no or negative relation with students epistemological development, the independent self-construal is the only developmental factor that shows consistently significant positive influence on students epistemological development across the studies. The results of this study thus reaffirmed the findings of the previous research (Youn, 2000; Youn, et al, 1999) by showing that among the six developmental factors, only the independent self-construal (i. e., the individualistic self-view) had significant positive relation with Korean high school students beliefs.

The same conclusions of the previous studies (Youn, 2000; Youn et al., 1999), therefore, can be made from the present findings. The conclusion of the previous studies was that it is individualistic emphasis that is related with students epistemological development, whereas collectivistic emphasis has nothing to do with or negative influences on students epistemological development regardless of students nationality or the variability of the surrounding cultures. This study showed that the same conclusion can be applied regardless of sub-cultural variability of the same culture or country.

Schommers (1989) study showed that parenting style, which encourages childrens independence, individual choice, and responsibility, was facilitative to their epistemological development. The emphases of such parenting style is consistent with those of individualism. Also, as discussed in the introduction, it was student-centered learning approach of the US that is related to the development of

sophisticated epistemological qualities such as taking initiative and becoming independent, active, open-minded, flexible, and persistent learners.

Thus, the present and previous findings together suggest that for the development of sophisticated epistemological qualities, it is necessary to provide students freedom and opportunities to be independent and responsible learners in their approaches to learning both at home and school settings. In addition, the present findings which identified no or significant negative relation between Korean high school students educational level or age and their epistemological beliefs suggest that more attention should be given to find ways to develop Korean high school students learning beliefs because of the following reasons.

Korean society is taking steps toward a more technologically advanced and informationally oriented society, and the transition to such a society would be a key for Korean society's survival in increased international competition of the 21st century. In order to achieve such a transition successfully, education may need to take a more important role due to the limited natural resources available in Korea. If epistemological beliefs are to be developed from early on (starting from high school level rather than from college level), that is, while students mind habit and brain function is more plastic and flexible, then the development can be accelerated or achieved with more ease as mentioned already.

Another reason for this need would be Korean society is undergoing rapid and radical socio-cultural changes in everyday life. This indicates that Korean educators may need to train youngsters in a direction that can help them to adjust to such a rapidly changing reality filled with uncertainties and complexities with more flexibility, creativity, and especially with adventurous curiosities.

Limitations and Suggestions for Future Research

The findings of the present study supported the culture-specific nature of learning beliefs. However, the differences between the findings of the present study and those of the previous studies with Korean college students suggest that more future empirical research may need to locate clearer sources of such differences as well as the replication of this study. Future studies may be benefited from considering the following limitations of the present study and suggestions for future research.

This study was exploratory and descriptive in design,

using basically correlational analysis (multiple regression), due to the lack of theoretical and previous empirical research on the topic of the study. Therefore, no attempt should be made to impute a causal relationship among the variables analyzed.

Secondly, this study employed a convenience sampling method instead of random sampling. As a result, the probability of the occurrence of systematic bias was not controlled. The replication of this study, therefore, is required and participants need to be recruited by using a random sampling method.

Thirdly, the relationship between American high school students learning beliefs and their self-construal has never been investigated. Therefore, the American high school students as well as Korean students from local high schools need to be included in the future analysis. This study included students only from two Korean high schools located in Seoul area. Therefore, the results of this study should be generalized only to the student populations that have similar characteristics with the sample employed in this study. Until the present results are reconfirmed by future research, the results of this study and their interpretations, therefore, should be used with discretion and care.

Fourthly, the sub-cultural differences between the two Korean young generations were not directly measured. Instead, speculation was made regarding the differences between the two groups, based on the analysis of the changing reality of Korean society and their impact on the sub-cultural variability between the Korean young generations. Therefore, future research may need to make an attempt to investigate such questions as Do such differences reflect the real cultural change of Korean society or schools as assumed in this study? If so, what are the direct relations between the sub-cultural differences and Korean high school students epistemological development?

Finally, the construct of individualism-collectivism utilized in this study did not reflect the more fine-tuned specification of the construct which was revised by Triandis (1995; as cited in Kim, 1997). Triandis added the dimension of horizontal-vertical relationship to individualism-collectivism. The horizontal pole represents equality, benevolence, and universalism, whereas the vertical pole represents hierarchy, power, and achievement. Future research utilizing the revised measure may identify more specified relationships between cultural variables and learning beliefs than the findings of this study.

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