PERSONAL EPISTEMOLOGICAL BELIEFS AND THEIR RELATIONSHIP TO LEARNING

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ABSTRACT

This paper investigates students' beliefs about the nature of knowledge and learning, or epistemological beliefs, and how these beliefs affect motivation to learn, choice of study strategies, and perceived academic performance. Results from this study suggest that "naïve" epistemological beliefs serve as a barrier to knowledge integration and promote the use of short term learning strategies and superficial learning. Students with more "sophisticated" epistemological beliefs tend to be more intrinsically motivated to learn, use higher level learning strategies and report higher levels of perceived academic performance. Teaching recommendations to develop more sophisticated epistemological beliefs include (1) creating opportunities for student construction of knowledge, (2) providing explicit guidance in knowledge organization and integration, and (3) emphasizing sophisticated epistemological perspectives through spoken and written classroom discussions.

INTRODUCTION

Marketing educators are constantly challenged to employ teaching pedagogies that motivate and engage students for enhanced academic performance. Growing evidence suggests that students' epistemological beliefs, or their beliefs about the nature of knowledge and knowing, affect motivation to learn, cognitive learning strategy usage, and learning outcomes (Hofer 1994; Schultz, Pintrich, and Young 1993); and they have been influential in the development of educational theories for effective instruction (Duschl 1990). Educational research has established that students have considerable variation in their beliefs that knowledge is certain, simple, absolute, acquired quickly, and they have the ability to construct new knowledge (Hofer and Pintrich 1997). Belief that learning is quick and that knowledge is certain predicted poor performance on comprehension mastery tests with oversimplified and inappropriate absolute conclusions (Schommer 1990). In addition, Phillips (1999) found epistemological beliefs were able to differentiate class performance on unstructured case analyses but did not on multiple choice exams. There is also a substantial amount of research that suggests learners vary in the study strategies they choose to employ and in their ability to assess their success in comprehending new knowledge. Propositions presented and tested in this current study are based on the idea that students' motivation to study, their selection of learning strategies, and their assessment of learning are linked to their personal epistemological beliefs.

For example, if students have a naïve epistemological believe that knowledge is characterized by isolated bits of information rather than integrated concepts, it may lead to the use of short term memorization and ultimately to superficial understanding. This may be further reinforced by instructors lecturing (source and authority of knowledge) and clearly telling students exactly what will be covered on multiple choice exams (simple and certain knowledge). Reciting facts would constitute understanding for these students and their naïve epistemological beliefs would be reinforced. Epistemological beliefs are posited to develop in college students as they make meaning of their educational experiences (Perry 1970). Students are thought to enter college with beliefs that knowledge is simple, certain, and handed down from authority. These beliefs are gradually revised to a position that knowledge is complex, relative, and that learning requires substantial time and effort. Whether intentional or not, marketing educators' selection of instructional pedagogies and assessment techniques clearly communicate epistemological positions and ultimately impact the development of students' personal epistemological beliefs.

The purpose of this research is to deepen marketing educators' understanding of epistemological beliefs by examining the development of epistemological beliefs and their relationships with motivation to learn, learning strategies, and learning performance. This article begins with an overview of personal epistemological beliefs that lead to our definition and conceptualization of the construct. Next, propositions are developed for this exploratory investigation involving the development of epistemological beliefs and their relationships to motivation, study strategies, and performance. This is followed by an overview of the methodology and a presentation and discussion of the findings. Finally, conclusions and implications are offered to better understand and enhance the teaching and learning process in the classroom.

PERSONAL EPISTEMOLOGICAL BELIEFS

Epistemology or "the theory of knowledge" is the study of the nature and justification of human knowledge. Traditionally, epistemology has been the central domain of philosophers. However, recently it has become a focus in education because of pervasive evidence of its influence on learning, thinking, reasoning, and problem solving (Greeno 1989; Schommer 1993; Wellman 1990). Two primary research streams have evolved from this blending of philosophy, psychology, and education. One set of theories addresses how personal epistemological beliefs develop and attempts to interpret how educational experiences shape these beliefs while the second research tract examines the influence of epistemological beliefs, on the cognitive processes of thinking and learning.

Initial research by Perry (1970) attempted to explain how students' interpretation of their educational experiences leads to the development of their beliefs about knowledge and learning. Perry undertook a four year longitudinal study tracking college students' cognitive development process utilizing a combination of personal interviews and structured questionnaires. This data formed the basis for his proposed scheme of nine positions of intellectual and ethical development along with transitional steps between the positions. The basic epistemological movement was from a dualism to relativism perspective as students interacted with their educational environment and assimilated new experiences and/or modified their cognitive frameworks. Difficulty in operationalizing Perry's scheme and his sample of predominately white, elite, male college students from Harvard generated substantial discussion resulting in many refinements to the developmental sequence. For example, King and Kitchner (1981, 1994) elaborated on the upper levels of Perry's scheme and offered a reflective judgment model that describes how students perceive and reason about ill-structured problems. Their reflective judgment model proposes three levels: (1) pre-reflective (knowledge is simple, concrete, absolute, needs no justification, and true reality is known by authorities), (2) quasi-reflective (knowledge is contextual, relative, and each person is entitled to his or her own opinion), and (3) reflective (knowledge is constructed and must be understood contextually, and critical thinking and probable justification guides knowledge construction). King and Kitchner's (1981, 1994) cross-sectional and longitudinal studies indicate that higher educational attainment is correlated with higher stages of reflective judgment.

Perry's developmental scheme was heavily criticized as being developed by male researchers based on male respondents. An alternative model developed by Belenky et al. (1986) provided a set of epistemological perspectives from which women know and view the world. Her study included only women and proposed a model based on the metaphor of voice. This model's developmental positions ranged from silence (listening to authority) to constructed knowledge (participation in the construction of knowledge) and seem fairly congruent with Perry's (1970) and King and Kitchner (1994) stages of development. The lasting impact of Belenky et al. work is the distinction between separate knowing and connected knowing which continues to serve as a basis for understanding gender-related learning issues.

The second major stream of research addresses the relationships between epistemological beliefs and the cognitive processes of thinking and learning. Schommer (1990, 1993) was specifically interested in how epistemological beliefs influence comprehension and academic performance. To investigate these relationships, Schommer developed a more systematic quantitative approach to measuring epistemological beliefs as compared to Perry (1970) and Belenky et al. (1986). She proposed a personal belief system made up of five independent dimensions (structure, certainty, source of knowledge, and control and speed of knowledge acquisition) in contrast to the previous unidimensional developmental stage conceptualization. These dimensions are not sequential developmental stages comparable to Perry's (1970), but instead each dimension is viewed as a continuum ranging from a naïve to a sophisticated perspective. The five dimensions were operationalized with a 63-item personal epistemological beliefs questionnaire. A prolific series of studies based on this questionnaire have examined the relationship between epistemological beliefs and study strategy usage (Schommer et al. 1992), science comprehension (Schommer 1990), math comprehension (Schommer et al. 1992), academic performance (Schommer 1993), and interpretation of controversial issues (Kardash and Scholes 1996). These studies have sampled middle school students, high school students, college students, gifted students and adults. They have been conducted cross-sectionally and longitudinally in addition to spanning multiple domains of subject matter. This line of research has established the importance of considering epistemological beliefs in instructional psychology.

As significant as Schommer's contributions are in understanding the influence of epistemological beliefs, there still remains some conceptual and measurement issues that need to be resolved with her questionnaire. Clarebout et al. (2001) questioned the reliability and validity of the scale based both on multiple studies by Schommer and empirical results reported by other independent researchers. In addition, Clarebout et al. conducted two separate empirical studies and were unable to replicate the scale's factor structure. Primary concerns revolved around the face validity of some items, items cross loading on factors, and in the mixing of first-person, second-person and third-person wording of the statements. Thus, they raised doubts about the usability of the questionnaire, and recommended revising the questionnaire based on a clearer theoretical framework.

In an attempt to integrate the two streams of research (developmental stages and influence of epistemological beliefs), Hofer and Pintrich (1997) provide a comprehensive review of the theoretical and methodological issues involved in defining and conceptualizing a framework for epistemological beliefs. Their work provides the foundation for a clearer theoretical framework as called for by Clarebout et al. (2001). Hofer and Pintrich restrict their framework to two general areas consisting of (1) the nature of knowledge and (2) the nature of knowing. The nature of knowledge is seen as "a progressive understanding that moves from the view of knowledge as absolute to a relativistic view and then to a contextual, constructivist stance." Two sub-dimensions define the nature of knowledge and are: (a) simplicity of knowledge (a continuum ranging from an accumulation of discrete facts to highly interrelated concepts) and (b) certainty of knowledge (a continuum ranging from absolute truth exists with certainty to knowledge is tentative and evolving). The process by which one comes to know is reflected in the framework as the nature of knowing and is also defined with two sub-dimensions: (a) source of knowledge (a continuum ranging from knowledge is provided by an external authority to actively constructing knowledge yourself) and (b) justification of knowledge (a continuum ranging from reliance on authority evaluation to reasoned justification and multiple perspectives for their beliefs).

Our study expands Hofer and Pintrich's (1997) above framework for epistemological beliefs by also including a third general area based on Schommer's (1990) proposed belief structure. This third area is the nature of learning (knowledge acquisition) and is comprised of two sub-dimensions: (a) ability to learn (a continuum ranging from a belief that the ability to learning is fixed to a belief that one can improve their ability to learn) and (b) speed of learning (a continuum ranging from beliefs that learning comes quickly or not at all to belief that learning is gradual). Therefore, we define personal epistemological beliefs as an individual's beliefs about (1) the nature of knowledge, (2) the nature of knowing and (3) the process of learning. Our conceptualization specifies six sub-dimensions based on a continuum ranging from a "naïve" to a "sophisticated" level of epistemological beliefs.

DEVELOPMENTAL PROGRESSION AND RELATIONSHIPS TO MOTIVATION, COGNITION AND PERFORMANCE

Early work by Perry (1970, 1981), Baxter Magolda (1987, 1992), and Kitchner and King (1981) established a foundation for the proposition that epistemological beliefs progressively develop through the interpretation of our educational experiences, especially in college students. Schommer (1993, 1997, 1998) found substantial differences in epistemological beliefs across years in high school, and that the level of education can predict beliefs about the structure and stability of knowledge and learning. In addition, she reports (1990) that the number of college-level classes completed predicts belief in the uncertainty of knowledge for university students. The general trend of development is from a perspective that knowledge is right or wrong, to a position of relativism, and then to a position in which individuals are active constructors of meaning (Hofer and Pintrich 1997). Therefore, we offer the following proposition:

P1: Personal epistemological beliefs will become more sophisticated as students accumulate more educational experiences.

Results from the Belenky et al. (1986) study of women's epistemological beliefs differ from Perry's (1970) initial study that was based solely on men suggesting possible gender differences in epistemological beliefs. Galotti et al. (1999) found women believe "to know" means considering other people's perceptions first, where as men are more likely to view "to know" as understanding a more objective, distant truth. Schommer (1993, 1997, 2002) reports significant differences in gender with women being less likely to believe in quick learning and fixed ability in learning. In addition, women were more likely to take multiple perspectives on issues (knowledge justification).

P2: Personal epistemological beliefs will display gender patterns.

Students' motives to learn have been significantly related to the sophistication of students' epistemological beliefs (Paulsen and Feldmen 1999; Hofer 1994; Schutz, Pintrich, and Young 1993). Students who believe that the ability to learn is fixed at birth, are less likely to enjoy school (Schommer 1997) and those who believe knowledge is certain are more likely to accept tentative text as if it were permanent fact (Schommer 1990). Variation among epistemological beliefs also influenced students' willingness to accept challenges and their overall persistence in learning (Dweck and Leggett 1988; Schoenfeld 1985). Paulsen and Feldmen (1999) found students with naïve epistemological beliefs in regards to knowledge is simple, that learning takes place quickly, and that the ability to learn is fixed to be more extrinsically goal oriented. They did not find a significant relationship between motivation and beliefs about the certainty or simplicity of knowledge.

P3: Naïve personal epistemological beliefs will be positively related to extrinsic motivation and sophisticated beliefs positively related to intrinsic motivation.

Changes in epistemological beliefs are speculated to lead to changes in cognitive study strategies. For example, if students believe that knowledge is simple and certain, they will undertake study strategies that memorize isolated facts and think they know the material when they can recite the facts and, therefore, they can stop "studying." Schommer (1992) found that study strategies mediated the relationship between epistemological beliefs and math-

ematical text comprehension. Kardash and Howell (2000) report that belief about the speed of learning affected both the number and type of cognitive strategies that undergraduate students used to process dual-position text. Furthermore, epistemological beliefs may affect how students interpret information (Schommer 1990), comprehend text (Kardash and Scholes 1995), and how they monitor their comprehension (Ryan 1984).

P4: Naïve personal epistemological beliefs are positively related with superficial learning strategies, and sophisticated beliefs are related with higher level learning strategies.

Academic performance, as measured by grade point average, has been related to beliefs that learning is gradual and the ability to learn is improvable both for middle school students (Schommer et al. 2000) and for high school students (Schommer 1993; Schommer et al. 1997). Academic performance can also be defined as performance on mastery tests or tasks which provide comparable results to the above findings relating epistemological beliefs to GPA. Schommer (1990) reports that belief in quick learning and certain knowledge predicted poor mastery test performance with university students. In addition, Schommer, Crouse, and Rhodes (1992) found belief that simple knowledge was associated with poorer test performance and less accurate assessment of their comprehension. Gifted high school students who held beliefs that the ability to learn is fixed, that learning is quick, and that knowledge is unchanging wrote oversimplistic and unalterable solutions to an academic task and performed below academic expectations (Schommer and Dunnell 1997).

P5: Naïve personal epistemological beliefs are related to lower learning performance and more sophisticated beliefs are related to higher learning performance.

METHOD

Data Collection

Respondents in this study included 293 students enrolled in marketing classes during the spring semester of 2003. The in-class survey was administered in each section of Marketing and Society (1 section, n = 35), Principles of Marketing (4 sections, n = 172), Market Analysis (six credit hours of combined marketing research and consumer behavior; 2 sections, n = 35), Marketing Planning (2 sections, n = 37), and Marketing Management (1 section, n = 14) at a Midwestern four-year public university. These courses provide a cross section of students from the start to the finish of our marketing curriculum and represent typical marketing courses taught by marketing educators in general. The above courses are required of all our marketing majors and are offered in a strict sequence. Therefore, there was no chance for a student to complete more then one survey. Approximately ninety percent of our majors were included in these courses. Eighty eight percent of the enrolled students in these courses completed the survey, which reflects a typical absenteeism rate during the day the in-class questionnaire was administered. Students were predominately traditional undergraduates with 50 percent female and 54 percent indicating they were majoring or minoring in marketing. The average number of credit hours completed was 70, with a range of 11 to 128, indicating a good representation of typical marketing students at all stages of their marketing education. The distribution of total average credit hours completed was as follows: Marketing and Society, 43; Principles of Marketing, 60; Market Analysis, 79; Marketing Planning, 94; and Marketing Management, 113. In addition, the distribution of majors in the Principles of Marketing sections closely mirrored the College of Business's distribution of majors. The researcher/author was not an instructor in any of the courses comprising the sample.

Measures

Personal Epistemological Beliefs. Students' epistemological beliefs were defined as being comprised of the three general dimensions (the nature of knowing, the nature of knowledge, and the nature of learning) with each having two sub-dimensions. A 12-item shortened form of Schommer's (1990) original 63-item questionnaire was developed to measure the above dimensions. A short form was deemed desirable to keep the overall survey to reasonable length in order to reduce in-class completion time and to reduce respondent fatigue that can lead to missing values and/or higher refusal rates. The criteria and procedures recommended by Stanton et al. (2002) served as the guide for shortening the scale.

Scale reduction/modification began with the examination of articles that report the results of using Schommer's (1990) scale. These include eight articles authored by Schommer, five articles with different authors that used Schommer's questionnaire, and four articles that modified Schommer's scale and analysis procedures. In general, the articles reported ranges of inter-item correlations (typically .45 to .75), cronbach's alpha (typically .5 to .8) and factor loadings (above .4). The items from the above studies formed the pool of items for consideration for the reduced scale. The items were categorized into the three general dimensions (nature of knowing, knowledge and learning) based on their reported factor loadings. Items that pertained to dimensions not specified in our definition, as well as duplicative items across scales were eliminated. Even though individual item-total correlations were not reported in the above studies, the ranges of correlations suggest all items under consideration should contribute to reasonable internal consistence. It should be noted that maximizing internal consistency is not recom-

mended in scale shortening because of the potential to fail to adequately sample the construct domain and reduce validity (Stanton et al. 2002). Boyle (1991) suggests moderate to low item correlation is actually preferred to ensure a broad coverage of the particular construct.

Next researcher judgment (authors) was used to select the reduced set of items that represent each of the three general dimensions and their corresponding sub-dimensions. Recall that the pool of items now under consideration has been scrutinized by multiple authors and reviewers and has been subjected to numerous statistical evaluations. Therefore, Stanton et al. (2002) recommends the developer's own judgment be considered as important as other criteria in item retention. They suggest the following criteria be used to guide the judgmental selection of items: clarity of expression, relevance to respondents, semantic redundancy with other items, and face validity. In addition, items were also very carefully chosen to achieve a balance between positive and negative wordings within dimensions and to represent the full range of each subdimension. Each item was rewritten to be presented in the first person. Table 1 presents the items organized by their intended dimensions and subscales.

A seven-point strongly agree/disagree scale was used to indicate the respondents' opinions about learning and knowing. Consistent with Schommer's (1990) scale analysis, the scores of the items for each sub-dimension were summed to represent that sub-dimension. Table 2 presents the results of the factor structure for this scale which supports the three factor conceptualization. The coefficient alphas for each subscale ranged from .42 to .58, indicating moderate reliability which is in line with the guidelines for shortened scales primarily concerned with definitional operalization and less with redundancy of items (Boyle 1991). In addition, the average intraitem correlation of the subscales is .32 which is substantially greater then the average interitem correlation (.12), indicating the usefulness of subscales for the analysis (Clark and Watson 1995). All items were scored so that higher scores indicate a more 'sophisticated' level of epistemological beliefs.

Learning Motivation. The scales for intrinsic and extrinsic motivation are based on self-determination theory (Deci and Ryan 1985; Deci, Vallerand, Pelletier, and Ryan 1991). Intrinsic and extrinsic motivations were composed of four-items, each with ten-point "agree/disagree" scales. Intrinsically motivated behaviors are driven by the enjoyment, excitement, and challenge of engaging in the activity itself. They tap Deci and Ryan's (1985) definition of intrinsic motivation to know, to accomplish things, and to experience stimulation. The following revised items were selected from the Academic Motivation Scale (Vallerand et al. 1992) for intrinsic motivation: "I will have the satisfaction of improving my personal knowledge and skills," "I will have a sense of personal accomplishment," "I will have completed exciting and challenging class activities," and "I will have enjoyed learning about an interesting subject." Compared with intrinsic motivation, extrinsically motivated behaviors are undertaken for reasons other than the activity itself, such as external rewards, benefits, punishments or obligations. Items for extrinsic motivation include: "I will receive a good grade that will help my GPA," "I think the required time will have a negative effect on my social life and other grades," "I will have simply completed a required course, nothing more," and "I will make other people proud of me." A two factor principles component analysis with varimax rotation produced a solution consistent with the hypothesized loadings for intrinsic and extrinsic motivation. Sixty-two percent of the variance was accounted for with the two factor solution and the coefficient alphas were .69 for intrinsic motivation and .53 for extrinsic motivation.

Learning Strategies. Cognitive learning strategies are conceptualization as three general types: (a) superficial cognitive; (b) deep cognitive; and (c) metacognitive (Somuncuoglu and Yildirim 1999; Hwang and Vrongistinos 2002). A formative indicator specification was chosen for the measurement model to represent the casual priority running from the measured indicators to the three latent constructs. This formative measurement model was chosen because if any one of the items (types of learning strategies) increases in frequency, the construct (e.g., superficial cognitive strategies) increases; conversely, if a student's use of superficial cognitive strategies increases, it does not mean each of the items under that construct also increases. Therefore, a composite index (a linear sum of a set of measurements) for each of the three types of learning strategies was constructed.

Diamantopoulo and Winklhofer's (2001) index creation guidelines and the criteria for scale shortening (Stanton et al. 2002) formed the basis for the process of selecting items to represent the three different learning strategies. Ninety-three items from the Motivated Strategies for Learning Questionnaire (Pintrich and De Groot 1990) formed the pool of potential items for the index. This scale is well recognized and used in the educational psychology literature. After the pool of items were categorized into the three learning strategy dimensions, the item selection criteria, as elaborated on in the construction of the epistemological beliefs scale, were applied to select seventeen items. The seventeen items, presented in Table 3, were randomly ordered and a five-point scale (never, rarely, sometimes, often, and always) was used to indicate how often the student used a given learning strategy in the surveyed course.

Items in formative indices should provide a unique influence on the latent variable with minimal redundancy since the formative measurement model is based on a multiple regression. This is in contrast to the traditional internal consistency measures used with reflective measures, which are inappropriate for assessing indices

TABLE 1
MEASURES OF PERSONAL EPISTEMOLOGICAL BELIEFS

Dimension	Subscale	Items
Nature of Knowing	Source (expert – self)	I rely on textbooks, teachers, and other experts as my source for factual knowledge. (R)
		My experiences and discussions with others allow me to construct factual knowledge myself.
	Justification (authority – evidence)	When I read something in a textbook or hear it from a known expert I accept it to be true without having to critically analyze it. (R)
		I evaluate all the evidence and different perspectives before I consider something to be true.
Nature of Learning	Ability (innate – improvable)	I think some people are just born smart, others are born dumb. (R) My ability to learn new things has really improved since high school.
	Speed (quick – gradual)	If I cannot understand something quickly, it usually means I will never understand it. (R)
		When I do not understand something right away, I know if I spend the time and effort I will gradually learn it.
Nature of Knowledge	Simplicity (facts – interrelated concepts)	I know I understand a topic once I have memorized the individual facts pertaining to it. (R)
		I cannot fully understand a topic without relating it to other topics and classes.
	Certainty (absolute – relativistic)	I know something for certain when there is only one right answer. (R)
		Even when some knowledge is considered absolutely true I have to rethink it when I see it in a different context or situation.

Note: Seven-point strongly agree to strongly disagree scale. (R) reverse coded.

(Bagozzi 1994). Therefore, multicollinearity among the items was assessed. Variance inflation factors ranged between 1.2 and 1.8, suggesting the degree of multicollinearity is acceptable based on the less-than-10 threshold suggested by Kleinbaum, Kupper, and Muller (1988). In addition, relatively low interitem correlations, ranging from .15 to .58 with the average interitem correlation of .27, also suggest minimal item redundancy and concur with the guidelines of Clark and Watson (1995).

The usefulness of subscales was examined by comparing the interitem correlations with intraitem correlations. Intrasubscale correlations (.36 to .44) were substantially higher than intersubscale correlations (.13 to .22), suggesting the usefulness of the three subscales within the overall learning strategy construct.

Learning Performance. Learning performance constitutes students' self-assessment of their overall learning performance and involves the behaviors or actions that are relevant to the goals of the course. Goal-relevant action (performance) is a multidimensional construct with three determinants of relative variance: (1) declarative knowledge (knowledge of facts, rules, principles and procedures that are a prerequisite for successful task performance), (2) procedural knowledge and skill (the capacity attained when declarative knowledge has been successfully combined with knowing how and being able to

TABLE 2
PERSONAL EPISTEMOLOGICAL BELIEF FACTOR STRUCTURE

Subscales	Nature of Knowing	Nature of Learning	Nature of Knowledge
Source of Knowledge	.810		
Justification of Knowledge	.802		
Ability to Learn		.805	
Speed of Learning		.746	
Simplicity of Knowledge			.803
Certainty of Knowledge			.733
% of variance explained	30.19	21.35	17.09
Eigenvalue	1.81	1.28	1.03

Note: N = 293. principles component analysis, varimax rotation with Kaiser normalization.

TABLE 3
MEASURES OF LEARNING STRATEGIES

Strategy	Items
Superficial	I try to memorize everything that might be asked on the exam.
	I memorize lists of important terms and concepts.
	I read my class notes and the course readings over and over again so I will remember them.
Deep Cognitive	I go over my class notes and make an outline of important concepts and ideas.
	I organize the information from all my class notes and the readings into simple charts, diagrams, or tables.
	I write brief summaries of the main ideas and concepts from the readings and the lectures
	I try to make connections between the readings and the concepts from lectures in order to comprehend the course as a whole.
	I try to relate concepts and ideas from this course to those in my other courses whenever possible.
	I try to apply ideas from course readings to other class activities such as lecture and discussion.
	I think about possible alternatives whenever I hear an assertion or conclusion in this class.
	I try to decide if there is supporting evidence for conclusions, interpretations or theories that are presented.
Metacognitive	I set goals for myself in order to direct my study activities.
	I think about possible alternatives whenever I hear an assertion or conclusion in this class.
	If I become confused about something I read, I go back to my previous notes and sort it out.
	I try to determine which concepts I don't understand well.
	I ask myself questions to make sure I understand the material.
	I try to determine the way I study according to the course requirements and the instructor's teaching style.

Note: All items scored on a 5-point scale ranging from 1 (never) to 5 (always).

perform a task), and (3) volitional choice (choice to expend effort, choice of what level of effort to expend, choice to persist in the expenditure of the chosen level of effort) (McCloy, Cambell, and Cudeck 1994). The two knowledge dimensions above (declarative and procedural knowledge) where measured with a single item while a second item measured the volitional choice aspect of performance. The two items were modifications of a learning performance scale used by Young (2001). Students responded to: "Right now, how would you rate the level of your current performance in this Marketing course?" (1) "Your overall understanding of marketing knowledge/skills." and (2) "Your overall amount of time and effort spent on this marketing class." A twelve-point scale anchored with letter grades (A+, A, A-, . . . D+, D, F) was used to record self-assessed class performance. Descriptive properties of the two items indicate that students did use the full twelve-point range of the scales. The understanding of the knowledge item had a mean of 9.24 and standard deviation of 1.63, while the volitional choice (time and effort) item's mean and standard deviation were 8.94 and 2.23. The correlation between the two items was .32 indicating little redundancy in the two items representing the two primary aspects of perceived learning performance.

RESULTS AND DISCUSSION

The purpose of the first analysis is to examine the development of epistemological beliefs as students matriculate through college, and determine whether personal epistemological beliefs differ by gender. The six subdimensions of epistemological beliefs were analyzed with MANCOVA and the resulting beta coefficients are presented in Table 4. Coefficients in Table 4 indicate that as students complete more course work (credit hours), their beliefs about the nature of knowledge and knowing gain in sophistication. Specifically, they become more relativistic in their belief about the certainty of knowledge, and they rely more on evidence than simply accepting knowledge from authorities. However, their beliefs about the nature of learning do not vary with matriculation, suggesting this dimension may be developed early in education and is quite stable. Alternatively, the college experience may not be designed to enhance these particular beliefs. These findings are consistent with both cross-sectional studies (Schommer 1993) and longitudinal studies (Schommer et al. 1997) that indicate students develop more sophisticated epistemological beliefs as they progress through school. Our results indicate epistemological beliefs about the nature of knowledge and knowing continue to develop as students progress through college, supporting proposition 1, which is also consistent with Perry's (1970) original research in epistemology development.

The significant coefficient for gender on the subdimension "knowledge justification" indicates that males tend to have a more sophisticated view of the nature of knowing, which relies more on the consideration of evidence and different perspectives than accepting information from authorities. In addition, a significant negative coefficient on the nature of the "ability to learn" supports the findings of Schommer (1993) in that females are less likely to believe in fixed ability to learn and tend to be more sophisticated in their nature of learning beliefs (Schommer et al. 1997). Therefore, gender differences do seem to exist in epistemological beliefs about learning and knowing, with females more likely to rely on faculty and textbooks for information and believe their ability to learn can improve; thus, supporting proposition 2.

Because propositions one and two above were supported indicating that epistemological beliefs continue to develop through additional education and may vary by gender, we control for both variables through the use of partial correlation analysis. Partial correlation analysis measures the strength of the relationship between a criterion variable and a single predictor variable when the effects of other predictor variables are held constant. The partial correlation coefficients for the relationships among epistemological beliefs, the constructs of motivation to learn, cognitive learning strategies, and perceived learning performance are presented in Table 5.

The coefficients for motivation show an overall ex-

TABLE 4
MANCOVA RESULTS: EPISTEMOLOGICAL BELIEFS BY CREDIT HOURS AND GENDER

	Nature of Knowledge		Nature of Knowing		Nature of Learning	
	Certainty	Simplicity	Justification	Source	Ability	Speed
Credit Hours	.015**	.006	.018**	.009**	.007	.007
Gender	-.163	-.252	.589**	.099	-.658**	-.137

Note: N=293. Beta coefficients presented, ** .01 significance level, gender (males = 1).

pected pattern of negative coefficients for extrinsic motivation and positive coefficients for intrinsic motivation. This suggests, as students develop more sophisticated epistemological beliefs, their interest and enjoyment in learning for the sake of learning also increases while their reliance on extrinsic rewards and acknowledgment declines. Specifically, students who rely on evidence and construct knowledge themselves (nature of knowing), are less likely to be extrinsically motivated as indicated by the significant negative correlation coefficients. In addition, beliefs that the ability to learn can be improved and that learning takes time and effort, result in higher intrinsic motivation and lower extrinsic motivation. The coefficients for the nature of knowledge were of expected sign; however, they were not significant at the .05 level. These results are consistent with those reported by Paulsen and Feldman (1999), both in the significant coefficients but also in the insignificant coefficients of the certainty of knowledge sub-dimension. Our conclusions that naïve beliefs about learning and knowing correspond to extrinsically motivated students and more sophisticated beliefs correlate with intrinsically motivated students, are also consistent with the findings of Hofer (1994) and Schutz, Pintrich, and Young (1993) thus, supporting proposition 3.

The relationships between epistemological beliefs and learning strategies reveal significant negative correlations between the nature of knowing and knowledge and superficial learning strategies. Students with more sophisticated epistemological beliefs report less reliance on short term memorization and rehearsal learning strategies. The belief in the ability to improve learning is positively related to superficial learning as well as both deep and meta-cognitive learning strategies, indicating the importance of this belief in all types of learning strategies. It can also be seen that both deep cognitive and metacognitive learning strategies are also positively related to a belief that learning (speed sub-dimension) is gradual and takes time and effort. This evidence supports proposition 4, indicating that more sophisticated epistemological beliefs are related to the use of higher level cognitive learning strategies (deep cognitive and metacognitive).

When examining learning performance's knowledge dimension, as measured by student's perceived understanding of marketing knowledge/skills, it can be seen (r = .192) that students who critically evaluate and examine evidence from multiple perspectives (knowledge justification) self report a higher level of understanding than students who rely on authorities for knowledge. In addition, students who believe that the nature of learning (speed sub-dimension) is gradual and may require more time and effort if they do not understand things right away, also perceived they have a higher level of understanding (r = .188). This suggests that teaching pedagogies of self-discovery and experimental learning are consistent with greater perceived understanding.

Performance's volitional choice dimension measured as the perceived amount of time and effort spent on the course was found to be positively (r = .170) related to the nature of learning's ability to learn sub-dimension. Those students who believe their ability to learn can improve,

TABLE 5
EPISTEMOLOGICAL BELIEFS CORRELATIONS WITH LEARNING MOTIVATION, LEARNING STRATEGIES, AND LEARNING PERFORMANCE

	Motivation		Learning Strategies			Performance	
	Extrinsic	Intrinsic	Superficial	Deep	Meta	Understanding	Time/Effort
Nature of Knowing							
Source	**-.180****	**.016**	**-.146****	**.040**	**.034**	**.051**	**-.033**
Justification	**-.151****	**.084**	**-.154****	**.104**	**.017**	**.192****	**.089**
Nature of Learning							
Ability	**-.111***	**.176****	**.148****	**.211****	**.180****	**.069**	**.170****
Speed	**-.146****	**.237****	**.030**	**.209****	**.200****	**.188****	**.045**
Nature of Knowledge							
Simplicity	**-.008**	**.006**	**-.218****	**-.007**	**-.010**	**-.015**	**-.044**
Certainty	**-.048**	**.008**	**-.134***	**.051**	**.041**	**.032**	**.016**

Note: N = 293. * =.05, ** = .01 significance level. Partial correlations controlling for credit hours and gender.

report more time and effort expended in the class. Interestingly, student's evaluation of their class performance, based on the amount of time and effort spent in that particular class, was not statistically related to their epistemological belief that the nature of learning is gradual and requires time and effort. From a measurement standpoint, this may be interpreted as support that the two measures are, in fact, measuring two different and separate constructs (epistemological belief versus class performance) and; therefore, the similar terms "time and effort" are not semantically confounding the measures. Conceptually, it may also mean that the time and effort required for that specific class (perceived performance) was not seen as being related to gaining knowledge and understanding (nature of learning – speed sub-dimension). Instead, the time and effort expended might have been thought of as busy work simply required for the course grade. If this later interpretation is correct, it would imply instructors need to make the connection between class assignments/effort/time and the learning objectives (knowledge and understanding) explicit. None of the other epistemological beliefs sub-dimensions were significantly related to the perceived time and effort aspect of learning performance. Given only three of the twelve correlations among epistemological beliefs and perceived learning performance were significant, we find some but limited support for proposition 5, stating that more sophisticated beliefs are related to higher levels of perceived learning performance.

CONCLUSIONS AND IMPLICATIONS

Results of these data indicate that students' views on the nature of knowledge and knowing continue to develop as they gain educational experiences. Furthermore, students with more sophisticated epistemological beliefs tend to be more intrinsically motivated to learn, make greater use of higher level learning strategies, and report higher levels of perceived learning performance. These data provide possible insight in explaining why some students rely on superficial learning strategies and how they set their standards for what understanding means. Naïve epistemological beliefs may serve as a barrier to knowledge integration and higher level learning. Today's marketing students need to be able to cope with changing circumstances and unstructured problems, requiring more sophisticated epistemological beliefs and higher level learning strategies.

It is critical to consider how classroom practices contribute to the development of students' epistemological beliefs. Do we provide assignments that are quick to complete or challenging tasks that take time and effort? Do our tests require recall of isolated facts or understanding of concepts? Are there single right answers or are several possible answers allowed? Are texts and technology deployed for the dissemination or the creation of knowledge? These contrasting educational practices tend to promote the use of either superficial learning strategies or higher level learning strategies and, hence, reinforce naïve or sophisticated epistemological beliefs respectively. Cochran (1997) found that information, disseminated in lectures, and understanding, measured by tests, promoted ways of succeeding in the course over meaningful understanding of the principle knowledge. This may explain why this study's learning performance measure "understanding of knowledge" had a low correlation with learning performance measured as "time and effort spent on the class." Students may be carrying out the required activities with little thought of their educational value. Beers (1988) concludes that the learning environment and the instructional context do have a profound influence on the development of students' epistemological beliefs, which concurs with the results from this study. How can marketing educators encourage self construction of knowledge, critical analysis of evidence, interrelating concepts, contextual considerations, persistence in efforts to learn and belief in improvable ability to learn? We offer three recommendations for marketing educators (1) create opportunities for student construction of knowledge, (2) provide explicit guidance in knowledge organization and integration, and (3) emphasize sophisticated epistemological beliefs through spoken and written classroom discussions.

Changing students' philosophical views of the nature of knowledge and knowing may first start by changing our philosophical views on education and instruction. If a goal of the marketing curriculum is to assist students in becoming responsible life-long learners, critical thinkers, and problem solvers, a sophisticated system of personal epistemology beliefs is necessary and will require an educational philosophy that will facilitate these outcomes. An alternative to the traditional teacher focused (teacher is the source, expert, and disseminator of knowledge) pedagogy is the constructivist learning framework that is student focused and considers previous student learning as the foundation for building new knowledge. Building new knowledge on previous learning can assist students in taking ownership and responsibility for their learning and can enhance self-directed learning (Peters 2000). Constructivist theory suggests one has to experience the world to know it and emphasizes the concept of reality over objectivism. Constructivists use the metaphor of construction because it aptly summarizes the epistemological view that knowledge is built by individuals (Cobern 1993). The typical starting point is getting students to reflect on what they already know and have experienced about a give topic, decipher what they do not know, and then build on their knowledge by relating it to theoretical knowledge being presented. Encouraging discussion of their experiences helps broaden the knowledge base and construct knowledge from others' experiences. Higher level learning skills such as the ability to critically think,

reflect, and transfer knowledge are developed and utilized in this process of learning.

The role of the constructivist teacher is to design learning experiences where learners are actively doing, reflecting, and evaluating their learning experiences. The teacher becomes the interface between the curriculum and the student to develop meaningful learning (Peters 2000). This type of experiential learning can be a powerful pedagogy for teaching marketing's broad body of concepts, principles, and analytics by internalizing theory through guided practice. It has the potential to promote student construction and evaluation of knowledge, contextual consideration of knowledge and understand, without rote memorization, thus developing more sophisticate epistemological beliefs. The marketing education literature provides numerous examples of pedagogies that promote constructivist learning such as critical thinking assignments Celuch and Slama (2002), living cases (LeCair and Stottinger 1999), students as consultants (Kumcu and Kumcu 1998), service-based learning (Papamarcos and Watson 2001), and integrating ethical decisions into business statistics (Divoky and Rothermel 2001).

However, effectively implementing the above constructivist/experiential learning pedagogies in a manner which promotes the development of more sophisticated epistemological beliefs requires specific attention to knowledge acquisition not just experiential activities. For example, successful completion of problem-solving tasks and experience were found not to be a valid indicator of students' conceptual understanding of underlying concepts in the sciences (McDermott and Shaffer 1992), and service-learning experiences devoid of explicit reflection did not foster academic learning (Sheckley, Allen, and Keeton 1993). Even the originator of the experiential learning theory, John Dewey (1933), acknowledged that experience in and of itself is not always educative. In fact, if students do not think seriously about their experiences, their experiences may reinforce stereotypes and incorrect suppositions (Glenn and Nelson 1988). Key to this educational philosophy is the student's ability to integrate their prior experience and/or experiential learning tasks with conceptual knowledge in an effort to form new knowledge.

Constructivist/experiential learning provides great opportunity for faculty intervention to explicitly inform students as to how knowledge is integrated, the importance of accessing prior knowledge, and that many times there are multiple perspectives and right answers. Course pedagogies can explicitly be utilized to raise the consciousness about the nature of knowledge, knowing and learning. Conceptual knowledge represents the facts, concepts, principles, and their interrelationships that apply to a specific domain (Alexander 1996). Conceptual organization of knowledge is a major characteristic of expert proficiency. Suggesting a primary goal of meaningful learning is to continue the organizational development of conceptual understanding (Glaser and Bassok 1989). Koszma et al. (1996) have shown that students often focus on superficial terminology or isolated facts and cannot be expected to direct their attention to core concepts within a discipline. This superficial knowledge does not provide a foundation for new learning. The implication is that students require explicit and extensive guidance from experts (teachers) in the selection, organization, and application of conceptual knowledge in their learning.

An example of a pedagogical tool to help organize and integrate knowledge is the use of concept maps. Concept maps can be thought of as a metacognitive tool in that they can help learners think about their own thinking processes. The map provides a tangible "learning product" that can help build the learner's self-esteem (Pressley and McCormick 1995) and can potentially assist in the development of more sophisticated epistemological beliefs. Guidance and practice is required for concept maps to become an effective learning tool (White and Gunstone 1992), which means instructors need to model (walk and talk) the map construction process. However, students personally constructing and elaborating on their own concept maps are an important part of the learning process. When concept maps are used early in a learning unit, they help to focus attention on the topic and allow preassessment of knowledge, skills, experiences, and misconceptions with the concepts. Used at the conclusion of the unit, maps can help learners integrate new knowledge, review for a test, and/or provide a formal evaluation tool.

In addition to providing learning experiences and explicit guidance in knowledge construction, everyday communications, such as classroom discussions and writing within the curriculum, shape and define both teachers' and students' epistemological views of the discipline. All disciplines have controversial issues that can be presented to students to encourage their examination of multiple perspectives of complex issues. Many business textbooks now provide sidebars that present business situations with ethical and social responsibility issues designed for point/counter point discussions. The nature of these discussions can influence students' epistemological views. Do the discussions promote unprepared, unsupported, top-of-mind comments or do they encourage the thoughtful use of evidence and the specification of relevance in providing their point of view? When done in a cooperative context (Johnson and Johnson 1979), and with a well prepared teacher, these discussions can enhance intellectual growth and epistemological beliefs (Fredericks and Miller 1993). Controversy of this nature in the classroom is suggested to be very desirable (Lusk and Wienberg 1994).

Writing within the discipline also communicates and reinforces epistemological positions (Keys 1999). For example, in Marketing, a popular perspective is that of

being Market Oriented. Market Oriented consists of three behavioral components (1) customer orientation, (2) competitor orientation, and (3) interfunctional coordination and two decision criteria (a) long term focus and (b) profitability (Narver and Slater 1990). In addition, Market Orientation focuses on the ongoing generation, dissemination, and response to market information. Do the case write-ups, projects, research reports, and marketing plans created throughout the major require that the above components and criteria be addressed? Or, do the assignments narrowly focus on the particular issue that is currently being taught? Do students experience writing for multiple audiences such as their peers, business practitioners, consumers, as well as, the instructor? Aspects of writing such as the use of evidence, documentation of sources, links to theory and models, the role of expertise, and explicit consideration of multiple perspectives (production, finance, etc.) all shape the epistemological view of knowledge construction, use, and representation in our discipline.

Understanding how students' personal epistemological beliefs continue to develop and their relationship to learning, challenges us as marketing educators to reflect on our own educational philosophies and instructional practices to determine how they may enhance or diminish the development of epistemological beliefs. Further research could address some of the limitations inherent in this study and enhance our understanding of the relationships between epistemological beliefs and learning. The ability to generalize this study's results requires replication with student samples from multiple universities being taught with a variety of pedagogies. In addition, the refinement of the measures and the inclusion of other variables would increase the diagnostic value of scales, allowing assessment of individual instructional practices. The limitations of our research notwithstanding, we believe that this exploratory research introduces an important topic to marketing educators and provides insights that can help facilitate designing instructional practices for developing epistemological beliefs.

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