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The relationship between out-of-class activities and cognitive epistemological development in college freshmen as mitigated by student demographic variables

Leslie Dennen

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The University of San Francisco

THE RELATIONSHIP BETWEEN OUT-OF-CLASS ACTIVITIES AND
COGNITIVE EPISTEMOLOGICAL DEVELOPMENT IN
COLLEGE FRESHMEN AS MITIGATED BY
STUDENT DEMOGRAPHIC VARIABLES

A Dissertation

Presented to the

Faculty of the School of Education

Learning and Instruction Department

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Education

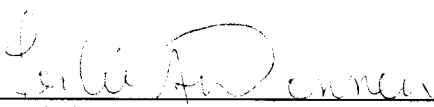
by

Leslie Dennen

San Francisco, CA

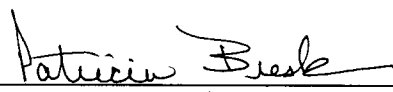
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This dissertation, written under the direction of the candidate's dissertation committee, has been presented to and accepted by the Faculty of the School of Education in partial fulfillment of the requirements for the degree of Doctor of Education. The content and research methodologies presented in this work represent the work of the candidate alone.

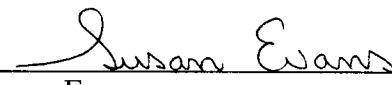

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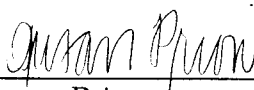
Dissertation Committee


Patricia Busk Chairperson

9 May 2007


Susan Evans

5.9.07


Susan Prion

5/9/07

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CHAPTER I

Introduction

Statement of the Problem

One of the most important influences on learning and the eventual outcomes of a student's college experience is the campus environment. According to Pascarella and Terenzini (2005), the experiences students have in college change them in a variety of ways. These changes come from students' activities in both the formal academic and the nonacademic domains of university life. Studies published since 1990 are more persuasive than ever that college students' lives in class and out of class are intimately connected to forming their educational experience and that the complexity of this connection needs to be further understood (Pascarella & Terenzini, 2005).

Since the 1980s, a paradigm shift has been taking place in higher education that changes the purpose of the institution from delivering instruction to facilitating student learning. The traditional model of university life has been classroom-centered and teacher-directed. Faculty members distribute knowledge, and students are responsible for acquiring it, not for participating in its discovery or construction (Pascarella & Terenzini, 2005). Recently, college professionals have realized that this traditional model has "mistaken a means for an end" (Barr & Tagg, 1995, p. 13). The role of the university is not just to provide instruction but to produce student learning by whatever means that are effective. By shifting the focus of "Instruction Paradigm" to "Learning Paradigm," a new framework is put in place that redefines the role of teachers, students, and

academic services in higher education. Whereas the Instruction Paradigm defines the purpose of the university as an institution where courses and degree programs are offered by faculty who are experts in their fields, the Learning Paradigm expands the purpose of the university to include all experiences inside and outside the classroom (Barr & Tagg, 1995).

Schroeder (2005) called for bridging the boundaries between academic and student affairs to create “seamless learning environments” that integrate learning in and out of the classroom (p. 206). Schroeder argued that in order to create a seamless first-year experience for students, academic and student affairs must build alliances and partnerships. Academic affairs professionals have traditionally been concerned with faculty and classroom-related issues whereas student affairs professionals provide services such as registration and orientation, programs to promote leadership and time management skills, and co-curricular activities. There are, however, deeply ingrained attitudes that must be overcome to forge effective partnerships between academic and student-affairs professionals. The prevailing view of faculty that student affairs are ancillary or supplementary to the institutional mission is one barrier to collaboration. Another barrier is the sometimes counterproductive perspectives of faculty and student-affairs professionals that the former do not care about students or that the latter create inappropriate, distracting activities for students.

Schlossberg (1989) argued one element that is influential in college success is a student’s sense of belonging in the college community. Students can experience a sense of marginality when they enter into a new community. If a student believes he or she does not fit in, he or she can become depressed, irritable, and insecure. Students from minority groups are particularly at risk of

feeling marginalized, which may continue throughout their 4 years of undergraduate education. Nonminority freshmen and transfer students also may experience marginalization for a certain period of time. According to Schlossberg, when students believe they are marginalized, they also believe that they do not matter. Schlossberg identified five components that constitute the construct mattering: *attention*, a sense that others notice you; *importance*, a feeling that others care about you; *ego extension*, a belief that others empathize with your successes and failures; *dependence*, a feeling that you are needed; and *appreciation*, a feeling that your efforts are valued. Schlossberg, Lynch and Chickering (1989) stressed that it is the responsibility of educational institutions to create an environment that fosters a sense of mattering in students. When students perceive that they matter and belong, they are more likely to become involved socially and academically (Hamrich, Evans, & Shuh, 2002). Kuh, et al. (1991) underscored this need: "The most critical issue regarding campus environments and student involvement is creating a sense of belonging, a feeling on the part of students that the institution acknowledges the human needs of social and psychological comfort, and that they are full and valued members of the campus community" (p. 321).

In order to prepare students for an increasingly complex world, universities can no longer view themselves as a collection of departments isolated from each other or as academic affairs isolated from student affairs. According to Thomas Friedman (2005), the world is being "flattened" by geopolitical, economic, and technological advances that will change the way one lives and does business. Suddenly more people from different places are collaborating and sharing knowledge from different fields of work than ever

before. Joel Crowley, an IBM strategist, explained that employees at companies such as IBM no longer work exclusively within their own company, but, in order to compete globally, they increasingly need to pool resources with other companies (Friedman, 2005). The competition for intellectual capital is global, and, as students enter the workforce, critical-thinking skills, communication and collaboration skills, and creative initiative will become necessary. The onus, therefore, is on the institution to create a series of learning environments whereby students discover and construct knowledge for themselves and become members of a community of learners. Baxter-Magolda (2006) argued that college educators should share the common goal of guiding students from naïve assumptions about their roles of passively accepting information from “experts” to developing their cognitive awareness and critically constructing their own perspectives depending on different contextual situations. She argued that this transformation of how students think is more complex than learning a skill set. Research on cooperative and collaborative learning has shown consistently positive outcomes in achievement, critical thinking, sociability, self-esteem, motivation, and other beneficial outcomes (Lovell & Nunnery, 2004).

Academic institutions in the 21st century must find ways to foster success for a variety of students. University students in the US come from more diverse backgrounds than ever before. Since the early 1990s, enrollment of African-American students has increased by 48%, Hispanic-American students by 99%, and Asian-American students by 78%, while the enrollment of European-American has remained about the same (Snyder, Tan, & Hoffman, 2004). Increasing numbers of high-school graduates will need postsecondary education support systems in order to prepare for a complex social, economic, and political

world. As students enter higher education in greater and greater numbers, universities can no longer employ a “one-size-fits-all” approach, but must find new and different ways to create successful learning environments for a diverse student population.

One factor that has been shown to affect student success is student engagement, otherwise known as peer interaction or academic involvement. As students immerse themselves in the academic environment, they learn behavior from their peers that promotes achievement and leads to satisfaction with their educational experience, which in turn, encourages more successful behavior. Kuh (2003) found that, after controlling for student background characteristics such as high-school achievement, one key factor that promoted student success was student engagement. Kuh, Pace, and Vesper (1997) examined a 10% sample of a data set from 30,000 lower division students who took the College Student Experiences Questionnaire (CSEQ). They found that active learning and cooperation with other students had the strongest positive influence on self-reported academic gains. In addition, students who perceived good relationships among peers and between students and faculty reported greater gains than those who did not. Inman and Pascarella (1998) analyzed a subset (n=671) of the data from 2,400 entering freshmen from 23 colleges and universities. Their study also suggested a positive influence of extra-curricular involvement on cognitive development in the freshman year. Consistent with these findings, Ethington (2000), in a study of 48 institutions, found that students who interacted more with other students, had more positive college experiences, and have higher mean gains (in self-reported grades).

Students living at home who are minorities, women, or first generation in college students may be at additional risk of failing to adapt to the academic environment. For many minorities, family includes an extended family of grandparents, aunts, uncles, and cousins, whereas European-American students think of family as a nuclear unit. For minority students, the transition from high school to college, moving away from family life and community networks, may seem a greater sacrifice than that of European-American students. By contrast, European-American students perceive college as a rite of passage into independence and adulthood (Morely, 2004). The work of several researchers has suggested that students of color at institutions with predominantly European-American students are particularly at risk of feeling socially isolated and academically discouraged. These students may benefit even more from student engagement than European-American students (Berger & Milem, 1999; Hoffman, 2002). Donovan (1984), in a multivariate and path analysis of 400 African-American students, found that student engagement was the best predictor of academic achievement, even more so than high-school grades or standardized test scores. These results were consistent with Elmer and Pike (1997) who found in a study of 1,006 freshmen at a public Midwestern university that, for minority students, student engagement was related more positively to grades than was entering ability.

First generation in college students, particularly those who are minorities, women, or both face additional hurdles. Elkins, Braxton, and James (2000) highlighted the importance a strong support system for student success, particularly for first generation in college and minority students. According to one study, first generation in college students reported less encouragement from

parents to attend college (Terenzini, Springer, Yaeger, Pascarella, & Nora, 1995). First generation in college and minority students who lack parents, friends, and siblings with college experience may lack an adequate support system, which could impact negatively academic success, particularly if they live at home. According to Schommer (1990), students with parents who have been to college were more likely to encourage their children to take more responsibility for their own learning, to self-monitor comprehension, and to avoid simplistic interpretations of information. Pike and Kuh (2005) reported that first generation in college students are at a disadvantage even when controlling for precollege characteristics. First generation in college students are less likely to live on campus, develop relationships with faculty and peers, and find satisfaction with the campus environment. They are also more likely to work more hours and come from lower economic backgrounds. First generation in college students are more likely to be minority students, and when those students are women, they may be further influenced by prohibitive cultural values and lack of educational aspirations (Lofink & Paulson, 2005; Pike & Kuh, 2005).

Women are more represented on campus now than ever before, but for first generation in college and minority students, women are still an underrepresented group (Pike & Kuh, 2005). Lofink and Paulson found that first generation in college females, even though they constituted the majority of the first generation in college students in their study, were statistically significantly less likely to continue their education after the first year. In addition, women's perceptions of institutional climate may differ from men's perceptions. Berger and Milem (1999), in a longitudinal study of 1,343 entering freshmen at a private,

residential university, found that there were statistically significant differences in perceptions of peer-support by gender and that females were more positively impacted by student engagement.

Research has suggested that the greater the student engagement in the academic community, the greater the changes in entering freshmen. In a study of over 200,000 students, Astin (1985) concluded that for some student outcomes, academic engagement was more strongly associated with changes in students than either the student's high-school achievement or the institution's characteristics. According to Kuh et al. (1991), about two-thirds of a college student's time is spent on activities other than attending class and studying. The evidence that students who are involved in out-of-class activities gain more from their college experience than those who are not underscores the importance of creating institutional conditions to encourage learning opportunities. Kuh (1995) emphasized the significance of research linking peer experiences with student learning and personal development. Because of studies linking academic integration and achievement, perceived quality of education, and persistence in college freshmen, institutions have instituted oncampus programs to foster student interaction with peers and faculty outside of class, such as learning cohorts and learning communities. These institutional changes have been part of a conceptual shift to encourage peer and faculty interaction on campus.

Purpose

Although campus involvement has been linked to retention (DeBerard, Spellman, & Julka, 2004), satisfaction (Einarson & Matier, 2005), critical thinking (Gellin, 2003; Tsui, 2000), and increased achievement (Kuh, et al., 1997), little is known about the effect of oncampus involvement and the cognitive-structural

development of students. What students believe about their knowledge, how and what they know, and how they learn has a powerful influence on their learning, and understanding this process can enhance students' educational experience inside and outside of the classroom (Hofer & Pintrich, 2002).

Cognitive structural theorists explore how people interpret their experiences and integrate new concepts to which they are exposed. Hofer and Pintrich explained that cognitive-structural development of students occurs progressively in stages over the course of their educational career, moving from simplistic assumptions to more complex assumptions about the nature of knowledge and knowing.

Cognitive-structural research has been done in five areas: (a) epistemological reasoning, (b) moral reasoning, (c) faith development, (d) ego development, and (e) maturity (Hamrick, et al., 2002).

The current study is significant because if out-of-class activities can be shown to advance the complexity of students' cognitive development, then the "learning- paradigm" model for the university as a place to produce learning both inside and outside of class would be supported. If one of the goals of higher education is to provide an environment that prepares students to succeed in an increasingly complex world, then the college environment needs to be one that fosters critical thinking and provides opportunities for students to work together and connect information from different sources. This study investigated the relationship between academic engagement (involvement in out-of-class activities) and student beliefs about their learning in second-semester freshmen in order to find out whether involvement in out-of-class activities advances students' concepts of knowledge and of themselves as learners. When students view themselves as active participants in their own learning, they make choices

that increase opportunities for a more mature understanding of the world and their place in it (Tsui, 2000).

Background and Need

Higher education is undergoing a major reform in response to changing economic agendas, shifting demographics, eroding public confidence, demands for accountability, and increasingly diverse student populations. In reports on the status of higher education (Boyer Commission on Educating Undergraduates in the Research University, 1998; Kellogg Commission on the Future of State and Land Grant Universities, 1998; Wingspread Group of Higher Education, 1993), all undergraduate experiences, not just classroom instruction, need to be connected with student learning and development. All of these reports put student learning first (Schroeder, 2005). Twenty years of research have suggested that out-of-class activities shape academic and cognitive domains and that students' interpersonal interactions are a major source of influence on student learning. These out-of-class activities are probably not immediate but accumulate over an extended period of time (Pascarella & Terenzini, 1991).

According to Astin, Keup, and Lindholm (2002), two influential national reports in the 1980s, *Involvement in Learning* (Study Group, 1984) and *Integrity in the College Classroom* (Association of American Colleges, 1985), were responsible, in part, for stimulating nationwide efforts to transform higher education. They listed the conceptual shift from teaching to learning, the formation of learning communities, student involvement in community service, technology, and new pedagogies such as collaborative learning, service learning, and team teaching as some of the reform measures.

In order to assess whether reform efforts instituted in the 1980s had produced changes in student outcomes, Astin et al. analyzed two 4-year longitudinal databases from the Cooperative Institutional Research Program (CIRP) that followed the same set of 117 baccalaureate-granting institutions. The two databases were 9 years apart, from 1985-1989 and from 1994-1998. The 1985-1989 cohort included 14,021 students and the 1994-1999 cohort included 9,281 students. The researchers wanted to investigate whether higher education in the US had strengthened its capacity to enhance student learning and development during the 1990s, what specific student outcomes have been influenced positively by all these reform efforts, and if there were any negative outcomes from these institutional changes.

Controlling for entering characteristics, Astin, Keup, and Lindholm (2002), found students in the 1990s had changed from their 1980s counterparts on several measures. The positive changes included interaction with faculty, hours spent doing volunteer work, satisfaction with faculty and administrators, and public-speaking ability. The researchers pointed out that these changes were internally consistent with research that suggests that interaction with faculty increases satisfaction with faculty and volunteer work increases public-speaking ability (Astin, 1993a). There were several other positive outcomes that may suggest evidence for a systemic transformation: interaction with fellow students, overall satisfaction with college, growth in critical-thinking skills, growth in working cooperatively, and satisfaction with support services. These changes were consistent with research that has associated increased integration of student activity with a number of positive outcomes (Astin, 1993a). The results also suggested negative changes in student behavior: decreased hours spent doing

homework and increased hours spent watching television. The researchers proposed that the decrease in time spent on homework and the increase in time spent watching television were possibly responsible, in part, for a decrease in values, specifically commitment to environmental clean-up, acceptance of other races, social activism, and feminist views. These negative outcomes suggest that, although increased student engagement has produced some positive transformations, higher education's ability to interest students in contemporary issues has declined (Astin et al., 2002). The researchers speculated that the advantages of faculty-student interaction may have been offset by a decrease in peer-to-peer interaction. College freshmen in general have declined steadily in academic involvement from 1990 (Sax, Astin, Korn, & Mahoney, 2000). In addition, institutional competitiveness and the consumer-culturization of higher education may have produced a conservative backlash that discourages the college's role in promoting political and social activism (Astin et al., 2002).

If students are to participate on a global playing field when they graduate, they need to be equipped not only with academic skills but also a broad perspective of themselves as participants, collaborators, and innovators. These qualities call for an increased awareness of values, such as tolerance of others and a sense of commitment for their environment. When students mature cognitively, they progress from a relatively naïve state whereby they learn information that is handed to them to becoming active participants in their learning. Their perspective on the world and their position in it becomes increasingly complex, taking into account multiple perspectives. If peer-to-peer interaction fosters growth in students' cognitive epistemology by encouraging students to interact with others from different backgrounds, negotiate meaning,

question their beliefs, work together, and share knowledge, then institutions would be well-advised to increase opportunities for peer interaction. Barr and Tagg (1995) argued that, in the learning paradigm, an educational institutional purpose is not just the delivery of instruction but the creation of situations that cause students to think for themselves, solve problems, and become members of a learning community.

In a review of research on student involvement in a collegiate setting, Moore, Lovell, McGann, and Wyrick (1998) reported that studies suggest that in addition to having a positive impact on retention, achievement, self-confidence and leadership, job placement and marketability also are positively impacted by students' involvement in college. Researchers in education are beginning to realize that grades are only one indicator of student development in college. Skills gained from participation in activities outside the classroom are equally important to prepare students for professional success. In one study, recruiters in both education and engineering fields preferred to hire students with a high level of activities and medium grades over those students with high grades and medium activities. Employment recruiters also looked for at least a medium level of engagement in on-campus activities when hiring college graduates (Albrecht, Carpenter, & Silvo, 1994).

In *Challenging and Supporting the First Year Student* (Upcraft, et al., 2005), the researchers called for a revised definition of student success in the first year. Whereas retention has been the traditional linchpin for first-year student success, institutions also need to focus on student learning and development to ensure student success. The following criteria were proposed for a broader definition of student success:

1. Developing intellectual and academic competence. Students must develop not only the intellectual skills, such as reading, writing, and technical skills but also skills necessary to become educated people, such as critical thinking, problem solving, and reflective judgment. They must learn how to learn and appreciate what it means to become educated in a broad sense.

2. Establishing and maintaining interpersonal relationships. Having supportive relationships contributes to students' academic and interpersonal success. Traditional-aged students need to form new friendships and redefine their family support systems. Older and commuter students need to integrate existing commitments with their college-based relationships with friends, faculty, and staff. Supportive relationships help students not only during college but also in their pursuits after college.

3. Exploring identity development. First-year students are in the process of developing their own identities as learners and as participants in the academic community and the larger community.

4. Deciding on a career. Most first-year students enter college to prepare for a career, but their initial goals may change over time. The first year should help students clarify career goals.

5. Maintaining health and wellness. The first year is often very stressful for students, with competing demands for their time and behavior. Students must learn to deal with stress and negotiate many commitments in their academic and personal lives. They must learn to maintain health and wellness and make decisions concerning alcohol, drug use, sexual behavior, nutrition, physical activity, and other behaviors.

6. Considering faith and the spiritual dimensions of life. Until recently, students' faith or values were not considered as part of a college curriculum, yet for most students their belief system is part of who they are. During college, most students will examine their belief and value systems in relation to their own self-concepts and their place in the world. Successful first-year students must begin to reconsider and internalize what they believe and value.

7. Developing multicultural awareness. First-year students are often exposed for the first time to people and cultures different from their own. Diversity should be a positive educational condition, but often students need to learn awareness and appreciation of the multicultural character of today's collegiate environment.

8. Developing civic responsibility. First-year students must learn to become responsible citizens in a democratic society. Too few students vote in national, state, or local elections. Educational institutions have begun to address this issue by implementing course-based service learning and promoting civic awareness through volunteer and fundraising activities (Upcraft et al., 2005).

Student-development theory has emerged from this expanded view of the purpose of higher education. Student-development theories focus on the social and psychological changes in students and the factors that contribute to these changes (Hamrick, et al., 2002).

This study contributed to bridging the boundaries between academic and student affairs. Traditionally, academic-affairs research has concentrated on inclass learning and knowledge, and student-affairs research concentrated on out-of-class student satisfaction and needs. The current study proposed to investigate how student engagement in out-of-class activities relates to how they

perceive themselves as students and how they view the construct of knowledge. Numerous studies have suggested that engagement in out-of-class activities influences retention, achievement, and student satisfaction (Kuh, 1995; Pascarella & Terenzini, 2005; Terenzini, et al., 1996; Whitt, Nora, Edison, Terenzini, & Pascarella, 1999), but few studies have investigated how student engagement affects student thinking. Understanding how students think of themselves as learners is an essential element in understanding student development in college because once students arrive on campus, their success depends on the choices they make: whether they persist or give up, how they choose to spend their time, and how well they integrate new information. If engagement in out-of-class activities can be linked to cognitive development, a stronger argument can be made for creating an integrated campus culture that fosters student success.

Theoretical Rationale

Cognitive epistemology is a growing area of research that seeks to investigate the beliefs individuals have about knowledge and learning, and the nature of reasoning that leads to these beliefs. Emerging theories of cognitive epistemological development have their basis in Piaget's (1950) theory of intellectual developmental, genetic epistemology. In 1970, William Perry used the concept of epistemological development to understand how college students interpreted their educational experiences. This study later became known as "the Perry scheme" and has been the foundational study for nearly all current psychological work on epistemological beliefs (Hofer & Pintrich, 1997). Educational research in epistemology that followed Perry's work investigated gender and knowing (Belenky, Clinchy, Goldberger, & Tarule, 1986), gender-related patterns of knowing (Baxter-Magolda, 1992), critical reasoning about ill-

formed problems (King & Kitchener, 1994), and student beliefs about how they learn (Moore, 1989; Schommer, 1990).

William Perry (1970) originally designed his study to explore how students view the roles of teachers, their own roles as students, the functions of class activities, and the nature of knowledge in response to a sometimes inexplicable mismatch between student and teacher perceptions of the educational experience. For their first study in 1955, Perry and associates conducted yearly interviews with 31 students resulting in 98 interviews and 17 complete records over the course of four years of study at Harvard University. The second longitudinal study in 1963 included a larger sample of 109 students, 366 interviews, and 67 complete 4-year reports. The initial instrument used to select students was called the Checklist of Educational Values (CLEV) and was based on the assumption that student responses about their college experiences were largely due to personality. In the interviews, researchers invited students to elaborate at the end of each school year what had “stood out” for them.

As Perry and his associates reviewed the interviews year by year, they realized that students’ reinterpretations of their learning seemed to fall into a logical progression. Students’ concepts of themselves as learners were viewed through coherent interpretive frameworks that developed complexity over the years. Each stage represented the students’ current view of the world. By analyzing student comments and perceptions in the interviews, Perry and his team were able to map out a coherent scheme of development that described the cognitive maturation of students over their four years of study. Although boundaries between positions are not static, nine positions were identified and grouped into the following four clusters (Perry, 1970): *Dualism*: Positions 1 and 2,

Multiplicity: Positions 3 and 4, Relativism: Positions 5 and 6, Commitments to Relativism: Positions 7 to 9. The Perry Scheme defines the stages or positions of development as follows:

Dualism

Position 1: The student views the world in terms of black and white, right and wrong. Knowledge is gained by hard work and obedience to the teacher. The teacher is the Authority whose role is to distribute knowledge to the student. (paradigm: a spelling test).

Position 2: The student views multiple opinions or uncertainty of opinion as flaws in the Authority or as a “test” to determine if the student can find the “Correct Answer.”

Multiplicity

Position 3: The student admits there could be multiple opinions but only temporarily until the right answer is found. In cases where there are not yet clear answers, students are graded on how they express themselves.

Position 4: The student accepts the legitimacy of multiple opinions and, in doing so, views all opinions as having equal merit. Another interpretation of position 4 is that a line of reasoning is legitimate within the particular context of what the teacher wants.

Relativism

Position 5: The student contextualizes all knowledge, including the teacher’s, in relation to specific situations.

Position 6: The student realizes the necessity of making a commitment within the context of a relative world.

Commitment to Relativism

Position 7: The student makes an initial Commitment in some area.

Position 8: The student experiences the implications of Commitment and explores different types of responsibility.

Position 9: The student affirms his or her identity among multiple responsibilities and realizes that Commitment is ongoing (Perry, 1970).

This scheme of development is not a formula through which the student progresses automatically. There are conditions of delay, deflection, and regression that Perry terms (a) *Temporizing*: The student delays in some position for a year, hesitating to take the next step, (b) *Escape*: The student becomes alienated between stages 4 and 5 and denies responsibility for his or her own beliefs, and (c) *Retreat*: The student becomes fixed in absolute beliefs of Positions 2 or 3.

According to Moore (2001), the Perry scheme incorporates two important components of learning: (a) learning to cope with and confront uncertainty when grappling with new ideas and (b) developing more complex ways to understand the nature of learning and the self. The Perry scheme describes learning as incorporating diversity in the form of multiples: learning to integrate multiple opinions (positions 1 through 3), multiple contexts or perspectives from which to analyze issues (positions 4 through 6), and multiple commitments through which students define their values and identities (positions 7 through 9; Moore, 2001).

As learners advance through these stages, they begin to perceive knowledge as less certain and more open to interpretation, but interpretation is increasingly contextualized. Perry's scheme of epistemological development was chosen for this study because it lends itself particularly well to a college setting.

Cognitive transformations have been shown to develop along Perry lines in students who have engaged in collaborative environments (Lovell & Nunnery, 2004). In addition, student satisfaction has been shown to increase with higher stages of epistemological development. As students become more metacognitively aware, they develop a sense of agency in their own learning, and this self-knowledge leads to an increased sense of control over and satisfaction with their educational experience (Lovell & Nunnery, 2004).

Learning Environment Preferences

Whereas Perry's study used primarily unstructured interviews, research building on Perry's work has evolved to include more structured formats (Baxter-Magolda & Porterfield, 1985; Belenky et al., 1986; King & Kitchener, 1994; Moore, 1989). The Measure of Intellectual Development (MID) was developed by Moore in 1982. The MID narrowed the focus of research to student concepts about their learning process. The MID used sentence stems and semistructured essay-tasks scored by trained raters to assess cognitive development. The Learning Environment Preferences (LEP), developed by Moore in 1987, is a computer-scored recognition task based on the MID. The LEP focuses primarily on the intellectual portion of the Perry scheme, positions 2 through 5. Beyond position 5 involves the type of complex thinking in a relative context, which according to Moore (2001), would be better assessed by qualitative methods. Position one was not included because it was never verified adequately empirically but was a hypothetical extension in Perry's original study (Moore, 2001).

An objective measure of epistemic beliefs has the advantage of analyzing larger sample sizes and has prompted research on the relationship between

personal epistemology and other constructs such as learning strategies, motivation, and academic performance. Because interviews take time to administer and transcribe for analysis, need trained raters to score, and are expensive, objective measures of epistemological beliefs are more amenable to assessing larger program or academic outcomes (Hofer, 2002). According to Moore (1989), “there is a growing interest nationally in outcomes assessment (Educational Testing Service, 1987; Jacoby, Astin, & Ayala, 1987) and given the significance of intellectual development as a college outcome, it is not surprising that institutions are exploring the Perry scheme as a major part of an assessment program” (p. 505). Educational researchers recently have used the Perry scheme to investigate intellectual growth in problem solving (Marra & Palmer, 2004), collaborative learning groups (Lovell & Nunnery, 2004), instructional design (Wise, Lee, Litzinger, Marra, & Palmer, 2004), and different cultures (Zhang, 2004). The LEP was selected for this study because it enabled the researcher to use a larger sample size than other measures for epistemological development such as interviews or essays.

Research Questions

The following are the research questions proposed for this study:

1. Is there a relationship between out-of-class activities during the freshman year and student cognitive epistemological development as measured on an epistemological scale?
2. Does the relationship between out-of-class activities during the freshman year and cognitive epistemological development differ if high-school involvement is added to college involvement?
3. Does the relationship between out-of-class activities during the freshman year

and cognitive epistemological development differ by gender, ethnicity, or generational status?

Definition of Terms

Academic (or Student) Integration: The extent to which the student shares the attitudes and values of peers and faculty in the university and abides by the formal rules and informal expectations for that community (Pascarella & Terenzini, 2005).

Academic (or Student) Involvement: Academic or student involvement refers to the amount of time and effort students put into educationally purposeful activities outside of class. In this study, academic or student involvement is synonymous with academic or student engagement, oncampus involvement, and out-of-class activities and is measured by the combined answers to question number 6 on the Questionnaire of Student Engagement.

Authority: (upper-case A) The possessors of the right answer in the Absolute or the mediators of same (Perry, 1970).

authority: (lower-case a) An aspect of social organization and interaction in a relative world, with many differentiations.

Cognitive development: Development associated with thinking and reasoning processes, and with how individuals structure meaning. Some studies view critical thinking as a subset of cognitive development. In this study, cognitive development, critical thinking, and cognitive epistemological development are synonymous. In this study, cognitive development is measured by the Cognitive Complex Index (CCI) score on the Learning Environment Preferences (LEP) instrument.

Cognitive Epistemological Development: In this study, cognitive epistemological development is synonymous with cognitive development and is measured by the Cognitive Complex Index (CCI) score on the Learning Environment Preferences (LEP) instrument.

Commitment: (upper-case C) The fourth category of Perry positions 7 and 8. A conscious affirmation of responsibility within a relative world. Individuals form and commit to personal values while recognizing the relative nature of knowledge. These positions are more descriptive of adult stages of development. Perry contrasts the term Commitment with the unexamined commitments that have never been questioned (Perry, 1970).

Critical Thinking: The ability to evaluate and integrate new information, make connections to solve problems, and recognize complexity. In this study, critical thinking is synonymous with epistemological thinking and cognitive development.

Demographics: In this study, demographics include ethnicity, gender, age, generational status in college, and work status as measured by the Questionnaire of Student Engagement.

Dualism: First category of Perry positions 1 and 2. Student views the world as knowable. Knowledge is transmitted by Authorities. Beliefs are either right or wrong (Perry, 1970).

Epistemology: The study of how an individual views knowledge and knowing. Epistemological development involves the coordination of subjective with objective knowing and is synonymous with cognitive development.

Generational Status in College: In this study, generational in college status refers to whether or not a student is the first generation in his or her family to attend

college. A student is classified as first generation when he or she responds on question 15 of the Student Engagement Questionnaire that both mother and father did not complete a minimum of Associates' Degree.

Ill-structured or "wicked" problems: Problems that cannot be solved by simple formulas. They require judgment of available evidence and weighing of two or more reasonable but opposing arguments. For example, does the health risk of spraying for mosquitoes outweigh the health risks of not spraying? (King & Kitchener, 2002).

LEP: Learning Environment Preferences. A survey instrument developed by William Moore (1987) designed to measure student cognitive development by position according to the Perry Scheme.

MID: Measure of intellectual development, an instrument using structured interviews to assess students' level of Perry position according to the Perry scheme.

Multiplicity: Second category of Perry positions 3 and 4. Students begin to perceive uncertainty of knowledge. By position 4, individuals perceive a difference of opinion about knowledge with all opinions equally valid (Perry, 1970).

Out-of-class Activities: Also described as student engagement or oncampus involvement. In this study, out-of-class activities were measured by item 6 on the Student Engagement Questionnaire.

Relativism: Third category of Perry positions 5 and 6. Individual begins to perceive the self as a participant in the construction of knowledge. Knowledge begins to be seen as relative, contingent, and contextual (Perry, 1970).

Student Development: The ways that a student grows, progresses, or increases his or her development capabilities as a result of enrollment in an institution of higher learning (Hamrick, et al., 2002, p. 31).

Student (or academic) Engagement: Also referred to as academic or student involvement, oncampus involvement, and participation in out-of-class activities. In this study, student engagement was measured by item 6 on the Questionnaire of Student Engagement. For example, "How often have you participated in study groups during your freshman year?"

Forecast of the Study

Chapter I introduces background information on the paradigm shift in higher education from institutions providing instruction to institutions facilitating student learning through programs that integrate student experiences both inside and outside the classroom. The need for continued research on the effects of student engagement in out-of-class activities, particularly during freshman year, is explained. There is also an explanation of cognitive development, a construct describing students' perspective on knowledge and learning, as a desirable result of student engagement. The Perry scheme is explained as a measure of cognitive development.

A review of the literature on college involvement and critical thinking, campus culture, critical thinking related to epistemological studies, research using the Perry scheme, and research using the Learning Environment Preferences instrument as a measure of cognitive development can be found in Chapter II.

The methodology of the study is contained in Chapter III. This chapter includes an explanation of the research design, a description of the participants,

Human Subjects considerations, procedures for surveying the participants in the study, a description of the instruments, including reliability and validity, and an explanation of the scoring procedures and data analysis.

Chapter IV provides the results of the study. This chapter includes a description of the distribution of the cognitive development scores of the population, an explanation of the statistical analyses used, and the results of the analyses of the research questions. It also provides a description of findings not included in the research questions.

A summary of the study and overview of related research, limitations to the study, a discussion of the findings, and implications for future research are provided in Chapter V.

CHAPTER II

Review of the Literature

In order to provide a context for this study, this literature review is divided into four sections. Section one presents the research on college involvement and critical thinking because the construct of critical thinking has been compared with that of cognitive development; both constructs have been defined as problem-solving and reasoning skills. Section two presents the research on campus culture and student involvement because there is strong evidence that campus culture influences student involvement in out-of-class activities, and out-of-class activities have been linked to critical thinking and other types of cognitive and emotional development in students. Section three explains how critical thinking relates to epistemological studies and presents research using the Perry Scheme to measure cognitive development. Finally, research using the Learning Environment Preferences (LEP) instrument as a measure of cognitive development is presented in order to provide a basis for the present study, the relationship of out-of-class activities to cognitive development in college freshmen as measured by the LEP.

College Involvement and Critical Thinking

One of the primary goals of higher education is to help students to learn to think critically (Gellin, 2003; Pascarella, 1989; Tsui, 2000). Learning factual information is certainly part of the college curriculum, but perhaps now more than ever, learning how to think, evaluate, and integrate information from a variety of sources is even more important because specific content material changes or becomes obsolete, and new information is discovered on a daily basis.

Educators value fostering critical-thinking skills because students can use these skills to function in a variety of situations (Tsui, 2000).

A college degree has long been regarded as sound preparation for functioning in the world, but Pascarella's (1989) study provided evidence that college experience and not simply life experience and maturity account for increased critical-thinking skills that students gain after they leave high school. Pascarella's longitudinal study compared two matched-pairs groups of high-school graduates. Seventeen pairs of students were matched on variables of gender, ethnicity, socioeconomic background, achievement (ACT), and a critical-thinking score, the Watson-Glaser Critical-thinking Appraisal (CTA). One student in each pair attended one of 18 different universities for a year. The other person did not attend any institution of higher education. After one year, the students were again tested for critical-thinking skills and were given a questionnaire about their experiences during the preceding year. For college students, this included residence, in- and out-of-class activities, courses taken, and college attended.

Controlling for covariates of ethnicity, gender, CTA scores, ACT scores, and family socioeconomic status (SES), college status had a statistically significant result for three of six subscores on the critical-thinking measure: CTA total score, interpretation of evidence, and evaluation of arguments. The researcher reported that one year of college attendance accounted for 3.73-point advantage or 17% improvement in overall critical thinking beyond the level of students who did not attend college. The effect size for the noncollege group was .44, and the standard deviation was 8.43. For the 1987 analysis of subscales, the first year of college was associated with a 24.8% increase in interpretation and a

17.7% increase in evaluation of arguments beyond that of similar students who did not attend college. The researcher also concluded by conducting an additional set of analyses that showed findings were independent of school attended, major, residence (on- or off-campus), or precollege traits. No individual specific experience could account for the increase in thinking skills, but changes in students were believed to be a result of the students' total engagement with the intellectual and social experiences of the college environment. External validity for this study was accounted for by selecting students from five different high schools that ranged in socioeconomic status. These students attended 18 different institutions of higher education that ranged in ACT selectivity from 17 to 29 on a 1- to 36-point scale.

Limitations to this study may include the relatively small sample size due to the need to match students on a number of variables. Further, the one-year time period may not have been long enough to investigate all the effects of college on critical thinking. In addition, 7 of the 30 college students attended one or more college courses over the summer preceding the Fall enrollment. These experiences may have confounded the results for these 7 students.

This study is an important foundational study for future studies on the effects of college environment on student development because it was the first longitudinal matched-pair study that suggested changes in student development, beyond those of normal maturation experiences, may have been due to the experiences students had while attending an institution of higher education.

Building on the results of this research, Inman and Pascarella (1998) sought to further investigate the influence of college activities on critical thinking

in college students. The researchers used a larger sample taken from a subsample of 2,400 freshmen from 23 colleges. The participants included 671 students from six institutions: one community college, two research universities, one historically Black institution, one state university, and one liberal-arts college. The sample consisted of 326 residential students (48.6%) and 316 commuter students (47.1%).

In the Fall of 1992, entering freshmen were given a precollege measure, the College Assessment of Academic Proficiency (CAAP) developed by the American College Testing Program (ACT) to assess incoming academic skills and critical-thinking skills. The critical-thinking skills portion consisted of 32 items that require students to analyze and evaluate arguments contained in four reading passages. In addition, initial data included a survey of demographic characteristics and background. In the Spring of 1993, the students were given a different form of the CAAP to measure critical thinking along with the College Student Experiences Questionnaire (CSEQ) to measure campus involvement and another survey instrument to obtain residential information.

A multiple-regression analysis was conducted to investigate if residence and campus involvement accounted for changes in critical-thinking skills. Critical-thinking scores were regressed onto (a) precollege characteristics and abilities, (b) student residence, (c) college environment, and (d) college involvement measures. When age, gender, motivation, work responsibility, and enrollment status were accounted for, the results showed, predictably, that precollege characteristics accounted for 56% of the variation in critical-thinking scores at the end of freshman year. This result is consistent with previous research that suggests precollege characteristics as strong predictors of college

performance (Astin, 1985; Pace, 1990; Tinto, 1975). For the variable of student residence, contrary to what the researchers expected, the results did not show a relationship between residence and critical-thinking skills. For the variable of college involvement, however, there was a statistically significant increase in explained variance of critical-thinking scores (change in $R^2=.03$). The researchers concluded that out-of-class experiences can contribute to cognitive development. The larger sample size of 671 students gave this study greater statistical power than Pascarella's 1989 study. Limitations included the selection of institutions, which may not be representative of all colleges in the country, and the period of time for this study, which may be insufficient for measuring subsequent effects of college on critical-thinking skills. This study lends credibility to the idea that students' overall experience outside as well as inside the classroom is instrumental in developing students' cognitive abilities.

To address time limitations in the previous studies, Whitt, Edison, Pascarella, Nora, and Terenzini (1999) used the same measures, CSEQ and CAAP, in a longer study with a larger student sample. Their longitudinal study was designed to measure the effects of student interaction on cognitive development and critical-thinking skills over a period of 3 years. This sample included initial data from 3,840 students from 23 institutions participating in the National Study of Student Learning (NSSL). Follow-up data were collected in the Spring of 1993, the Spring of 1994, and the Spring of 1995. Of the original sample, useable data over the 3-year period were obtained from 994 students. Controlling for confounding variables of precollege cognitive development, race and ethnicity, gender, age, motivation, socioeconomic status, hours enrolled, and

hours employed, the researchers correlated student interaction with cognitive development and critical-thinking skills for each year.

Positive effects were found for course-related and noncourse-related peer interactions (both in- and out-of-class) on cognitive growth. For course-related peer interactions (with critical alpha set at .01) for year 1, $r = .11$ for CAAP critical thinking and $r = .13$ for CAAP composite cognitive development. For noncourse-related peer interactions, for year 1, $r = .25$ for CAAP critical thinking and $r = .28$ for CAAP composite cognitive growth. For year 3, for noncourse-related interactions, $r = .13$ for CAAP critical thinking. On the basis of this longitudinal study, the researchers argued “that accumulated evidence of the importance—even the necessity—of involvement is so robust that any efforts to foster and enhance learning (inside or outside the classroom) must incorporate plentiful opportunities for active engagement and involvement” (p. 72).

The relationship between college experience and critical-thinking skills has been investigated in several other longitudinal studies since the middle 1980s (Edison, 1997; King, Kitchener, & Wood, 1985; Walker, 2001). The studies in this section represent a shift in educational research since the 1980s toward examining the effects of the entire college experience on students’ cognitive development and critical- thinking skills. From the above studies, it can be concluded that peers do contribute to a student’s cognitive development in college and that out-of-class experiences are an important component of student learning.

Campus Culture

Because so many studies have supported student engagement in campus activities as a contributing factor to students’ cognitive development, campus

culture has become the focus of subsequent studies. According to Kuh et al. (1991), the institutional environment, which can include physical surroundings as well as social and intellectual stimuli, can affect powerfully students either negatively by being confusing and alienating or positively by being stimulating and encouraging. Student behavior is a product of students' interaction with the subenvironments (physical spaces, policies, and people) of an institution (Kuh et al., 1991).

In a mixed-method study, Tsui (2000) used data from a national sample of the Cooperative Institutional Research Program (CIRP) and interviews of students, teachers, and administrators to investigate the relationship of campus culture to critical-thinking skills. The CIRP scores were used to identify institutional growth in self-reported critical thinking (IGCT). Through a regression analysis, 4 institutions were selected for case study, two with high institutional means for IGCT and two with low institutional means for IGCT (CIRP scores not reported). In addition, the institutions were chosen for their selectivity in admissions: two with high selectivity (SAT averaged 1300) and two with low selectivity (SAT averaged 1000). The resulting four universities used in the study comprised a sample of school A (low institutional selectivity and high IGCT), school B (low selectivity and low IGCT), school C (high institutional selectivity and low IGCT), and school D (high selectivity and high IGCT). Extended interviews with students, faculty, and administrators; class observations; and observations of student interactions in campus settings revealed three elements of campus culture that appear to influence critical-thinking skills: epistemological orientation, ability to instill responsibility and self-reflection in students, and promotion of social and political awareness.

The first finding, epistemological orientation refers to the dominant way students obtain knowledge. The epistemological orientation of an institution can pertain to learning opportunities both in and out of class. For the two low-IGCT schools, the epistemological orientation of the school stressed the traditional model of teacher-centered lecture and the transfer of information and convergent thinking. Students seemed pressured to “get through the material” and believed peer contributions as more of a distraction than as part of the learning process (Tsui, 2000, p. 430). By contrast, the two high-IGCT schools used a greater variety of teaching methods, including investigation of problems with no clear answers (wicked problems), collaborative work, and study groups outside of class. Students were encouraged to be active contributors to their learning process.

For self-reflection and responsibility, both high-IGCT schools encouraged students to take greater responsibility for their learning. For both schools, students had greater autonomy in designing their course curriculum and greater opportunities for participation in campus decisions. One dean explained, “We try to be very collaborative in our decisions. Students are confronted with major issues that take a lot of critical thinking” (Tsui, 2000, p. 431).

For social and political awareness, the campus culture at the high-IGCT schools promoted social and political concerns and encouraged students to be active in social justice and environmental concerns and to take personal responsibility for changing the world for the better. Many students from these two schools were reported to be involved in volunteer work in the local community. One student observed that, through her work in urban classrooms, she was able to realize how ideas discussed in the classroom played out in real-

life situations. Conversely, students at the low-IGCT schools seemed unconcerned and uninvolved with politics or social concerns. Professors at school B complained that students did not read very much. The students at school C were described as living in an “isolated little world” and detached from the world outside the campus, partially because of lack of time and partially because they were apathetic (Tsui, 2000, p. 433).

The researcher concluded that both high-IGCT universities, regardless of the incoming aptitude level of the student body, demonstrated that campus climate can foster critical-thinking skills inside and outside the classroom by promoting student interaction, collaboration, discussion of real-world problems, volunteer work, and leadership roles. This important study suggests that campus environments can have an effect on critical-thinking skills for both high- and low-achieving students and that students’ precollege abilities are only part of the equation when considering factors that influence student success.

The limitations for this study may include researcher bias because the researcher chose each institution on the basis of IGCT scores and, therefore, may have selected data unconsciously to confirm her hypothesis (even though individuals were selected randomly for interviews). Another limitation of the study was that only 4 institutions were included in the study, which may not be representative of other institutions of higher education.

Perhaps the most convincing study on the effects of student involvement on critical thinking is Gellin (2003). This study was a meta-analysis of eight studies between 1991 and 2000. There were four criteria used to select studies for this meta-analysis. The first criterion was the publication date had to fall between January 1991 through December 2000. The second criterion was that each study

had to include a student-involvement variable, which was defined as at least one finding from the following seven variables: athletics, Greek life, clubs and organizations, faculty interactions, peer interactions, living on campus, and employment. The third criterion was the dependent variable must be a measured construct called critical thinking. The criteria for the critical-thinking measure was the use of a critical-thinking assessment instrument such as the Watson-Glaser Critical-Thinking Appraisal (WGCTA), Cornell Critical-Thinking Test (CCTT), California Critical-Thinking Skills Test (CCTST), and the Collegiate Assessment of Academic Proficiency critical-thinking component (CAAP). The fourth criterion was that each study must include enough statistical data to calculate effect sizes.

Studies were selected from ERIC, PsychINFO, and Digital Dissertations. Keywords included *student involvement*, *critical thinking*, and *higher education*. For the student involvement variable, the key words *cocurricular*, *extracurricular*, *out-of-class*, and *outside the classroom activities* were used. Keyword search terms for critical thinking included *student learning*, *student development*, *cognitive development*, *intellectual growth*, *analytical skills*, and *problem solving*. Keywords used to find higher education studies were *undergraduate*, *college*, *university*, and *postsecondary*. In addition to online databases, a manual search of bound periodicals was conducted. Ten journals were identified that included studies on student learning in higher education: *American Educational Research Journal*, *College Student Journal*, *Community College Review*, *Journal of College Student Development*, *Journal of General Education*, *Journal of Higher Education*, *National Association of Student Personnel Administrators (NASPA) Journal*, *Research in Higher Education*, *Review of Educational Research*, and *Review of Higher Education*.

Reference lists were reviewed and electronic mail (email) correspondence was conducted in order to locate additional published or unpublished studies that met the criteria, making the review an unbiased one. The initial search identified 18 studies that met the four criteria.

The researcher performed a homogeneity test using a chi-square Q statistic with $k-1$ degrees of freedom to investigate whether the effect sizes of the studies were homogeneous enough to be included in the analysis. Results of the initial homogeneity test based on the 18 studies revealed that the effect size was heterogeneous and thus did not represent the entire distribution of effects ($Q=365.55$, $df=22$, $p=.00$). In order to locate homogeneous studies that could be included in a meta-analysis, studies were eliminated systematically until a remaining set of eight studies remained. The result of the meta-analysis for these studies was a mean ESr of .14 ($Q=5.55$, $df=22$, $p=.59$). This result meant that there was a small enough variance of the mean effect sizes to represent the distribution of effects. The mean ESr of .14 suggested that students who were involved in clubs and organizations ($ESr=.11$; $Q=3.22$, $df=1$, $p=.07$), lived on campus ($ESr=.23$; $Q=.42$, $df=1$, $p=.52$), and interacted with peers ($ESr=.14$; $Q=.64$, $df=1$, $p=.42$) experienced a .14 effect gain on critical-thinking skills over those students who were not involved. There was also a .13 effect gain in critical-thinking skills in students who worked over those who did not work ($Q=.47$, $df=2$, $p=.79$).

The researchers also suggested that the “overall effect of involvement may be greater than the effect of any single activity” (p. 754). There are two limitations mentioned in the study. The first is that a meta-analysis describes the relationship between two variables in terms of effect sizes, but it cannot explain causation. There may be other explanations for the findings due to institutional

or other student characteristics. The second limitation is that because of a lack of homogeneity in the initial 18 studies, the final meta-analysis resulted in the inclusion of only eight studies. From those eight studies, three of the seven involvement activities: athletics, Greek life, and interaction with faculty had insufficient findings, which may have affected the validity of the results.

Campus culture has been linked to student involvement and student involvement has been linked to student cognitive development in other studies (Astin, 1993a; Baird, 1988; Kuh, 1993, 1995). If research on campus culture shows that involvement of students contributes to the overall cognitive development of students, then campus climates can be oriented to foster critical-thinking skills.

Critical Thinking Related to Epistemological Studies

Critical thinking has been defined in a variety of ways. Pascarella and Terenzini (2005) defined the construct of critical thinking as an ability to do some or all of the following: “identify central issues and assumptions in an argument, recognize important relationships, make correct inferences from data, deduce conclusions from information provided, interpret whether conclusions are warranted based on given data, evaluate evidence or authority, make self corrections and solve problems” (p. 156). Generally-accepted definitions of critical thinking all have a strong cognitive component. The construct of critical thinking has been compared with that of cognitive epistemology (termed “postformal reasoning” by Pascarella & Terenzini, 2005) in that both are forms of cognitive reasoning and information processing. Critical-thinking skills have been described as those required to solve problems with verifiably correct answers, whereas postformal (or epistemological) reasoning involves solving “real-world” problems, termed “ill-structured” or “wicked” problems, for which

there may be incomplete or conflicting information and no clear answers (King & Kitchener, 2002). Tentative answers to such problems are said to be “constructed” rather than “discovered” (Pascarella & Terenzini, 2005). Several scholars have argued that constructing solutions to real-world problems requires a skill-set beyond that described as critical thinking. Other scholars make no distinction between critical thinking and epistemological thinking. Thoma (1993) claimed that, because different academic disciplines employ different methods of reasoning, “genuine critical thinking” requires individuals to realize the changing nature of knowledge and to make individual judgments within a variety of intellectual contexts. He contended that the Perry epistemological scheme is particularly relevant for describing various aspects of critical thinking. For this study, critical thinking was not distinguished from epistemological thinking.

Psychologists have used the term epistemology to describe study of human knowledge and reasoning. This term was first coined by Piaget (1950) as genetic epistemology, when he was developing his theory of intellectual development (Hofer & Pintrich, 1997). Since Perry’s (1970) epistemological scheme to explain how students integrate pluralistic experiences, research in education has developed lines of epistemological models as a way to measure student cognitive development and critical-thinking skills. According to Hofer and Pintrich (2002), research on cognitive epistemological development since Perry (1970) has developed along three lines of research. The first group of researchers have been interested in how epistemological assumptions influence reasoning and moral development (King, et al., 1985). The second line of research has investigated the effects of academic tasks on cognitive development

(Kronholm, 1996). The third line of research has investigated how individuals interpret their learning experiences (Baxter-Magolda & Porterfield, 1985; Belenky, Clinchy, Goldberger, & Tarule, 1973; Moore, 1989). This study is included in the third line of research on cognitive development: how student out-of-class interactions on campus relates to how students interpret their learning experiences.

Research Using Perry Scheme

The following section reviews studies that investigated changes in students as measured by their position along the Perry (1970) scheme. The first study used interviews with randomly selected students from a senior engineering class to investigate how students differed in their interpretation of their learning experiences according to Perry position. The second study investigated students' Perry positions as a result of instructional design.

Marra and Palmer (2004) conducted a qualitative and quantitative study of 19 senior college students purposely selected from the opposite ends of the Perry scale (P-scale), 10 with a P-scale rating of 5 to 7 (Relativism) and 9 with a P-scale rating of below 4 (Multiplicity). Twenty-seven students were selected randomly from a sample of 200 senior engineering students at a large Eastern university. From the subsample of 27, 19 were selected for semistructured interviews about their academic experiences, including questions about their preferences for learning, definitions of knowledge, solving open-ended problems, making decisions when information conflicts, and encountering individuals with different opinions from themselves.

Results showed four themes that stood out for both high and low groups: teaching and learning, group work, problem solving, and whole college

experience. Both groups held similar views on teaching and learning; both appreciated active student-centered learning, and neither group preferred passive lecture and memorization. Both high- and low-P-scale groups were mixed in their opinions about group work. For problem solving and whole college experience, the high and low group showed differences according to group level. All the high-P-scale-level students described their problem-solving processes and showed appreciation for the opportunity to work on ill-structured problems (problems without a clear solution). By contrast, only 4 low-P-scale-level students commented on their problem-solving processes and struggled with the ill-structured problems. For whole-college experiences, low-P-scale-level students focused on the value of their major courses in preparing them for “real-world” experiences and viewed other courses outside their majors as irrelevant to their college experience. By contrast, high-P-scale-level students valued general-education courses as a way of “expanding their thinking” and were far more likely to experience an internship or cooperative learning experience (p. 118).

The researchers argued that students who achieved a higher Perry-level position were able to view all experiences as contextual and, therefore, were able to integrate learning experiences both inside and outside the classroom. They argued that the ability to operate within a contextual framework allows a student to learn from multiple sources and make thoughtful judgments about incomplete or ambiguous information.

The ability of contextual relativism (Perry position 5 and above) is what is desirable in students who graduate with a bachelor’s degree. This study contributed to the overall understanding of how cognitive development as

measured by the Perry scheme affects student interpretations of their learning experiences.

There were, however, several limitations to this study. First, because only seniors were interviewed, effects of 4 years of college experience on their cognitive development was not known. Second, the sample used in this study was not representative of a national sample for race or gender. Third, the interview protocol used to establish Perry position involves some researcher interpretation and cannot be said to be an exact measure for categorizing students.

In a second study, Wise, Lee, Litzinger, Marra, and Palmer (2004) used interviews to examine the effect of an interactive design course in Engineering on Perry position over 3 years. One hundred participants were selected randomly from a group of 850 engineering students enrolled in a collaborative-design-based course at a public Eastern university. In the first year, the collaborative course employed hands-on team projects instead of traditional lecture-style classes that required note-taking and recall-style exams. Under the supervision of an instructor, students worked in groups to solve complex problems. Another aspect of the program, the cooperative education program (co-op), required students to spend one undergraduate semester working in the industry. Fifty-three of the original 100 participants were interviewed the first year in the second semester. Of those 53, 32 completed follow-up interviews in semester five, and 21 students completed the final interviews in semester eight. All interviews were evaluated by one of 10 expert raters for level of Perry position.

The researchers conducted an analysis of variance, which determined school year as having a statistically significant main effect on Perry position

($F=27.30, p=.00$) for students who were enrolled in the collaborative design course over that of students who were enrolled in the regular Engineering curriculum. A Bonferroni test revealed that this effect was not sustained from the first to the third semester, but students participating in the collaborative design course showed a growth of approximately one Perry position between the first and the fourth and the third and fourth year. Limitations to this study included attrition of the participants that led to a smaller than ideal sample. The study was important to illustrate that curricular design that promotes active learning such as team projects and exposure to real-life situations can influence students' epistemological development, but such development does not take place in a systematic way and may not be consistent from year to year. In addition, there may have been some research bias in assigning Perry positions to student statements in semistructured interviews.

Other research using the Perry epistemological scheme to measure development in students includes gender differences in cognitive development (Baxter-Magolda, 1989), cognitive growth in Nursing students (McGovern & Valiga, 1997), effects of student epistemological beliefs on comprehension (Schommer, 1990, 1992), and cognitive development of international students (Zhang, 2004).

Research Using Learning Environment Preferences (LEP)

In 1987, William Moore developed an objective instrument to measure student cognitive positions along the Perry scale. The Learning Environment Preferences (LEP) was based on an earlier epistemological instrument, the Measure of Intellectual Development (MID), an instrument that assessed Perry positions from essay answers. The MID, however, required trained readers to

score the essays, which limited its use for a large number of students. The LEP includes 65 items using a rating scale, which makes the instrument accessible to use and score with a larger sample of students. Several studies have used the LEP as an instrument to measure students' epistemological development.

Hill (2004) used a mixed methodology to investigate whether program design can affect cognitive development in third-year preservice elementary and secondary teachers at an Australian university. In a study of 175 participants, pre- and postscores on the LEP and a second motivating style questionnaire were employed to compare two groups: 86 students enrolled in a special teaching program and 89 students in the comparison group. The program was inspired by a teaching model called Developmental Education for Conceptual Change (DECC). The goals of the program were to increase teachers' capacity to deal with complexity, to foster teachers' recognition of agency as internal as opposed to external, and to increase teachers' critical reflection. In addition, the program sought to change teachers' beliefs about the necessity of adopting controlling styles for motivating students. Student teachers in the DECC program taught in schools each week for the academic year in addition to meeting in their classes.

The motivating-style questionnaire, called Problems in Schools (PS) gave each participant a rating of highly controlling (HC), moderately controlling (MC), moderately autonomy-supportive (MA), or highly autonomy-supportive (HA) regarding the way they would handle eight hypothetical teaching situations. A repeated-measures design was used combined with a qualitative analysis of interview data. The research questions were (a) does participation in the program result in significant increases in autonomy-supportive motivating style and intellectual (epistemological) development compared with the

comparison group, (b) what is the nature of the impact of the program on motivating style and intellectual (epistemological) development, and (c) does motivating style correlate with level of intellectual (epistemological) development?

At the end of the program, analysis of interview data revealed 37% of the responses suggested a shift toward more autonomy-supportive pedagogical approaches for the experimental group and a 46% increase in a sense of personal agency. Motivating style statistically significantly correlated with level of epistemological development (as measured by the LEP) $r(173) = .27$, which suggested that teachers with higher epistemological levels were more likely to motivate students to be independent learners. There was a slight statistically significant increase in epistemological growth for program students compared with comparison students, program ($n=44$) $M_s = 3.7, 3.8$; comparison ($n=30$) $M_s = 3.7, 3.5$; $t(72) = 3.45$, $\eta^2 = .14$, and autonomy-supportive style, program ($n=51$) $M_s = 1.9, 2.5$; comparison ($n=28$) $M_s = 0.9, 0.2$; $t(77) = 2.45$, $\eta^2 = .07$, but problems with data collection undermined the confidence of the analysis. The researchers concluded that the DECC-inspired program made a modest contribution to student-teacher's epistemological growth and influenced them to adopt pedagogical approaches that encouraged student autonomy.

The limitations of this study included problems with two of the four program schools. When student-teachers encountered difficulties with students and were not supported by the school staff, they reverted to a more controlling teaching style. Data from the problem schools showed a regression in Perry position for these teachers. This regression may have compromised results because the teachers' LEP scores may have been affected not by the teaching

program itself but by difficulties in the particular teaching environment. These difficulties, nevertheless, may suggest that younger students, who are not mature enough to become independent learners, do need to be in an environment with more control. Therefore, the program may have been more useful in fostering cognitive development in adults than in elementary students.

The last study in this literature review investigated how adult groups of students interpreted their learning experiences when working together with students who were at their same level of cognitive development and when other members of the group were at different levels.

Lovell and Nunnery (2004) used the LEP to investigate whether groups of students who had the same Perry position collaborated better than groups that were composed of students with different Perry positions. The students also rated their satisfaction with group work. Sixty-eight students from a graduate counselor education class at a large, public, Southern university were given the LEP. On the basis of their scores, they were placed into 15 collaborative learning groups of four or five members. Seven groups (31 students) consisted of students with homogenous scores. Eight groups were composed of students who were randomly assigned. Students worked collaboratively in groups over the course of the semester. At the end of the semester, students completed a satisfaction survey. The researchers performed a *t* test to compare satisfaction means between the two groups. Results showed a statistically significant difference ($t(59) = 2.03$) between homogeneous ($M = .26$) and heterogeneous ($M = -.25$) groups. The analysis revealed a moderate ($d = .51$) effect size. The researchers also performed a weighted regression analysis to investigate whether level of cognitive development would have an interaction effect on group type

with regard to satisfaction. Results of the weighted regression analysis revealed that students scoring between 300 and 400 (Perry level 3 and 3/4) on the LEP showed the most differences in satisfaction between the two types of groups. After 400 (Perry level 4), little difference was measured, but below 400, the heterogeneous groups showed less satisfaction than the homogeneous ones. This finding suggests that students at different levels of cognitive development may experience some frustration when working with students who interpret their learning experiences differently.

Students' written comments were analyzed to provide more qualitative information about their experience and to investigate how students interpreted their experience according to Perry position. Student comments about satisfaction corroborated the quantitative data with more students in the homogeneous groups expressing positive comments about working together. Written comments of the students illustrated how students along different positions of the Perry scheme interpret their learning experiences. Students at the lower end of the Perry scale (positions 2 and 3) were more self-protective and grade focused. They made comments like "the academic benefits were minimal" or were concerned about others who "didn't do their share" of the work (Lovell & Nunnery, 2004, p. 146). Conversely, students at position 5 enjoyed challenges of trying to solve problems with others and showed increased metacognition and sense of agency in their learning. Their comments revealed an appreciation for different points of view from other members of the group.

Qualitative analysis of students' interpretations of their experiences in this study confirmed the epistemological descriptions of the Perry scheme: students with a higher level of epistemological development approached their learning

with a broader perspective and a more mature understanding of their learning process, whereas students with a lower level of epistemological development expressed more frustration with solving problems and were more concerned about finding the “right” answers.

The authors provided guidelines for educators when working with groups of different levels. This study was important because it included students’ interpretations of their experiences, which helped to explain how epistemological development affects student learning. There are some limitations to this study. Researcher bias may have affected interpretation of written comments. The sample size was limited to one class of 68 students, which may limit external validity. In addition, the students ranged in age from 21 to 64, which may have limited relevance for 18-year-old college freshmen.

Summary

There is a considerable body of research that has investigated the relationship between student involvement and student development. Some research in this chapter has explored how campus environment can influence critical-thinking skills and how critical-thinking skills can be considered a type of cognitive development that goes beyond the construct of “learning” as measured by the comprehension of discrete information from a particular course or courses. Other studies (Hill, 2004; Lovell & Nunnery, 2004; Wise et al., 2004) have suggested how instructional design can affect students’ cognitive epistemological development. Because a broader interpretation of education in recent years includes integrating information from different sources and solving complex problems, course designs and campus environments have been modified to integrate more elements that are believed to foster critical thinking

and cognitive development. Few studies, however, have investigated the relationship of out-of-class activities and students' cognitive development as measured by Perry's epistemological scale. The Learning Environment Preferences instrument (LEP) provides an objective measure of student cognitive development according to Perry's epistemological scale and affords the researcher the opportunity to investigate the relationship of student cognitive development and student out-of-class interaction as measured by the researcher-developed questionnaire. If student cognitive development, as measured by the LEP, can be related to student participation in out-of-class activities, then this study contributes to the body of literature supporting academic involvement of students, particularly during the freshman year. This literature review provides the foundation and rationale for this study.

CHAPTER III

Methodology

This study investigated the relationship between out-of-class interactions and students' cognitive epistemological development. In this section, there is a description of the research design, participants, and human subjects considerations. Instrumentation, reliability and validity, scoring, and procedures for the study are also explained, followed by a restatement of the research questions.

Research Design

This study used a correlational design to relate the results of two instruments: a researcher designed academic-engagement measure whereby students were requested to respond to how much time they spent involved in on-campus activities outside of class and an epistemological measure (LEP) designed to indicate students' cognitive epistemological development according to the Perry (1970) scheme.

Participants

Participants included a convenience sample of 241 students enrolled in a second-semester writing course at a private university in Northern California. At this institution, all freshmen students were required to complete a minimum of one semester of writing in the Rhetoric and Composition Department. Class sections were limited to 20 students. Twenty sections from 10 to 18 students were included in the study. Students were surveyed during the 6th and 7th week of Spring 2007 semester. The classes were held from Monday through Friday from 9:40 AM to 6:45 PM. In order to ensure that all students understood the written materials, international students were excluded from the sample. Due to

incomplete data, 18 questionnaires were excluded after the data were collected, leaving a total of 223 complete data sets. The excluded questionnaires did not share a common pattern. The sample was 70% female and 30% male. For question number 14, ethnicity, the largest group (40%) identified themselves as European American or White. The second largest category identified themselves as Asian American (24%). Among ethnicities reported in the “other” category were Filipino, Honduran, Berber, Asian Indian, Caribbean, Jewish, and Arab American. For the purposes of analysis, Filipino students were combined with Pacific Islander, Honduran and Caribbean students were combined with Hispanic students, Asian Indian and Asian students were combined, and Jewish and European American students were combined. The majority reported they were 19 years old or younger (95%), freshman (91%), and on-campus residents (89%). Approximately half of the sample (53%) reported they were unemployed. (See Table 1 and Table 2.)

Human Subjects Considerations

Protection of human subjects in this study complied with the standards set by the American Psychological Association (2002) and the standards set by the University’s Institutional Review Board. Written permission from the instructors and from the central coordinator was obtained in writing (see Appendixes C and D). Student participants were informed by cover letter that their participation was voluntary and that all information would be kept confidential (see Appendix E). The questionnaires were stored in a secure location. Individuals were identified by number only for data analysis purposes only. No student names were used to ensure anonymity. For those who chose not to participate, an alternative activity, an article to read, was provided. By emailing the researcher,

students were provided access to their scores and an explanation of their Perry level upon request.

Table 1

Demographic Characteristics of Sample Population

Demographic Characteristic	Frequency	Percent
Race/Ethnicity		
African American	10	4.5
Native American	1	0.4
Asian American	53	23.8
European American	90	40.4
Latino/Hispanic American	30	13.5
Native Hawaiian/Pacific Islander	15	6.7
Multiethnic American	16	7.2
Other	1	0.4
Declined to comment	7	3.1
Gender		
Male	68	30.5
Female	155	69.5
Age		
19 or younger	212	95.1
20-23	9	4.0
24-27	1	0.4
Over 27	1	0.4
Domicile		
USF Living Learning Community	7	3.1
USF Dormitory	198	88.8
Off campus	18	8.1
College Year		
Freshman	202	90.6
Sophomore	10	4.5
Junior	5	2.2
Senior	5	2.2

Instrumentation

The study used two instruments. The first instrument was a researcher-developed student-engagement questionnaire designed to assess the students' level of participation in out-of-class activities during their freshman year (see Appendix A). The second instrument was the Learning Environment

Preferences (LEP) instrument developed by William Moore (1987) to assess the students' cognitive development based on the Perry model of epistemological

Table 2

Employment Status of Sample Population

Variable	Frequency	Percent
Employment Status		
Not Employed	118	52.9
Employed On-Campus	56	25.1
Employed Off-Campus	49	22.0
Total	223	100
Hours worked per week		
1-5 hours	25	11.2
6-10 hours	37	16.6
11-15 hours	18	8.1
16-20 hours	14	6.3
Over 20 hours	11	4.9
Total	105	47.1

Development.

For the student-engagement questionnaire, question number 6 instructed students to mark their frequency of involvement in 10 categories of out-of-class activities during their freshman year on a 5-point rating scale ranging from "never" to "daily." The categories of on-campus activities were adapted from Arminio and Loflin (2003) who investigated the impact of student involvement at different points in their college careers. The activities included on the instrument were those that require academic communication and collaboration skills, skills that have been linked to cognitive development (Moore, 1987). The ten categories were combined to compute an overall score for academic engagement. In addition, students rated their high-school level of academic involvement on the questionnaire because there may be a relationship between cognitive epistemological development and more than one year of academic involvement.

Student demographic questions were included on the student-engagement questionnaire because studies show that the amount or value of student involvement may differ according to student gender (Berger & Milem, 1999), ethnicity (Berger & Milem, 1999; Donovan, 1984; Elmers & Pike, 1997; Kuh, Palmer, & Kish, 2003) and generational status (Elkins, Braxton, & James, 2000; Pike & Kuh, 2005; Schommer, 1990). Questions regarding students' residence and work were included on the questionnaire because student on-campus residence has been linked to increased integration (Skipper & Argo, 2003), and research on the relationship of student work to academic integration has had mixed results (Kuh, Palmer, & Kish, 2003).

The Learning Environment Preferences (LEP) was used without modification. The instrument consists of 65 items that measure five different content domains: view of knowledge and learning, role of the instructor, role of the student and peers, classroom atmosphere and activities, role of evaluation and grading. Each content domain has 13 questions that describe the student's "ideal learning environment" (Moore, 1987, p. 1). Students were instructed to rate each item on a 4-point rating scale according to how significant they believed each item would be to their learning, for example, "My ideal learning environment would emphasize basic facts and definitions" (Moore, 1987, p. 2). Students were then instructed to rank their top three choices in each category. Students received subscores for each domain that reflected students' preference for items that corresponded to one of four principle stages of adult development: Dualism, position 2; Multiplicity Early, position 3; Multiplicity Late, position 4; and Contextual Relativism, position 5. Position 1, Basic Duality, is not included because it is considered a hypothetical extension of Perry's original scale and has

not been verified empirically (Moore, 2000). A three-digit coefficient score, the Cognitive Complex Index (CCI), is a weighted index for all four preference scores. The CCI indicates the students' overall level of cognitive development along the Perry scale. The scores can indicate that the student's responses fall under a single position or indicate a transition between two positions.

The LEP was developed from an original item pool consisting of 134 statements taken from an earlier essay instrument, the Measure of Intellectual Development (MID), which was developed by Moore in 1982. The MID was an open-ended question instrument based on Perry's (1970) interviews. The statements for the LEP then were assigned to specific Perry positions two through five by two raters trained in the Perry scheme. Fifty-four items were rejected as ambiguous or unclear leaving the first pilot instrument with 80 items, four for each position in each domain. A series of pilot tests were given, leaving 60 items in the final version of the instrument. Each domain also includes one "meaningless" item to check whether students are choosing answers based on the complexity of the wording.

Reliability and Validity

The college involvement questionnaire was reviewed for content validity by a validity panel composed of five Academic Affairs professionals (see Appendix B). The validity panel reviewed the terms for out-of-class activities for redundancy, ambiguity, and suitability. Following suggestions from the panel, the activity 3, "clubs/groups" was combined with activity 9, "cultural or multicultural organizations" to form "clubs/groups/organizations," because the panel viewed the two original terms for activities as redundant. The panel also recommended changing the wording of activity 4, "school services" because it

was ambiguous. Activity 4 was changed to “tutoring or lab assistant.” No other changes were made to the wording of the college involvement questionnaire.

The LEP instrument was tested for reliability and validity using a sample drawn from several different types of institutions: a small public college (n=177), a medium to large public research university (n=275), two medium-sized state universities (n=68), a public community college (n=36), an Honors program at a small liberal-arts college (n=57), and an Honors program at a large research university (n=66). The total sample consisted of 725 students. Males comprised 47% of the sample, and females comprised 53%. The breakdown by class was 38% freshmen, 34% sophomores, 10% juniors, and 18% seniors.

The reliability coefficients for the domains and Perry positions in the Learning Environment Preferences instrument (LEP) are provided in Table 3.

Table 3

Cronbach’s Coefficient Alpha Reliability for the LEP (N=725)

LEP	Avg. Item Correlation	# items	Alpha
By Domain			
View of Knowledge	.13	13	.66
Role of Instructor	.14	13	.67
Role of Students and Peers	.14	13	.68
Class Atmosphere	.13	13	.66
Evaluation Procedures	.12	13	.63
By Position			
Two	.22	15	.81
Three	.15	15	.72
Four	.26	15	.84
Five	.26	15	.84

The reliability was assessed by test-retest and internal consistency. Cronbach’s coefficient alpha was computed for each individual domain and for each position

across all five domains. The coefficients ranged from .63 on “Role of Evaluation” to .84 for positions 4 and 5, which is acceptable for this type of instrument.

The validity of the instrument refers to how accurately it measures the construct or constructs it was designed to measure. The validity for the LEP was addressed in three different ways: criterion-group references, concurrent validity studies, and construct validity studies. For criterion-group references, a gender-based subsample ($n=470$) was drawn from the overall sample and compared for class level and gender. No differences were found for gender, but an analysis of variance showed statistically significant differences for class level, which means the sample overall reflected a steady progression from freshmen to senior ($F(3, 466) = 3.8$).

For concurrent validity, a subsample of 215 LEP and MID scores from two institutions were correlated. The correlations were .38 ($N=51$) and .57 ($N=34$). These correlations are not surprising because the instruments use two different types of formats: The information from the MID was extrapolated from semistructured essay tasks, whereas the LEP uses objective rating and ranking scales.

For construct validity, two factor analyses were computed to investigate whether the LEP measured the underlying factor constructs that correspond to the Perry scheme and to learn whether the LEP constructs displayed a hierarchical or developmental progression. For these reasons, the oblique rotation method, which accounts for a hierarchical correlation among factors was used. The first factor analysis produced an adequacy statistic of .921, which showed that the data were appropriate for factor analysis. Four separate factors, corresponding to Perry positions 2 through 5 with eigenvalues greater than one

(12.1 to 1.7) were produced. Because the normally acceptable cutoff for producing a distinct factor is an eigenvalue of one, this analysis showed that the constructs measured by the LEP corresponded with Perry positions 2, 3, 4, and 5. The second factor analysis was conducted from a random subsample of 200 drawn from the original sample of 725 participants. The adequacy statistic for the second analysis was .607, which still showed adequacy for factor analysis. The hierarchical nature of the factors was supported by the second analysis, in which two significant factors were extracted with eigenvalues of 2.31 and 1.20 (Moore, 2000, p. 11).

Scoring

Participants rated each item on a rating scale in terms of the person's ideal learning environment, then rank the three most important items in each domain. All the items except dummy items are keyed to Perry positions 2 through 5. The answers to each item, together with the three most significant across all five content domains, produced a CCI score from 200 (stable position 2) to 500 (stable position 5) that corresponds to Perry positions 2 through 5. The index function for the LEP is based on an R index, or the percentage of position 5 (relativistic thinking) for each answer. The participant received a three-digit index score that indicates a position along the Perry scheme. The scores were interpreted as follows: 200-240: Position 2, Dualism; 241-284: Transition from Position 2 to Position 3; 285-328: Position 3, Multiplicity; 329-372: Transition from Position 3 to Position 4; 373-416: Position 4; 417-460: Transition from Position 4 to Position 5; 461-500: Position 5. Relativism.

Procedures

During the 6th and 7th weeks of Spring Semester 2007, Instructors in the Rhetoric and Composition Department of a private university in Northern California were contacted and asked to volunteer 20 to 25 minutes of their class time for the researcher or her trained assistant to administer the paper-and-pencil instruments during class time. Students were given an article to read along with the instruments should they choose not to participate. (All chose to participate.) The Learning Environment Preferences (LEP) instrument was scored by The Center for Intellectual Development. The results were then merged with the data from the researcher-designed questionnaire measuring academic engagement as defined by amount of time involved in out-of-class activities.

Restatement of Research Questions

The three research questions for this study are the following:

First, is there a relationship between out-of-class activities during the freshman year and student cognitive development as measured on an epistemological scale?

Second, does the relationship between out-of-class activities and cognitive development differ if high-school involvement is added to freshman-year involvement?

Third, does the relationship between out-of-class activities and cognitive development differ by (a) gender, (b) ethnicity, or (c) generational status?

Data Analysis

Cognitive epistemological development was measured by the Cognitive Complex Index score (CCI) on the Learning Environment Preferences (LEP) instrument. Frequency of engagement in out-of-class activities was measured by responses to number 6 on the Questionnaire of Student Engagement. A dichotomous variable “Engaged” or “Not Engaged” was created by combining data from question number 6. The “Engaged” participants were those who participated in one or more than one activity more than once per month. “Not engaged” participants were those who participated in one activity, once per month or less. Years of engagement in high school was measured by responses to question number 8 on the Questionnaire of Student Engagement, “Which years did you spend time involved in out-of-class activities?”

The following demographic variables were obtained from the Questionnaire of Student Engagement. Gender was a dichotomous variable measured by the response to question number 12. Ethnicity was measured by the responses to question number 14. Generational status in college was measured by the answers to question number 15. First generation in college was defined by responses that indicated neither parent had completed a minimum of Associates Degree. Continuing Generation in college was defined by responses that indicated at least one parent had obtained a minimum of Associates Degree. Employment status and number of hours worked were measured by the responses to questions number 4 and 5. College entrance exam scores (SAT and ACT) and high school grade point average were obtained by the responses to questions 16 through 18.

First, a Pearson product-moment correlation coefficient was obtained between the Cognitive Complexity Index (CCI) score on the Learning Environment Preferences (LEP) instrument and the degree of out-of-class involvement as measured by the Questionnaire of Student Engagement to investigate whether a relationship exists between out-of-class activities during freshman year and epistemological development. Point bi-serial correlations were obtained to investigate the relationship between the dichotomous variable of engaged and not engaged and cognitive development (CCI score). Kendall's Tau was reported to investigate the relationship between the dichotomous variable of engaged and not engaged participants and Perry position. Means and standard deviations of CCI scores were reported for study groups and clubs to investigate the relationship between engaged and not engaged participants and cognitive development.

For the second research question, frequencies and percentages for years of high-school engagement and a dichotomous variable of freshman engagement were obtained to investigate whether years of engagement in high school were related to frequency of engagement in college. Kendall's Tau was reported as a measure of association. A regression analysis was conducted to investigate whether the relationship between cognitive development and participation in out-of-class activities is mitigated by high-school involvement in addition to college involvement. A multiple correlation coefficient was reported.

For the third research question, point biserial correlations were obtained to investigate whether a relationship exists between gender and engagement in out-of-class activities and gender and cognitive development. For generational status in college, a dichotomous variable was computed for those students who

had at least one parent complete a minimum of Associates Degree (continuing-generation students) and those students whose parents did not (first generation in college students). Point biserial correlations were obtained to investigate the relationship between generational status in college, engagement, and cognitive development. For ethnicity, three groups, Asian-Americans, European-Americans, and Hispanic-Americans were analyzed using a correlation ratio to investigate whether a relationship exists between ethnicity, cognitive development and engagement in out-of-class activities.

For additional findings, student variables of hours worked, grade point average, and SAT and ACT scores were investigated. A correlation ratio was obtained to investigate whether a relationship exists between students who are employed on-campus, students who are employed off-campus, and students who are not employed and their level of engagement in out-of-class activities. A Pearson product-moment correlation coefficient was obtained for number of hours worked and CCI scores. Point bi-serial r was reported for the number of hours worked and whether students were engaged or not engaged. Kendall's Tau was obtained to investigate whether a relationship exists between number of hours worked and Perry position. To investigate the relationship of self-reported grade-point average and cognitive development, a correlation ratio was obtained. To investigate the relationship of SAT scores, ACT scores, and cognitive development, correlations were used. To investigate the relationship between SAT scores, ACT scores, and Perry position, a correlation ratio was obtained. To investigate the relationship between cognitive development and more than one year of college, a point biserial correlation coefficient was obtained.

CHAPTER IV

Results

The relationship between student engagement in out-of-class activities and cognitive development was investigated using a researcher-developed instrument to assess the amount of time spent in out-of-class activities and the Learning Environment Preferences (LEP) instrument to assess cognitive development.

The LEP consists of 65 items that measure five different content domains: view of knowledge and learning, role of the instructor, role of the student and peers, classroom atmosphere and activities, and role of evaluation and grading. Each content domain has 13 questions that describe the student's ideal learning environment. Participants received a Cognitive Complexity Index score (CCI) that correlates to Perry's (1970) epistemological scheme (Table 4).

Table 4

Frequency and Percentage of Perry Position by LEP Score

CCI score	Perry	f	%	Characteristic
200-240	2.0	0	0.0	Dualism
241-284	2.5	31	13.9	Dualism leading to multiplicity
285-328	3.0	68	30.5	Multiplicity
329-372	3.5	58	26.0	Multiplicity leading to Relativism
373-416	4.0	51	22.9	Relativism
417-460	4.5	15	6.7	Relativism leading to commitment
461-500	5.0	0	0.0	Commitment
Total		223	100.0	

Students at a private university in Northern California enrolled in second-semester writing classes were surveyed. Out of 241 responses, 18 were deleted for incomplete data; 223 (93%) complete questionnaires were used in the study.

Figure 1 represents the distribution of scores as they relate to Perry's epistemological scale. There were no students who scored at position 2.

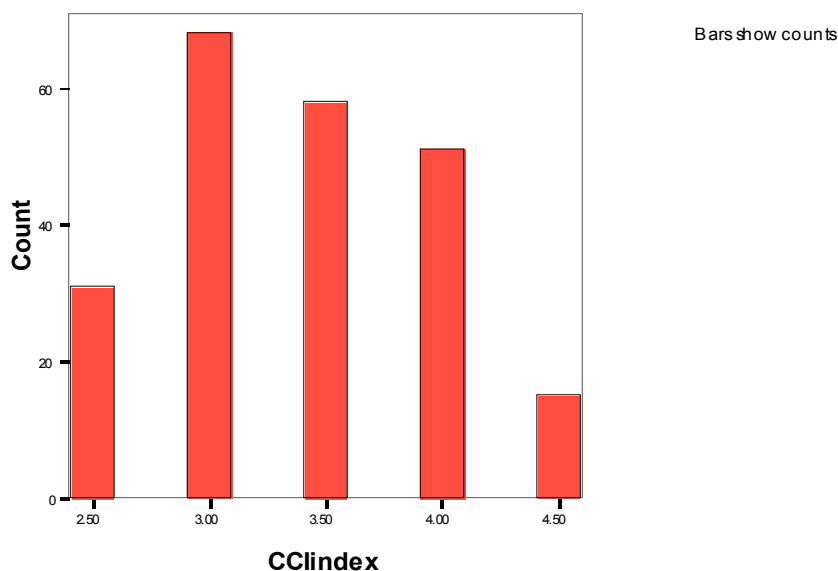


Figure 1. Distribution of CCI Scores According to Perry Position for 223 Students in Study.

Not surprisingly, the most frequent scores occurred at the 3.0 and 3.5 levels.

Very few participants scored above Perry position 4. This distribution means that the majority of the sample scored in the Multiplicity range of Perry position, a position consistent with Perry's original model of freshman perceptions of knowledge. Individuals who are in the Multiplicity position acknowledge the existence of some uncertainty in the world but still believe that all reality is directly knowable and that knowledge comes from an external source. Things that are not yet known will become known in time. It is not until Position 5, Relativism, that individuals begin to perceive knowledge as generated by the human mind and as uncertain.

Research Question One

Is there a relationship between out-of-class activities during the freshman year and student cognitive development as measured on an epistemological scale?

Correlations were obtained to assess the degree of relationship between frequency of engagement in out-of-class activities and the composite score (CCI) on the Learning Environment Preferences instrument. A Pearson product-moment correlation coefficient was obtained. The correlation coefficient is not statistically significant ($r=.07$).

Frequencies were computed to investigate total hours spent in out-of-class activities. Results showed that 19 students participated in no activities and 37 students reported participating in one activity once per month. These groups were combined to form group 1, "not engaged" ($n=56$). Group 2, "engaged," consisted of students who reported being engaged in one activity more than once per month or more than one out-of-class activity ($n=167$). The relationship between students who are engaged those who are not engaged and CCI score was investigated. Point biserial correlation coefficient is .06. The relationship between groups of engagement with Perry position was investigated using Kendall's Tau. The relationship between groups of engagement in out-of-class activities and Perry position did not reach statistical significance. See Table 5.

Frequencies were obtained for each separate activity in question #6 on the Questionnaire of Student Engagement to investigate which activities had the most student engagement. The category of "other" was not analyzed because there was an insufficient number of responses under any one category for an

analysis. Write-in answers included sports, performance, or campus events. An

Table 5

Frequency of Engagement in Out-of-Class Activities and Perry Position

Engagement	Perry Position					Total
	2.5	3.0	3.5	4.0	4.5	
Not Engaged	11	16	13	12	4	56
Engaged	20	52	45	39	11	167
Total	31	68	58	51	15	223

Kendall's Tau=.05. Not statistically significant.

inspection of the frequency of responses to question #6 (out-of-class activities) revealed that only two activities, study groups and clubs, included 50% or more participants. Point biserial correlations were obtained for these two activities to investigate if there was a relationship between participation or lack of participation in study groups and clubs and CCI scores. Neither result showed statistical significance (Table 6).

Table 6

CCI Means, Standard Deviations, and Point Biserial Correlation Coefficient for Study Groups and Clubs

Variable	Not Engaged (n=56)		Engaged (n=167)		Point Biserial r
	Mean	SD	Mean	SD	
	Study Groups				
CCI	341.67	48.68	341.47	49.36	.07
	Clubs				
CCI	341.01	50.08	342.97	46.04	.05

Research Question Two

Does the relationship between out-of-class activities and cognitive development differ if high-school involvement is added to freshman-year involvement?

Frequencies were obtained to investigate whether students who were engaged in high school also were engaged in college. Kendall Tau of .05 was reported to investigate whether there is a relationship between frequency of engagement out-of-class activities in high school and engagement in out-of-class activities in college. This analysis suggests that there is not a statistically significant relationship between engagement in high school and engagement in college (Table 7).

A regression analysis was conducted to investigate years of high-school involvement combined with frequency of college involvement for predicting CCI scores. When high-school engagement was added to freshman-year engagement, the relationship between student engagement and cognitive development improved but did not reach statistical significance.

Table 7

Frequency of Years of High-School Engagement Broken Down by Frequency of Freshman Engagement

Years of HS Engagement		Not Engaged	Engaged	Total	
1	Frequency	7	11	18	
	%	39	61	100	
2	Frequency	4	20	24	
	%	17	83	100	
3	Frequency	7	15	22	
	%	32	68	100	
4	Frequency	37	119	156	
	%	24	76	100	
Total		55	165	220	
		%	25	75	100

Kendall's Tau b = .05. Not statistically significant.

The multiple correlation coefficient R accounted for an additional 7% of the variation in CCI scores (Table 8). In other words, students who participated in out-of-class activities both in high school and in college scored higher on the

Learning Environment Preferences(LEP) instrument than students who did not participate in both high school and college.

Table 8

Regression Analysis for High-School and College Out-of-Class Activities Predicting CCI Scores (n=223)

Variable	Source	SS	Df	MS	F	Sig	R
College Activities And CCI	Regression	2498.19	1	2498.19	1.05	.31	.07
	Residual	526857.67	221				
	Total	529355.87	222				
High School/ College Activities and CCI	Regression	10044.64	2	5022.32	2.14	.12	.14
	Residual	508187.56	217	2341.88			
	Total		219				

Although this difference did not reach statistical significance, the higher scores might be related to the additional years of peer interaction students had while in high school.

Research Question Three

Does the relationship between out-of-class activities and cognitive development differ by (a) gender, (b) ethnicity, or (c) generational status in college? For gender differences, frequencies were computed to investigate the percentage of males and females in the sample. Males comprised 30.5% (n=68) and females comprised 69.5% of the sample (n=155).

Point biserial correlation coefficients were obtained to investigate whether a relationship exists between gender and frequency of engagement (OOC) and gender and cognitive development (CCI). (See Table 9 and Figures 2 and 3).

Table 9

Point Biserial Correlations, Means, and Standard Deviations for Engagement and Cognitive Development by Gender

Variable	Males (n=68)		Females (n=155)		Point biserial r
	Mean	SD	Mean	SD	
OOC	4.38	3.29	4.12	3.13	.04
CCI	339.40	47.96	342.55	49.33	-.03

Neither result was statistically significant, which suggests that males and females in this sample did not differ in their frequency of engagement in out-of-class activities or in their level of cognitive development.

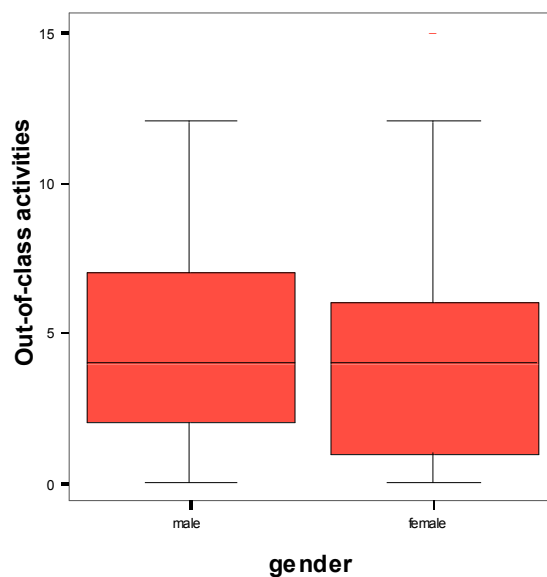


Figure 2. Frequency of Engagement by Gender

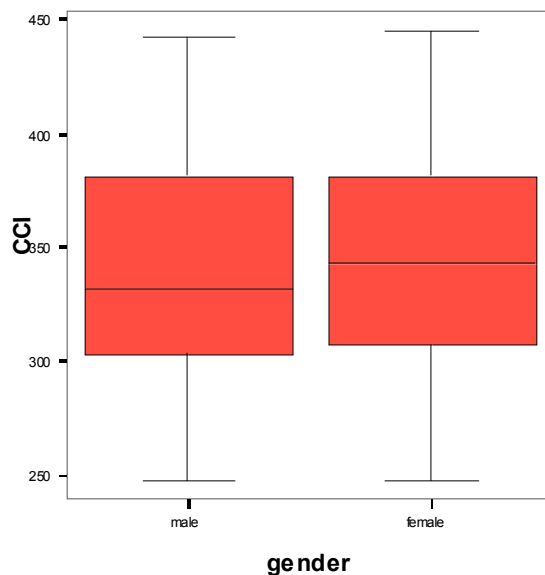


Figure 3. Level of Cognitive Development by Gender

For ethnicity, three groups were identified as having large enough sample size for analysis: Asian-American, European-American, and Hispanic-American. All other ethnicities had sample values that were too small for comparison purposes and were excluded from the analysis. A correlation ratio (eta, a strength-of-association index) was obtained to investigate whether there is a relationship between ethnicity and cognitive development (CCI) or academic engagement (OOC). The results did not show a statistically significant difference among the three groups for either cognitive development or academic engagement (Table 10).

For college generational status, a dichotomous variable was computed from question #15, "What was the highest grade your parents completed? Check one line for each parent." Students who reported both parents as not having completed a minimum of Associates Degree, were coded 0. All other students

Table 10

Means, Standard Deviations, and Correlation Ratios for Engagement and Cognitive Development by Ethnicity

Variable	Asian (n=53)		European (n=90)		Hispanic (n=30)		eta
	Mean	SD	Mean	SD	Mean	SD	
OOC	4.11	3.57	3.93	2.98	4.27	3.24	.04
CCI	337.57	46.01	350.40	50.29	341.50	51.13	.12

were coded 1. No distinction was made for whether the mother or father had completed the degree. Point biserial correlations were obtained to investigate if there was a relationship between generational status in college and frequency of out-of-class activities (OOO) and between generation status in college and cognitive development (CCI) (Table 11). No statistically significant differences were found for generational status in college and student engagement or for generational status in college and cognitive development.

Other Findings

In addition to the research questions, student variables of hours worked, grade point average, Scholastic Aptitude Test (SAT) and American College Test

Table 11

Point Biserial Correlations, Means, and Standard Deviations for Engagement and Cognitive Development by College Generation

Variable	First Generation (n=56)		Not First Generation (n=167)		Point biserial
	Mean	SD	Mean	SD	
OOO	4.20	3.34	4.20	3.12	.00
CCI	333.09	43.68	344.44	50.24	.10

(ACT) scores, and academic year were investigated for relationships between student characteristics, engagement in out-of-class activities, and cognitive development. Student residence was not included because 89% of the sample lived in the dormitory, 3% lived in a living-learning community, and 8% lived off-campus. Therefore, there was not enough variation in the sample for analysis.

To investigate whether a relationship exists between employment status (whether students were employed on campus, off campus, or not employed) and engagement in out-of-class activities, the correlation ratio of .21 was obtained. The result was not significant. Correlations were obtained to investigate whether a relationship exists between the number of hours worked and the frequency of engagement in out-of-class activities. The correlation coefficient was -.06. A subsequent correlation coefficient was obtained for a dichotomous variable engagement (engaged or not engaged) and hours worked. The point biserial coefficient was -.05. These results suggest that students' employment status or how many hours they work is not associated with how often they engage in out-of-class activities.

Correlations were obtained to investigate whether a relationship exists between number of hours worked and cognitive development. Pearson product-moment correlation coefficient is .14. The result is not statistically significant. For number of hours worked and Perry position, Kendall's tau was reported (Table 12).

A final correlation was obtained for a dichotomous variable of employed or not employed and ethnicity to investigate whether there is a relationship between ethnicity and work status. A point bi-serial correlation coefficient of -.02 was obtained which was not significant. This result suggests that for this sample,

there is no relationship between ethnicity and whether a participant works or not.

Table 12
Number of Hours Worked and Perry Position

Hours worked	2.5	3	3.5	4	4.5	Total
1-5	3	12	6	2	2	25
6-10	3	10	6	15	3	37
11-15	1	7	3	6	1	18
16-20	1	3	5	3	2	14
Over 20	1	2	4	3	1	11
Total	9	34	24	29	9	105

Kendall's Tau=.13. Not statistically significant.

In order to investigate whether a relationship exists between student-reported grade point average and Perry Position, the correlation ratio .40 was obtained (Figure 4). Two hundred out of 223 (90%) students reported grade point averages. This result suggests that there is a relationship between grade point average and cognitive development and gives credibility to the model of cognitive epistemological development as defined by Perry (1970) and others.

For self-reported SAT and ACT composite scores, fewer cases were reported, which makes the data less reliable. For SAT scores, 82 out of 223 (37%) students reported data. Correlations were obtained to investigate the relationship between SAT scores and Cognitive Complex Index score (CCI). The Pearson product-moment correlation coefficient is .32, which is statistically significant ($p \leq .01$).

For the relationship between SAT scores and Perry position, a correlation ratio of .71 was obtained, which is statistically significant at the .05 level and a large practical effect. This result suggests that there is strong relationship between SAT scores and level of cognitive development (Figure 5).

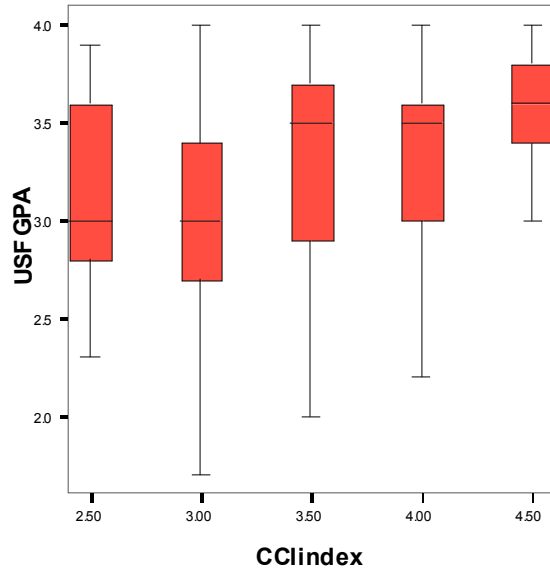


Figure 4. Relationship of Grade Point Average to Perry Position.

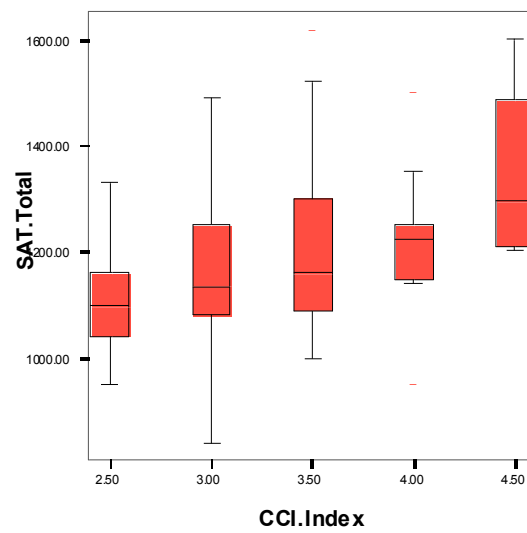


Figure 5. SAT Scores and Perry Position

For ACT composite scores, 67 out of 223 (30%) students reported data. The correlations for ACT scores and CCI scores were not as strong as those for SAT scores. The Pearson product-moment correlation coefficient is .23, which is not statistically significant. The SAT is described as a general aptitude test that measures critical thinking skills, and the ACT is described as a curriculum-based assessment of English, mathematics, and science skills; consequently, ACT and SAT scores should correlate positively with CCI scores. The ACT scores, designed to measure achievement in specific subject areas, whereas SAT scores are designed to measure overall thinking and reasoning ability. The difference between scores for a specific skill set and scores for general reasoning ability and critical thinking may account for the stronger correlation of SAT scores with CCI scores.

The sample contained 10 students who were sophomores 5 students who were juniors, and 5 students who were seniors. These groups were combined to form one group called “upperclassmen.” (Some students take their writing requirement after their freshman year.) A point biserial correlation coefficient was obtained to investigate the relationship between freshmen and upperclassmen and CCI. The result was not significant (Table 13).

Table 13

CCI Means, Standard Deviations, and Point Biserial Correlation Coefficient For Freshman and Upperclassmen

Variable	Freshmen (n=202)		Upperclassmen (n=20)		Point biserial
	Mean	SD	Mean	SD	
CCI	341.91	48.83	338.52	49.96	-.02

Summary

This section provides a summary of the results of the study. None of the major research questions were supported by the analysis. Frequency of engagement in out-of-class activities did not show a statistically significant relationship to cognitive development as measured by the Learning Environment Preferences instrument. When years of high-school engagement in out-of-class activities were added to freshman engagement, the relationship between student engagement and cognitive development improved but still did not reach statistical significance. No statistically significant differences were found for the relationship between student variables of gender, ethnicity, and college generational status in college and the frequency of out-of-class activities or cognitive development.

Additionally, no relationship was found for work, whether on- or off-campus, engagement in out-of-class activities, or cognitive development. There was a small but statistically significant relationship between self-reported grade point average and cognitive development and a large statistically significant relationship between SAT scores and cognitive development. No statistically significant relationship was found for cognitive development and academic standing.

CHAPTER V

Summary, Discussion, Recommendations, and Conclusions

This chapter presents a summary of the study, an overview of the research, limitations, a discussion of the findings, suggestions for future research, implications, and conclusions.

Summary of the Study

The primary purpose of this study was to investigate the relationship of freshman student engagement in out-of-class activities and cognitive development as measured on an epistemological scale. The second purpose of this study was to investigate whether cognitive epistemological development differs if high-school engagement is combined with college engagement in out-of-class activities. A third purpose of this study was to investigate whether the relationship between engagement in out-of-class activities during the freshman year and cognitive epistemological development differs by gender, ethnicity, or generational status in college.

A convenience sample of 241 students enrolled in 20 sections of second-semester Rhetoric and Composition classes were given two instruments. One instrument was a questionnaire regarding their level of engagement in out-of-class activities during their freshman year. Demographic information such as age, gender, ethnicity, parents' education, and residence was included on the questionnaire. The second instrument, Learning Environment Preferences (LEP), was designed to assess the participants' cognitive development, also known as the Perry Position along an epistemological scale. Correlations were obtained on a final sample of 223 responses to investigate whether students who engaged in out-of-class activities scored higher on the LEP than those who were not

engaged. No statistically significant relationship was found for engagement in out-of-class activities during freshman year and level of cognitive development. No statistically significant relationship was found for years of high-school engagement combined with freshman engagement and level of cognitive development, although years of high-school engagement did account for an additional 7% of the variation in Cognitive Complexity Index (CCI) scores. No relationship was found for gender, ethnicity, or generational status in college, either for level of engagement or for cognitive development. A statistically significant positive relationship was found for self-reported grade-point average and cognitive development and for Scholastic Aptitude Tests (SAT) scores and cognitive development. No relationship was found for American College Test (ACT) and cognitive development.

Overview of the Research

Extensive research (Pascarella & Terenzini, 2005) has suggested that student entering characteristics, such as high-school achievement and socioeconomic status, have a large influence on student success in college. There is, however, evidence to support the effects of the contextual influences of a college environment on student success as well. Astin's (1984) theory of student involvement claims that once a student arrives on campus, the choices the student makes influence how well he or she integrates into college life. Student engagement with other students outside of class encourages successful learning behavior that promotes achievement and leads to satisfaction with the educational experience (Kuh, 2003). Because of the interest of Academic Affairs professionals in promoting academic integration, researchers have begun to explore how students' interactions on campus impact their learning experience.

Cognitive structural theorists explore how people interpret their experiences and integrate new concepts to which they are exposed. William Perry's (1970) theory of epistemological development has spawned 30 years of research that has investigated students' views of knowledge and learning and informed the work of academic- and student-affairs professionals (Baxter-Magolda, 1989; Moore, 1987; Schommer, 1990; Terenzini, Pascarella & Blimling, 1996). Understanding this process of interpretation and integration of knowledge can enhance student's educational experiences both inside and outside the classroom (Hofer & Pintrich, 2002).

Limitations

There are several limitations to this study. The first limitation is that Perry's original study was modeled on 4 years of university experience. Students engaged in out-of-class experiences for one year may not have had sufficient time to process and accommodate new ways of thinking into their cognitive scheme. The current data were collected before spring break during the 6th and 7th weeks of second semester. Cognitive development has been shown to take place over a period of time as students experience integrating new information into what they already know (Perry, 1970). Freshmen students engaged in out-of-class activities may be in the process of redefining their concept of knowledge and knowing, but typically are not capable of contextualizing knowledge from a Relativistic position until their third or fourth year in college. Therefore, students engaged in out-of-class activities, although benefiting from the experience, may not demonstrate a measurable difference in Perry position until much later in their college careers.

Another limitation is that this study accounts only for frequency of student engagement in activities and not for the specific contributions students may make within a particular activity (for example, attending a meeting versus presiding over a meeting). Opportunity for leadership has been shown to have a strong relationship to student development and may make a greater impact than passive participation (Arminio & Loflin, 2003). The instrumentation in this study was suitable for surveying a large number of students but did not allow for students to elaborate on the quality or intensity of their participation.

A third limitation is that the original Perry Scheme was conducted on White, male, Harvard students who may not be representative of the 21st-century college population. The participants in this study were 70% women and 30% men; only 40% identified themselves as White or European American. The issue of gender has been addressed in the literature (Belenky, Clinchy, Goldberger, & Tarule, 1973; Moore, 1989). Belenky et al. used an interview protocol based on Perry's study to investigate the cognitive development in women from different socioeconomic status (SES) populations. Her results suggested that cognitive development in women follows a progression related to but not the same as the positions described by Perry. Results for the LEP validity showed no differences for gender (Moore, 2000). Some studies have suggested that cognitive development may follow a different pattern for students from other cultures (Zhang, 2004). Potential cultural bias and difficulty in English language comprehension in this study have been controlled for by excluding international students from the sample.

Finally, the sample used in this study may not be representative of students in other types of higher education. The participants for this study were

taken from a private 4-year religious-affiliated university in the San Francisco Bay area. Students are required to live on campus during their first year unless a parent or guardian lives in the area. Only 8% of the sample reported living off-campus, and roughly half reported they were not employed either on or off campus. In addition, 94% of the sample reported being 19 or younger. These findings may not be generalizable to a community-college or commuter-school population, where a significant number of students may be older, have families, and work full-time.

Discussion

The scores for cognitive development in this sample ranged from 247 to 445. The mean Cognitive Complexity Index (CCI) score for freshmen participants in this study was 341.91, which indicates a midrange Perry position of beginning multiplicity. Students are beginning to become aware of the uncertainty of knowledge, but still view multiple opinions as legitimate only until the correct answer is found. These results suggest there is still room for growth in cognitive development. As students broaden their perspectives of their roles as learners, they have more resources to think critically and deeply. How students view knowledge and integrate information into their existing schemas according to Perry position are shown in Table 14.

Previous research has suggested that student culture has an important effect on the quality of college experience. Student interactions with other students create the climate and culture of an institution, which in turn, affect students' perceptions of their work, their purpose in college, and their professional and personal goals for the future (Kuh & Whitt, 1988).

Table 14
Levels of Epistemological Understanding

Level	Assertions	Reality	Knowledge	Critical Thinking
Dualism	Assertions are copies of an external reality	Reality is directly knowable	Knowledge comes from external source	Critical thinking is unnecessary because answers come from Authority
Multiplicity	Assertions are facts that are correct or incorrect in their representation of reality	Reality is directly knowable	Knowledge comes from external source	Critical thinking is a vehicle for comparing assertions to reality and determining their accuracy
Relativism	Assertions are opinions freely chosen by and accountable only to their owners.	Reality is not directly knowable	Knowledge is generated by human minds and is uncertain	Critical thinking is irrelevant because everyone is entitled to his or her own opinion
Commitment to Relativism	Assertions are judgments that can be evaluated according to a set of criteria	Reality is not directly knowable	Knowledge is generated by human minds and is uncertain	Critical thinking is valued as a vehicle to understanding and sound judgment

Note. Adapted from Kuhn and Weinstock (2002)

For research question 1, no relationship was found between student engagement in organized activities that require communication and collaboration skills and Cognitive Complex Index (CCI) scores. These findings are not consistent with the body of research on campus culture and critical thinking (Gellin, 2003; Pascarella, 1989; Tsui, 2000). Because both critical thinking and epistemological development have been described as problem-solving, reasoning, and integrating information, studies that involve the construct of critical thinking should be relevant for investigating cognitive epistemological development. Gellin's (2003) meta-analysis showed a .14 effect gain in critical thinking for overall involvement. The term "involvement" in Gellin's meta-analysis, however, did not specify the length of time students were engaged in out-of-class activities.

According to Hofer (2002), the trajectory of epistemological development typically moves from a dualistic to a multiplistic point of view as the knower begins to realize the relative merits of different positions that can be supported with evidence. One might term this movement a broadening of perspective. The advanced stage, in most epistemological models, characterizes the knower as reconciling objective and subjective aspects of knowing. The knower becomes increasingly aware that knowledge is self-constructed and continuously evolving. The students in this sample were enrolled in freshman writing classes that are designed to promote critical thinking and argumentation skills, but in order to develop measurable progress in these skills, students may need more time than two semesters.

In Perry's (1970) original study, he described freshman students in his study as going through a period of transition from a dualistic framework (Positions 2-3) to a multiplistic framework (Positions 3-4) as they struggle to integrate new ways of thinking into their existing schema. They find themselves in a conundrum, however, because, in receiving a liberal education, they are learning to critically think for themselves. But they are in the process of learning this skill from an "Authority," whom they still consider to hold the answers. The likely response to this situation is either opposition or adherence to authority. Ironically, students who adhere to authority at this stage of development are more likely to learn the skills of critical thinking needed for independent thought whereas those who oppose authority, thinking they are fighting for independence, "pit themselves over and against the enemy within the very dualistic structure which they perceive Authority to be imposing on them" (p. 96). This process of learning how to think independently within the

parameters of a specific context and then applying those skills and knowledge to other contexts beyond the classroom is a complex process that students experience over the course of their education.

In Perry's interviews, freshmen students speaking from a dualistic point of reference (Position 2-3), expressed a desire to obtain "knowledge" from the Authority. Statements such as "If teachers would stick more to the facts and do less theorizing" (p. 67), and "I'm interested in more about what the *real* things in history are . . . what the *real* causes are" (p. 74) indicate a belief in a "knowable Truth."

As students struggle through the process of learning how to interpret their experiences, they become less certain about the nature of knowledge. Below are some excerpts from Perry's interviews that illustrate students' struggles with this process. The first is a sophomore student assessed as speaking from Position 4. The student recognizes the possibility of independent thought within the context of Authority:

But if you try to use the approach the course outlines, then you find yourself thinking in *complex terms*: weighing more than one factor in trying to develop your own opinion. Somehow, for me, just doing that has become extended beyond the courses. (p. 100)

Another student describes how he realized that the process of thinking takes precedence over finding the "answer":

Finally I came to realize about the middle of the second term that they were trying to get you to look at something in a complex way and to try to weigh more factors than one, and talk about things in a concrete manner. (p. 101)

In making the transition from early to late stage in Multiplicity, students found a new sense of community and a genuine sharing of ideas with peers. At Position 4 moving to Position 5, there is a recognition that "Authority" is struggling with

questions and answers as well. “Authority” no longer is defined by one who “knows” fixed truths, but as one who simply has more experience in exploration for knowledge. This realization transforms the ideal of Authority to authority, and this new realization opens up the possibility of a community of learners among peers and authorities:

The college here is a place where your ideas are questioned . . . I think this is an experience which . . . makes you question these old values. It’s hard here, but you have advantages too which partly make up for it. You have other people going through somewhat the same experience, really intelligent people who have similar interests . . . a community somewhat like yourself, and that makes it easier in a way. (pp. 121-122)

Perry explained that the discovery of the legitimacy of different frames of reference is freeing to the student at first and brings a new sense of power. The student now can “think about thought”: talk intelligently about frames of reference, identify unsupported assumptions, and evaluate the effectiveness of different interpretations of data. There is, however, an uncertainty and a sense of responsibility that comes with this new freedom. Upperclassmen in Perry’s study looked back on their transformation of thought that occurred over 4 years of study and provided the researchers with some insight as to how this transformation took place:

I think more recently I have been less certain. When I rejected things [freshman year], it was very strong . . . My position has become much more relative than what it was. I don’t think I had doubts as a freshman when I made a decision, and now I have. (p. 173)

The same student later in the interview talked about how he had come to view other students who hold different values than himself:

I think as a freshman, it would have been much easier for me to reject these people than it is now, with much less lingering doubt. It would not have been at all possible for me as a freshman to set these people up and compare them to other people. All this comparing, of course, makes final

decisions more difficult. The more you compare things, the more difficult decisions become and, the less sure you are of any right and wrong.
(p. 174)

It is from this uncertainty of absolute right and wrong answers that the individual student must find his or her own way if he or she is to progress to the later stages of Commitment with Relativism in Positions 7, 8, and 9.

Progression to the later stages of the Perry scheme comes with age, education, and maturity and is beyond the scope of the current study, but reflecting on students' accounts of their initial perceptions and how these perceptions gradually matured as students were exposed to classes, peers, and faculty, one can postulate that exposure to out-of-class activities does contribute to the overall cognitive development of freshmen even though it was not measurable in the current study after one and a half semesters.

For question 2, although 71% of the students in this study reported having been engaged in activities all 4 years of high school, no relationship was found between the amount of engagement in high school and the amount of engagement in college (see Table 6 in Chapter 4). This finding is consistent with Fredricks, Bloomfield, and Paris (2004), who defined student engagement as a multidimensional construct that unites behavior, emotion, and cognition. Students engage in school activities for a variety of reasons that may change over time. Student engagement in high-school activities does not predict necessarily student engagement in college activities. Marks and Jones (2004) investigated factors that influenced continued participation in community service for high school and college students. They conducted a secondary analysis of the NELS:88 database in its first, second, and third follow-ups. Their final sample of 6,491 members revealed several factors that influenced whether students who

volunteer for community service in high school continued volunteerism in college. Among the factors that contributed to students not continuing to volunteer were financial concerns in college and the reason for participation in high school. If students were required to volunteer in high school, they were less likely to participate in college. Students who were encouraged but not required to participate in high school, however, were less likely to drop participation in college. The researchers posited that coerced volunteerism may undermine the desire to volunteer whereas encouragement may promote students' good will while allowing them to make choices for themselves. Marks and Jones also found that having attended a Roman Catholic high school decreased chances of students volunteering in college, possibly because of the higher level of volunteer service required in Roman Catholic high schools. Although this study investigated factors affecting continuing volunteerism for community service from high school to college, these factors also may help explain continuing participation in other out-of-class activities.

For the relationship of high-school engagement combined with college engagement as it affects cognitive development, the result was not statistically significant. Even though the result was not statistically significant, the direction of this finding is consistent with Inman and Pascarella (1998) and Whitt, Nora, Edison, Terenzini, and Pascarella (1999). Both studies concluded that participation in out-of-class activities can contribute to cognitive development over time.

Additionally, other factors may confound the cognitive development of students in high school as defined by the Perry scheme. High-school students are still in the process of maturing physically, emotionally, and mentally and live

under the authority of parents. Part of the progression of cognitive epistemological development of students in college is for individuals to begin to question the “Authority” of experts in order to develop their own intellectual identities within a relative world. Students in high school may not be ready for all of these changes until college, which does not mean, however, that they do not benefit from out-of-class activities in terms of learning collaboration and communication skills.

For question 3, no statistically significant relationship was found for gender, ethnicity, or college generational status and either cognitive development or out-of-class engagement. The results for gender and student engagement are not consistent with Berger and Milem (1999), who conducted a longitudinal study of 1,343 freshman students at a private, residential university. Using a multivariate analysis of data from three survey instruments (the Student Information Form, the Early Collegiate Experiences Survey, and the Freshman Year Survey), the researchers found by the end of the Fall semester, females were more likely to interact with peers outside of class ($\beta=.15$). The results for gender are, however, consistent with Whitt, Edison, Pascarella, Nora, and Terenzini (1999) who, in a study involving 3,840 first-year students from 23 institutions, found no differences by gender for peer interactions and critical thinking. A later study by Whitt, Pascarella, Elkins Nesheim, Marth, and Pierson (2003) investigated gender differences of 1,038 students from 18 four-year institutions over a period of four years. This later study showed no differences by gender for out-of-class interactions on critical-thinking skills in the first year, but there were differences by gender in critical-thinking skills by the third year. The sample in

this study was 70% female and 30% male, which also could have affected the results because females outnumbered males 3 to 1.

The results for ethnicity are not consistent with several studies on ethnicity and academic integration. Although much of the research on ethnic differences in social and academic integration has focused on African American students (Berger & Milem, 1999; Caldwell, 2003), research on Mexican American students (Attinasi, 1989) and Asian and Latino students (Morley, 2003; Strage, 1999) has revealed differences in minorities for the effects of peer interaction. The results are consistent with Kuh (1995), however, who concluded that “race and ethnicity do not explain differences in undergraduate activities and outcomes. “What matters most is what one does with one’s time outside of class” (p. 146). No relationship was found for the variables of ethnicity and work status, which is not consistent with previous studies that suggest minorities and first generation students are more likely to be employed while attending college (Lofink & Paulson, 2005; Pike & Kuh, 2005).

The findings for generational status in college, as it relates to student engagement, are not consistent with Pike and Kuh (2005) who in a secondary analysis of 500 College Student Experiences Questionnaires (CSEQ) from six institutions found that first generation in college students reported significantly lower levels of academic and social engagement than second-generation students. The researchers defined “first-generation” as students from families in which neither parent had earned a baccalaureate degree. In this study, “first college generation” was defined as neither parent having earned at least an Associates Degree. Roughly one quarter of the students were classified under this category.

This study found no statistically significant differences for work status (whether students were employed on campus, off campus, or not at all) or number of hours worked and either cognitive development or amount of student engagement. According to Terenzini, Pascarella, and Blimling (1996), the literature on the effects of student employment reported mixed results. Two studies (Hood 1984; Pascarella, Bohr, Nora, Desler, & Zusman, 1994) found no relationship between work experience and gains in cognitive complexity or critical thinking. Astin (1993b), however, found full- and part-time work off-campus had a negative effect on grade-point average, but part-time work on-campus had a positive effect on all areas of self-reported cognitive growth.

A statistically significant relationship was found for grade-point average and cognitive development. This finding supports cognitive epistemological development as an educational construct. Moore (2001) argued that epistemological development continues to reflect a critical dimension in understanding the process of learning and student approaches to learning. When students develop a more situated and connected perspective of their learning, the broader resources they have to draw from for any individual subject may be reflected in higher grades.

A statistically significant relationship also was found for SAT scores and cognitive development. The result is consistent with DeBerard, Spielman, and Julka (2004) who reported SAT scores as a significant predictor variable for first-year grade-point-average and for retention. SAT scores, however, may only be relevant as a predictor for first-year achievement in college. Pascarella and Terenzini (2005) reported that in an analysis of 200 four-year universities, the average SAT or ACT score had little or no relationship to seniors' scores on the

Graduate Record Exam, the Medical College Admissions Test, the Law School Admissions Test, and the National Teachers Examination. No statistically significant relationship was found for ACT scores and cognitive development. This result is not consistent with the literature for ACT scores as a predictor of freshman achievement and retention (Gifford, Briceno-Perriott, & Mianzo, 2006). The weaker relationship between ACT and cognitive development may be explained by the design of the ACT, which targets curriculum-based knowledge and not overall thinking ability.

In conclusion, no measurable relationship was found for the three major research questions posed for the study. Other findings did show a relationship between cognitive development and grade point average and cognitive development and SAT scores, which lends credibility to the construct of cognitive development. Possible reasons for the lack of relationship found for engagement in out-of-class activities and cognitive development include the short length of time students had to develop a measurable difference in their cognitive development (CCI) score, the limitations of the Questionnaire of Student Engagement, which did not ask students to describe the type and degree of their engagement (for example, member versus leader of a club), and the convenience sample from a private Jesuit university used in the current study, whose students may be more homogenous in their experience of academic engagement than a sample population at a public university.

Recommendations for Future Research

Perry's (1970) epistemological scale was based on an analysis of student perceptions over a period of 4 years of education. Measurable differences in

cognitive development may be apparent in a longitudinal study covering two or more years.

This study measured frequency of engagement in out-of-class activities but did not take into account the type of participation in which students were engaged. Measurable differences in cognitive development may be apparent in students who hold leadership positions or positions with more responsibility. Qualitative studies can provide richer details about subjects and complement quantitative studies. This study did not ask students what they did outside of class. More complete information can be obtained by soliciting from students how they spend their time and at what level they participate.

This study did not investigate how out-of-class activities may affect the cognitive development of international students. Student epistemology may have cultural differences (Yang, 2005). Additionally, student reasoning may vary in different disciplines (Pintrich, 2002). Cognitive epistemological development in science, literature, and other areas needs to be investigated. Finally, the relationship of cognitive development and retention needs to be explored. Retention research has primarily focused on the value of out-of-class engagement (Astin, 1993b; Cabrera, Castaneda, Nora, & Hengstler, 1992; Peltier, Laden, & Matranga, 1999; Tinto, 1988) but no studies have explored cognitive development as a factor in retention.

Implications

This study did not find a relationship between student engagement in the first year and students' epistemological development; however, universities nationwide are realizing the need to promote more integration and communication between disciplines, departments, faculty, students, and

community in order to prepare students to become informed and responsible citizens in an increasing complex and unstable world. Under the “Learning Paradigm” (as opposed to the “Instruction Paradigm”), Barr and Tagg (1995) explained knowledge as an “interacting of frameworks” and learning occurs when students use those frameworks to understand and act. The Learning Paradigm is based on a constructivist notion that calls for active, student-centered activities that promote teamwork and collaboration. When students engage in fractured, decontextualized instruction, learning is dependent upon contextual cues provided by the instructor and disappears when those cues are no longer present (Barr & Tagg, 1995). Students need a way to actively implement skills among a variety of contexts in a meaningful way. By rethinking the instructional paradigm and integrating campus instructional resources in new and innovative ways, education professionals can help students integrate learning and practice.

Harvard University, in their new general-education curriculum (the first complete revision in 30 years), called for an activity-based learning initiative for linking extra-curricular activities to classroom experience. This report highlights the importance of exposing students to different frameworks from which they can view and understand the connections between cultural, governmental, and economic forces. Instead of learning a discrete body of knowledge (or canon), the emphasis in Harvard’s general-education curriculum has shifted to learning how to think in different contexts, being exposed to a wide range of material, and learning how to apply the principals of what students learn inside the classroom outside the classroom (Kosslyn et al., 2007).

Other reports from research universities (The Boyer Commission on Educating Undergraduates in the Research University, 1998) and state universities (The Kellogg Commission on the Future of State and Land Grant Universities, 1998) have expressed similar goals for universities to institute and promote change. The Kellogg Commission recommended creating greater connections between the university and the community by instituting service-learning courses, learning communities, and university-community partnerships that would prepare students to lead and participate in a democratic society. The Boyer Commission also emphasized collaborative projects, effective communication skills, and learning environments outside the classroom so that students can profit from different approaches to the same issues. All these recommendations reflect a shift toward the “Learning Paradigm” in which students are encouraged to interact with subject material, faculty, community, and each other. The shift from “what to know” to “how to think” is essential in order to prepare students for the future.

Speaking at a the Internet and E-Business Conference and Expo held in New York in 2001, founder and CEO of J. D. Edwards, Edward McVaney introduced the new vision for his company with the phrase “collaborate or die.” McVaney pointed out that with intellectual capital and knowledge management as key components in today’s business world, businesses that do not communicate and collaborate, both internally among employees and externally, among partners and clients, are doomed to extinction (Portnoy, 2001).

The dramatic changes in university students since the 1980s is likely to challenge universities to think in new ways to accommodate them. According to Pascarella and Terenzini (1998), from 1984 to 1994, the total number of European-

American students rose by 5.1%, whereas the number of minority students increased by 61% in the same amount of time. By 1993, more than 40% of undergraduates were over the age of 25, and 46% of all full-time students ages 18 to 24 were employed with more than half this number working 20 hours per week or more. By 1996, almost 43% of all undergraduates were part-time students. The increasingly diverse and complex lives of today's students may in some way explain the results of Kuh's (1999) study of multiple national databases about the undergraduate experience from the 1960s to 1990s. The study showed students reporting substantially less progress in [some] areas traditionally considered the domain of general education since 1969. These areas included appreciation and understanding of literature (-37%), the arts (-43%), and science (-10%). Also reported were declines since the 1980s in awareness of different cultures (-8%), personal development (-6%), and values development (-5%). In addition, time students spend on their studies also has decreased an average of 7% from 1985 to 1998. In 1998, only about a third of the full-time respondents devoted 40 hours per week to academics. These findings corroborated a "diminished effect pattern" across all types of institutions that showed a 10% decline in students who said they "frequently" or "very often" integrated ideas from different classes or thought about practical applications of their studies (Kuh, 1999). These numbers show a disturbing trend toward disengagement of students who, perhaps, are struggling with competing responsibilities. According to Kuh (1999), "opportunities for serendipitous campus-based learning beyond the classroom is substantially attenuated for the majority of undergraduates today" (p. 116).

Universities must realize that challenges to student success need to be met with a collective, collaborative response from all institutional components if students are to be prepared to function in a multidimensional, technologically advanced society. Collaboration between academic and student affairs has been supported by the results of many studies (Kuh, 1995; Pascarella & Terenzini, 1991; Terenzini, Pascarella, & Blimling, 1996; Whitt et al., 1999). Since the mid 1980s, universities have initiated several institutional reforms designed to immerse students in the first-year experience: learning communities, freshmen seminars, service-learning courses, and others. Freshmen students cannot be expected to make connections and collaborate on their own. Although these reforms have contributed to the overall freshman experience, they usually have been implemented individually from either academic or student-services departments. Further reforms, such as freshmen cohorts that require students to take courses together, engage in active learning, and reflect on their learning process need to be implemented. Schroeder (2002) called for further collaboration between academic and student services to enact a “bold, unified vision of a highly integrated and coherent first year experience” that “seamlessly” integrates cocurricular and curricular components (p. 204). In order to provide learning experiences for students that enhance not only learning but also thinking, collaborative partnerships are necessary not only among students but also among institutional departments. Kuh et al. (1991) called for “involving colleges” that integrate rich out-of-class opportunities with challenges, support, and great expectations.

Conclusions

Cognitive development is a broad construct that may complement achievement in a specific skill set as a valuable measure of educational goals. When students have a broader perspective of themselves as learners and can make connections between areas of knowledge, they become better communicators, collaborators, and contributors. Although this study did not find a significant relationship between student engagement during the freshman year and cognitive development, the strength of the association between the two variables increased with the addition of high-school engagement. This finding may imply a longer period of time needed for cognitive development to take place. The Learning Environment Preferences (LEP) scores did show a positive correlation with both grades and SAT scores, which indicates that constructs of cognitive development, academic aptitude, and student achievement share similar attributes. If the purpose of education is not just for students to receive information but for them to analyze, synthesize, and evaluate information, then further investigation of cognitive development may be useful in preparing students for success.

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APPENDICES

APPENDIX A
Questionnaire Instrument

Questionnaire of Student Engagement

1. Where do you live?

(Check the one that most closely describes your residence)

- a. USF Living/Learning Community (LLC) _____
 b. USF Dormitory (NOT LLC) _____
 c. Off campus _____

2. Were you at the same residence last semester?

- a. Yes _____
 b. No _____

3. If NO to #2, where did you live Fall Semester?

- a. USF Living/Learning Community (LLC) _____
 b. USF Dormitory (NOT LLC) _____
 c. Off campus _____
 d. Another campus _____

4. What is your employment status?

- a. Not employed _____
 b. Employed on-campus _____
 c. Employed off-campus _____

5. If you work, please indicate how many hours per week:

- a. 1-5 _____
 b. 6-10 _____
 c. 11-15 _____
 d. 16-20 _____
 e. over 20 _____

6. For the following questions, circle the term to the right of the question that corresponds most closely with how often you have participated in the following out-of-class activities during YOUR FIRST YEAR OF COLLEGE.

Study groups	Never	Once/month	Twice/Month	Weekly	Daily
Service Learning (for a class)	Never	Once/month	Twice/Month	Weekly	Daily
Clubs/groups/organizations (not sports)	Never	Once/month	Twice/Month	Weekly	Daily
Tutoring or Lab assistant	Never	Once/month	Twice/Month	Weekly	Daily
Volunteer work	Never	Once/month	Twice/Month	Weekly	Daily
Fraternity/Sorority	Never	Once/month	Twice/Month	Weekly	Daily
Honors Society	Never	Once/month	Twice/Month	Weekly	Daily
Student Government	Never	Once/month	Twice/Month	Weekly	Daily
Literary/Newspaper/Yearbook	Never	Once/month	Twice/Month	Weekly	Daily
Other _____	Never	Once/month	Twice/Month	Weekly	Daily

7. During your first year of college, did you spend more time or less time on out-of-class activities than in your SENIOR year in high school? Please Check One:

I spent MORE time than senior year of high school _____

I spent LESS time than senior year of high school _____

I spent about the SAME amount of time as senior year of high school _____.

8. Which years in high school did you spend time involved in out-of-class activities?

Check all that apply.

Freshman _____ Sophomore _____ Junior _____ Senior _____

CONTINUE ON TO NEXT PAGE

Please check the appropriate descriptor:

9. Your academic standing:

Freshman _____ Sophomore _____ Junior _____ Senior _____

10. If this is not your freshman year, are you involved in out-of-class activities this year?

Please mark one:

_____ Yes, the same amount or more than freshman year.

_____ Yes, but less than freshman year

_____ No

11. Your age range:

19 or younger _____ 20-23 _____ 24-27 _____ Over 27 _____

12. Gender:

Male _____

Female _____

13. Are you an INTERNATIONAL STUDENT?

Yes _____

No _____

14. If you are NOT an International Student, please check your racial or ethnic identification (Check the one that most applies):

African American _____

Native American _____

Asian American _____

European American (White) _____

Latino/Hispanic American _____

Native Hawai'ian/Pacific Islander _____

Mutiethnic American _____

Other? Please indicate: _____

15. What is the highest grade level your parents completed? Check one line for each parent:

Mother

Father

Did not finish high school

Completed high school or equivalency

Attended some college but did not graduate

Completed an Associates Degree (A.A., A.S.)

Completed a Bachelor's Degree (B.A., B.S.)

Completed a Master's Degree (M.A., M.S.)

Completed a Doctoral Degree (Ph.D., Ed.D., M.D.)

16. What was your highest SAT Score? (200-800)

Verbal or Critical Reading: _____ Math Score: _____

17. What was your highest composite ACT score? (1-36) _____

18. What was your high-school GPA? (A=4.0) _____

19. By the end of this school year, how many credits will you have completed at USF? _____

20. What is your USF GPA so far? _____

APPENDIX B

Cover Letter to Validity Panel

Leslie Dennen

DATE

Dear

I am a doctoral student in the School of Education. I am investigating how out-of-class peer interaction is related to the cognitive development of students. Because of your experience in working with college freshmen, I am writing to ask you if you would be willing to be a member of my validity panel and review the enclosed list of questions from my proposed survey. Your response should not take more than about 20 minutes to complete.

Your participation is entirely voluntary, and your response will be kept confidential and in a secure location. Should you choose to participate, please find enclosed a short description of my study and list of terms that describe out-of-class activities. I would very much appreciate your taking the time to read over my terms for out-of-class activities and to mark yes or no to each question follow each term. The terms describe out-of-class activities that require academic communication and collaboration skills (not sports) and that are available to freshman students. Below each set of questions, please add any relevant comments. I would very much appreciate it if you could return the questionnaire to me through campus mail by _____. Your answers will enable me to refine my survey instrument so that the information I get from the students will be appropriate to my research.

Thank you again for your time. Please don't hesitate to contact me if you have any questions.

Sincerely,

Leslie Dennen

The Relationship Between Out-of-Class Activities and Cognitive Epistemological Development In College Freshmen as Mitigated by Student Demographic Variables

Today, more students are arriving on college campuses with a broad range of precollege preparatory experience. Most students experience a degree of culture shock when making the transition from high school to college life, but minority and first generation in college students may find acclimating to college culture particularly challenging. Minorities receive less encouragement from family members to attend college and feel a greater need to reject past attitudes than nonminorities (Elkins, Braxton, & James, 2000). In another study, Lofink and Paulsen (2005) found that first generation in college students are less likely to persist than continuing-generations students, especially if they are female and Hispanic.

Extensive research (Pascarella & Terenzini, 1991) has shown that student entering characteristics such as high-school achievement and socioeconomic status have a large influence on student success in college. There is, however, evidence to support the effects of the contextual influences of a college environment on student success as well. Astin's (1984) theory of student involvement claims that once a student arrives on campus, the choices the student makes influence how well he or she integrates into college life. Student engagement with other students outside of class encourages successful learning behavior that promotes achievement and leads to satisfaction with the educational experience (Kuh, 2003). Because of the interest of Academic Affairs professionals in promoting academic integration, researchers have begun to explore how students' interactions on campus impacts their learning experience. Cognitive structural theorists explore how people interpret their experiences and integrate new concepts to which they are exposed. Understanding this process of interpretation and integration of knowledge can enhance student's educational experiences both inside and outside the classroom (Hofer & Pintrich, 2002).

The purpose of this survey is to investigate how out-of-class student interaction, as measured by a researcher-developed questionnaire, is related to cognitive development, as measured by the Learning Environment Preferences instrument, by using a correlational analysis. This survey also proposes to examine whether the relationship of interactions to cognitive development differs by gender, ethnicity, and generational status.

The terms for out-of-class activities are critical to this study. By out-of-class activities, I mean voluntary participation in on-campus or college-related activities engaging two or more students in educationally purposeful activities that require a cognitive skill set, for example, skills of leadership, collaboration, communication, networking, or organization. In this study, the term "out-of-class activity" excludes intramural sports, watching TV, partying, or any activity that would be strictly for entertainment. The following list of terms are included on my questionnaire for out-of-class activities:

1. Study Groups. Two or more students who meet spontaneously or on a regular basis to exchange information about a course.
2. Service Learning. A volunteer activity associated with a class.
3. Clubs/Groups. A group that meets for a common interest that has some relevance to academics, for example, math club, campus activities (not sports).
4. School services. Paid or unpaid participation in an activity designed to assist other students academically, for example, lab assistant or tutor.
5. Volunteer work. Unpaid engagement in activities to help the community.
6. Fraternity/Sorority. Membership in a Greek organization.
7. Honors Society. An organization that encourages, recognizes, and rewards high academic achievement.
8. Student Government. Participation in Associated students of USF (ASUSF), Student Leadership and Engagement (SLE), student senate, or any other student governing body.
9. Cultural or Multicultural Organizations. Organization founded on an interest in a culture, subculture or ethnicity. Example: Latin American Student Organization (LASO)
10. Literary/Newspaper/Yearbook. Example: Foghorn, USF Don yearbook.

Please check YES or NO in the box to the right of the question and supplement your answer with comments as you deem necessary.

1. Study groups

	YES	NO
Would this term be clearly understandable by a USF student?		
Does this term relate to the purpose of my study?		
Does this term overlap with any other term on the list? If so, which one?		
What would be a more suitable name for this term?		
Should the term be included in my study?		
Should the term be deleted from my study? If so, why?		
Other comments?		

2. Service Learning.

	YES	NO
Would this term be clearly understandable by a USF student?		
Does this term relate to the purpose of my study?		
Does this term overlap with any other term on the list? If so, which one?		
What would be a more suitable name for this term?		
Should the term be included in my study?		
Should the term be deleted from my study? If so, why?		
Other comments?		

3. Clubs/Groups.

	YES	NO
Would this term be clearly understandable by a USF student?		
Does this term relate to the purpose of my study?		
Does this term overlap with any other term on the list? If so, which one?		
What would be a more suitable name for this term?		
Should the term be included in my study?		
Should the term be deleted from my study? If so, why?		
Other comments?		

4. School services.

	YES	NO
Would this term be clearly understandable by a USF student?		
Does this term relate to the purpose of my study?		
Does this term overlap with any other term on the list? If so, which one?		
What would be a more suitable name for this term?		
Should the term be included in my study?		
Should the term be deleted from my study? If so, why?		
Other comments?		

5. Volunteer work.

	YES	NO
Would this term be clearly understandable by a USF student?		
Does this term relate to the purpose of my study?		
Does this term overlap with any other term on the list? If so, which one?		
What would be a more suitable name for this term?		
Should the term be included in my study?		
Should the term be deleted from my study? If so, why?		
Other comments?		

6. Fraternity/Sorority.

	YES	NO
Would this term be clearly understandable by a USF student?		
Does this term relate to the purpose of my study?		
Does this term overlap with any other term on the list? If so, which one?		
What would be a more suitable name for this term?		
Should the term be included in my study?		
Should the term be deleted from my study? If so, why?		
Other comments?		

7. Honors Society.

	YES	NO
Would this term be clearly understandable by a USF student?		
Does this term relate to the purpose of my study?		
Does this term overlap with any other term on the list? If so, which one?		
What would be a more suitable name for this term?		
Should the term be included in my study?		
Should the term be deleted from my study? If so, why?		
Other comments?		

8. Student Government.

	YES	NO
Would this term be clearly understandable by a USF student?		
Does this term relate to the purpose of my study?		
Does this term overlap with any other term on the list? If so, which one?		
What would be a more suitable name for this term?		
Should the term be included in my study?		
Should the term be deleted from my study? If so, why?		
Other comments?		

9. Cultural or Multicultural Organizations

	YES	NO
Would this term be clearly understandable by a USF student?		
Does this term relate to the purpose of my study?		
Does this term overlap with any other term on the list? If so, which one?		
What would be a more suitable name for this term?		
Should the term be included in my study?		
Should the term be deleted from my study? If so, why?		
Other comments?		

10. Literary /Newspaper /Yearbook

	YES	NO
Would this term be clearly understandable by a USF student?		
Does this term relate to the purpose of my study?		
Does this term overlap with any other term on the list? If so, which one?		
What would be a more suitable name for this term?		
Should the term be included in my study?		
Should the term be deleted from my study? If so, why?		
Other comments?		

PLEASE ADD ANY OTHER TERMS FOR OUT-OF-CLASS ACTIVITIES NOT INCLUDED ON THIS LIST. THANK YOU.

APPENDIX C

Cover Letter to Students

Dear Students:

I am conducting a confidential and anonymous study on out-of-class activities of students during their freshman year. This study is toward completion of my doctoral studies in the School of Education. Your involvement will help inform educators about how student interactions affect the first-year experience at a private university.

Participation in this study is voluntary. If you choose to participate, please complete the attached questionnaire. If you choose not to participate, please read the attached article. It should take you about 30 minutes to complete both instruments. You will be asked to both rate and rank on one part of the questionnaire. By rate, I mean chose the number on a 1 to 4 scale that most closely describes how significant that item is to your ideal learning environment: 1 meaning not at all significant and 4 meaning very significant. By rank, I mean when you have finished each section, list the three most significant items in order of their significance on the lines below each section. If you have additional questions about the study or wish to obtain your scores, you may call me or e-mail me. Approval for this study has been obtained from the Institutional Review Board. Thank you for your interest in and contribution to my research on the freshman university experience.

Sincerely,

Leslie Dennen