The impact of co-curricular involvement on college students' need for cognition

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THE IMPACT OF CO-CURRICULAR INVOLVEMENT ON COLLEGE STUDENTS’ NEED FOR COGNITION

by

Gina Tagliapietra Nicoli

An Abstract

Of a thesis submitted in partial fulfillment of the requirements for the Doctor of Philosophy degree in Counseling, Rehabilitation, and Student Development in the Graduate College of The University of Iowa

December 2011

Thesis Supervisor: Professor Elizabeth Whitt
ABSTRACT

The purpose of this research was to examine the influence of co-curricular involvement on the need for cognition. Using multiple regression, I analyzed the relationship between co-curricular involvement and the need for cognition while controlling for sex, race, pretest, precollege academic motivation, SES, precollege academic ability, high school involvement, institutional type, work, residence, major, non-classroom interactions with faculty, and the kind of instruction. I also analyzed whether race, sex, or the type of institution students’ attend further influenced the effect of involvement on the need for cognition.

The main effects model found the impact of involvement on the need for cognition to be statistically non-significant. While looking at conditional effects, I found being involved had a small, but positive, statistically significant impact on the need for cognition for non-white students. Also during this exploration I found sex and institutional type did not significantly impact the effects of involvement on the need for cognition. The suggestions for future research include replicating the current study and examining the impact of specific co-curricular involvement opportunities; following-up this study with a qualitative study to discover what students are gaining from co-curricular involvement; looking for additional conditional effects; and exploring what other college experiences impact the need for cognition.

Abstract Approved: ____________________________________________________________

Thesis Supervisor

Title and Department

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PH.D. THESIS

This is to certify that the Ph.D. thesis of

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CHAPTER ONE – INTRODUCTION

For decades, researchers have studied students’ college experiences (Astin, 1977, 1993a; Bowen 1977; Feldman & Newcomb, 1969; Knox, Lindsay, & Kolb, 1993; Kuh, Kinzie, Schuh, & Whitt, 2005; Pascarella & Terenzini, 1991, 2005). In light of this research, college faculty and staff work to structure students’ free time involving them in activities that research deems educationally effective (National Survey of Student Engagement [NSSE], 2009). For example, researchers at the National Survey of Student Engagement (NSSE) estimated that 50% of college students are involved in some type of co-curricular experience by the end of their senior year (National Postsecondary Education Cooperative, 2006). Research supports the importance of this involvement for undergraduate student learning and success (Pascarella & Terenzini, 1991, 2005).

Studies about the impact of out-of-class experiences range from explorations of the impact of involvement on critical thinking skills (Inman & Pascarella, 1998; Whitt, Edison, Pascarella, Nora, & Terenzini, 1999) to the development of written and oral communication skills (Beeny, 2003; Pike, 2000). Information gathered from longitudinal studies (Astin, 1993), national surveys (Pascarella, Seifert, & Blaich, 2008; Pascarella, Whitt, Nora, Edison, Hagedorn, & Terenzini, 1995) and ongoing observation (Sandeen, 2003), find that many college experiences facilitate cognitive growth and development in students. Despite this large body of research on the impact of co-curricular involvement on student learning, gaps remain.

I begin this chapter with a brief overview of the impact of external pressures on undergraduate education, including an increasing emphasis on measures of student learning and success. After examining the external context, I provide a synthesis of
theoretical and empirical literature on the role of student involvement, including in co-curricular activities, in student success in general, and an overview of one educational outcome – need for cognition – in particular. I selected need for cognition as the outcome of interest for this study because of its ability to measure students’ motivation to engage in cognitively-challenging activities. Next, I identify and describe purpose of the study and my research questions associated with this study. I conclude with definitions of key terms.

**Impact of the Current Economy on Higher Education**

Earning a degree is now the most important step to economic stability (Pascarella & Terenzini, 2005), as college graduates earn almost a million dollars more over the course of their working lives than individuals with only a high school diploma (Pennington, 2004). As of the first decade of the 21st century, almost 90% of young adults graduated from high school and about 60% of high school seniors enrolled in college the following year (Carnevale, Smith & Strohl, 2010). In 2007, this percentage translated into 18.2 million people enrolling in degree-granting institutions.

Students and their families have come to recognize a high school education is no longer sufficient to succeed in the 21st century workplace (Peter D. Hart Research Associates, 2005). Scientific and technological innovations, global interdependence, and demographic changes collectively reshaped the demands placed on current employees. To succeed, college graduates need to be “intellectually resilient, cross-culturally and scientifically literate, technologically adept, ethically anchored, and fully prepared for a future of continuous and cross-disciplinary learning” (American Association of Colleges and Universities [AAC&U], 2007, p. 15).
During the latest recession, a college degree was one way to seek job security. As of 2010, the unemployment rate for those with a high school diploma and no college is 10.1%, in contrast to 4.7% for those with a college degree (United States Department of Labor, 2010). The advantages of a college degree also are projected to continue with widespread technological advances and the increasingly global marketplace (Carnavale, Smith & Strohl, 2005). Economists forecast that, by 2015, the economy will recover enough to replace the nearly 8 million jobs lost since December 2007. However, most of these jobs were lost by individuals without a college education, and more than half of the replacement jobs will require at least some college (Lacy & Wright, 2009). Automation and overseas competition also have cut into the employment opportunities once available to persons without education past high school (Carnavale, Smith & Strohl, 2005).

Thus, the economy of the future will be different than that of even the recent past. This new economy will demand more education and an adaptability of its workers. Employers are looking for educated employees who are competent with the technical aspects of their jobs, skillful in a wide variety of human interactions, adaptable to changes in the work environment, and motivated to seek opportunities to continue to improve their skills (Peter D. Hart Research Associates, 2005). In a 2009, Hart Research Associates interviewed 302 employers regarding their views on college learning. They found most employers, around 90%, asked employees to take on more responsibility, use a broader set of skills and work harder than employees in the past (Peter D. Hart Research Associates, 2009). They expected graduates to possess skills in communication, self-directed learning, information literacy, critical thinking, and self-awareness (Peter D. Hart Research Associates, 2005; Kreber, 2006). To prepare for this
workplace reality, employers expected higher education to provide students with knowledge and skills in a specific field and the experience of applying this new information in productive ways (Association of American College and Universities [AACU], 2010). Unfortunately, according to a 2006 survey (Peter D. Hart Research Associates, 2005), 63 percent of employers believed that many of the recent graduates do not have the skills to succeed in this new economy.

Given the increasing demands for a college-educated workforce, institutions of higher education are subject to increasing public scrutiny. Some critics question whether students are receiving what they need from higher education to meet the demands of this changing and complex workplace (AACU, 2002; AACU, 2007). Public policy-makers and employers are putting pressure on colleges and universities to demonstrate that their students gain the knowledge and skills necessary to succeed in this new economy (Burke & Minassians, 2002). Higher educations’ constituents want to know that college graduates are well-trained for meaningful careers, prepared to support themselves and their families, and able to contribute to the growth of the economy on local, national and global levels (Peter D. Hart Research Associates, 2005).

What can colleges do to help students develop the knowledge and skills necessary to succeed after graduation? A large body of literature focuses on the importance of student involvement in all aspects of college for achieving desired educational outcomes. Research demonstrates a clear connection between student success and participation in educationally-effective activities (Kuh & Hu, 2003; Pascarella & Terenzini, 2005). Summarizing their extensive review of research on college outcomes, Pascarella and Terenzini (2005, p. 602) stated, “the impact of college is largely determined by individual
effort and involvement in the academic, interpersonal and extracurricular offerings on a
campus...” Such activities are associated with a range of positive educational practices
and conditions, including student-faculty contact, active learning, peer interaction,
prompt feedback, and inclusive learning environments (Astin, 1991; Chickering &
Gamson, 1987; Chickering & Reisser, 1993; Kuh, Kinzie, Schuh & Whitt, 2005;
Pascarella & Terenzini, 2005). Institutions have the power to influence student success
by organizing their resources and services to encourage students to participate in high-
impact educational activities. In the following section, I describe and discuss the
influence of co-curricular experiences in more detail.

**Impact of Co-curricular Involvement**

College impact research suggests that focusing on what students do during
college, both in and outside of the classroom, is the best way to enhance student success
student involvement: “the amount of physical and psychological energy that the student
devotes to the academic experience” (p. 297). Astin asserted that the more time and
effort students invest in the learning process, the more engaged they will be in their own
education, thereby increasing the amount they learn during college. Astin’s theory of
involvement assumes that simply exposing students to course material or a co-curricular
activity is unlikely to produce the desired learning goals; students must be active
participants in the learning process.

Not all forms of involvement are created equal, however. In his research on
college impact, Astin (1996) found that the three most powerful forms of student
involvement are academic involvement, involvement with faculty, and involvement with
student peer groups. In fact, Astin (1996) stated that peer groups are the strongest single source of influence on cognitive and affective development in college. Peers often act as a support network, both for academic and personal matters, thereby influencing student development (Tierney, Corwin, & Coylar, 2005).

Astin’s theory of student involvement suggests that student time is the most valuable resource. “According to the theory, the extent to which students can achieve particular developmental goals is a direct function of the time and effort they devote to activities designed to produce these gains” (Astin, 1999, p. 522). Student affairs administrators must ensure the co-curricular opportunities they provide are worth a student’s time and effort – that is, are educationally-effective programs and practices aimed at fostering student learning and development? Does involvement in Greek life, residence life, student government and other campus organizations contribute to the desired outcomes of college? Much of the evidence from past studies supports claims that involvement has a positive and measurable impact on student success (Astin, 1993; Baker, 2008; Brenner, Metz and Brenner, 2009; Cress, Astin, Zimmerman-Oster, Burkhart, 2001; Harper & Quaye, 2007; Hernandez, Hogan, Hathaway, & Lovell, 1999; Kuh, 1995; Martin 2000; McClure, 2006; Terenzini, Springer, Yaeger, Pascarella, & Nora, 1994; Titus, 2004; Whitt, Edison, Pascarella, Nora, & Terenzini, 1999).

Even with this vast research base, the picture of how involvement impacts learning is not complete. Although we know involvement influences skill acquisition in areas such as critical thinking, it is still unknown whether involvement affects an individual’s disposition toward learning. How do individuals approach a situation requiring complex cognitive skills, such as critical thinking? And what role, if any, does
co-curricular involvement play in that approach? Given the demands of the current economy, individuals need to continually update their knowledge and skills to remain current with the on-going scientific and technological changes. By developing a student’s enjoyment in learning along with his or her cognitive growth, educators are providing students with “learning that lasts” (Mentkowski & Associates, 2000, p.1). This comprehensive view of learning prepares and motivates graduates to continue learning throughout their lifetime. Continuing to develop this area of research, including new aspects of learning and development, will strengthen this research base, providing a greater breadth and depth of knowledge for faculty and staff as they allocate resources and design programs.

**New Area of Exploration: Need for Cognition and Co-Curricular Involvement**

Expanding the outcome of cognitive growth to include a student’s disposition toward learning is important for educators wanting to graduate “intrinsically motivated, self-directed learners” (Kuhn, 2003, p. 18). It is not enough for students to have the skills necessary to handle complex problems, they must have the inclination to want to solve them (AALE, 2005). Cacioppo and Petty (1982) labeled this inclination as an individual’s need for cognition, defined as their “tendency to engage in and enjoy effortful cognitive activity” (p. 116).

“Need for cognition,” as defined by Cacioppo and Petty (1982), reflects a person’s inclination and motivation to learn. At its most basic level, it represents how much people enjoy thinking about complicated topics and solving problems. A large body of research demonstrates the influence of the need for cognition on individual’s response to stimuli (i.e. advertisements, statistics, and commercials) in areas ranging
from social and cognitive psychology to medicine, journalism and law (Cacioppo, Petty, Feinstein, & Jarvis, 1996). Only a few studies examined the need for cognition as part of an outcome of college (Lindsay, 2007; Seifert, Goodman, Lindsay, Jorgensen, Wolniak, Pascarella & Blaich, 2008). Cacioppo and Petty (1996) believed that the need for cognition is similar to other learning constructs, such as critical thinking, and can develop or change over time. Current research needs to explore this claim, investigating where this change might occur in the college environment. Using the need for cognition as an outcome measure, this study explored whether change in the need for cognition occurs due to involvement in college-level co-curricular activities and if this change differed based on students’ race, sex and the type of institution they attend.

Research Questions

Decades of research on the impact of college demonstrate the importance of active student engagement in all aspects of college – academic and non-academic, curricular and co-curricular - for achieving a wide range of cognitive and affective outcomes. Motivation to engage in complex cognitive activities – that is, need for cognition – might be one such outcome, but additional research is needed to determine whether it is linked to student engagement in co-curricular activities. Therefore, the purpose of this study was to examine what, if any, impact involvement in co-curricular experiences had on the development of a student’s need for cognition during the first year of college. The study sought to answer the following research questions:

1. Controlling for background and precollege characteristics, what are the effects of co-curricular involvement on students’ need for cognition?
2. Does the effect of co-curricular involvement on need for cognition differ based on the amount of involvement?

3. Are the effects of co-curricular involvements on students’ need for cognition the same for all students or do they differ by student’s sex, race, and type of institution they attend?

**Definitions of Terms**

*Involvement* is the amount of physical and psychological energy that a student devotes to the college experience. For example, a student who is highly involved dedicates energy to studying, co-curricular involvement, interacts with other students and spends time on campus. On the other hand, a student who is uninvolved might ignore her or his studies, spend little time on campus, and/or have infrequent interactions with peers and faculty members. The amount of learning and personal development a student experiences is directly proportional to the quality and quantity of the student’s involvement (Astin, 1993).

*Co-curricular involvement* refers to non-academic experiences sponsored, sanctioned, or supported by the college or university. These experiences include, but are not limited to, participation in student organizations, intramurals, intercollegiate athletics, student government, leadership programs, and community service programs (Evans, Forney & Guido-DiBrito, 1998).

*The Need for Cognition* “measures an individual’s tendency to engage in and enjoy effortful cognitive endeavors” (Cacioppo, Petty & Kao, 1984, p. 306). Need for
cognition can be developed or changed over time (Cacioppo, Petty, Feinstein, & Jarvis, 1996). Individuals who are high in need for cognition are thought to be more likely to expend effort on formation acquisition, reasoning, and problem solving than those who are low in need for cognition (Cacioppo et al., 1996). Rooted in motivation theory, this construct describes how much people enjoy thinking, learning, and solving problems that require creative solutions.

Scope of the Study

Data for this study came from the 2006/2010 data collection of the Wabash National Study of Liberal Arts Education1 (WNSLAE). The purpose of this longitudinal study was to explore what teaching practices, programs, and institutional structures support liberal arts education. The seven outcomes associated with this type of education were: critical thinking, need for cognition, interest in and attitudes about diversity, leadership, moral reasoning, and well-being. For this collection period, the sample included 2205 undergraduate students at 17 institutions. A more detailed description is provided in chapter 3.

Summary and Conclusion

As the changes in our labor market, technological innovations and growth of knowledge occur, interested parties are starting to question the effectiveness of higher education to prepare graduates for this reality. One area called to question is higher education’s ability to prepare students with the cognitive skills and disposition necessary to succeed in the workplace. Employers believe that to succeed graduates need both the skills and motivation to engage in problem solving behaviors (Jones, 2005). As an

1 This research was supported by the Wabash Center of Inquiry in the Liberal Arts.
outcome measure, we know little about how this motivation, referred to as a student’s need for cognition, develops or what interventions impact this change. This study attempted to fill this research void by examining the impact of co-curricular involvement on students’ motivation to learn. A better understanding of the relationship between involvement and students’ need for cognition will allow administrators to more effectively design and encourage programs that have the greatest impact on student learning.

The next chapter provides a review of literature on student involvement, student involvement and cognitive growth, and the need for cognition, including conceptual framework for the study.
CHAPTER TWO – REVIEW OF LITERATURE

As stated in chapter 1, the purpose of this study was to examine the impact of co-curricular involvement on students’ motivation to engage in activities requiring cognitive effort, also known as need for cognition. Information on the current workforce, the demands society has for college graduates, and new calls for accountability in higher education reinforce the importance of students’ learning and development during college. A degree loses its utility if students cannot apply their knowledge, adapt to a changing environment, or seek opportunities for ongoing skill development and learning. Past research demonstrates that student involvement has a positive impact on cognitive growth (Astin, 1993; Pascarella & Terenzini, 1991, 2005). Growth in this area can be measured through grade point average or standardized test scores, but these measures provide only a partial picture of what cognitive development is, how it happens, or who supports it. This study sought to expand our understanding of learning by exploring the impact of co-curricular involvement on students’ need for cognition. In this chapter, I provide a context for the study by reviewing the relevant literature on issues facing the workforce, student involvement and learning, and need for cognition.

The State of the Workforce

The importance of a college-educated workforce is reflected in the relationship between college attainment and economic prosperity. In the 20th century, increased education attainment of our workforce contributed to gains in productivity, economic growth, and national and international competitiveness of the United States (Bosworth, 2007; Business-Higher Education Forum, 2003). From 1960 to 2000, the proportion of the population over the age of 25 that had received at least a high school diploma went
from 41 to 80.4 percent. College attainment also increased during this time. In 1960, only 7.7 percent of adults (age 25 and older) had a bachelor’s degree; by 2000 this number had increased to 24.4 percent (Bauman & Graf, 2003). Until 2000, those entering the workforce had much higher levels of education than those leaving the workforce (Bosworth, 2007).

The increase in educational attainment during these decades had a profound effect on the workplace. In a study on the private and public benefits of higher education, the Joint Economic Committee of the United States Congress found that 10 to 25 percent of economic growth could be attributed to gains in human capital, such as education (Joint Economic Committee, 2000). In analysis of last century’s economy, Gordon (2000) concluded that the direct effect of educational advances accounts for about 22 percent of the 1.62 percent average annual increase in U.S. labor productivity from 1913 to 1996. These studies underscore the role education had in facilitating the acquisition of new skills and knowledge that increased productivity during the past century (Joint Economic Committee, 2000). With the amount of available information, scientific and technology changes and the interdependence of economies worldwide, interested parties like business leaders and government organizations are questioning the ability of education to continue this trend in the 21st century (Business-Higher Education Forum, 2003). Initial reports exploring this topic point to a shortage both in the quantity and quality of college educated employees (AAC&U, 2007; 2008; 2010; Business-Higher Education Forum, 2003).

The anticipated needs of the workplace are met with an anticipated shortage of college-educated workers. The United States Department of Labor (2010) projects a
growth in the labor force of only 29 percent between 2000 and 2040, down from 102
percent between 1960 and 2000. While limited, this projection is still a sign of economic
growth. To translate this projection into a reality, an increase in the workforce is needed,
specifically with those possessing a college education.

In 2000, 67.1 percent of the population participated in the workforce. The rate
dropped to 66 percent in 2005, and the Bureau of Labor and Statistics projects the decline
to reach 60.8 percent in 2040 (Toosi, 2005). By 2020, there will be 40 million college-
educated Americans between the ages of 55 and 75. Census data show that the United
States is not producing college-educated workers fast enough to replace this large number
of retiring baby boomers (Toosi, 2005). Both the decrease in people entering the
workforce and the number of baby boomers aging out of the workplace leaves the
economy with a current and anticipated demand for skilled employees (Bosworth, 2007).

It is evident that a college education is more important than ever before, both for
individual and societal economic prosperity. Interested parties are questioning higher
education’s ability educate and graduate individuals who are prepared for life, work and
civic participation in an increasingly complex world (AAC&U, 2002; Bosworth, 2007;
Kuh, Kinzie, Schuh & Whitt, 2005). In a survey of 301 employers conducted by Peter D.
Heart Research Associates (AAC&U, 2008) employers gave college graduates
satisfactory marks in teamwork, ethical judgment and intercultural skills with low scores
in the areas of adaptability, critical thinking, writing, self-direction and global knowledge
(AAC&U, 2007). These same skills were identified as important in various other
employee surveys (Business-Higher Education Forum, 2002; Kreber, 2006; Knapper &
Cropley, 2001). At a basic level, employers want employees who can problem solve, take
initiative and make decisions in different contexts and under varying conditions (Kreber, 2006; Knapper & Cropley, 2001). Employers, researchers, and educators believe in order for higher education to meet the demands expressed in these surveys, the idea of learning needs to expand to include these outcomes in addition to the development of in-depth knowledge and skills that apply to a specific field of study. The question now remains where or how this development of skills and learning occurs in the college setting.

Based on previous research, we know what students do during college impacts their learning more than who they are or where they attended school (Kuh, Kinzie, Schuh & Whitt, 2005). The time and energy students devote to educationally purposeful activities that is the best predictor of the amount learning and development they will experience (Astin, 1993; Pascarella & Terenzini, 1991, 2005). Chickering and Gamson (1987) found effective activities to include: student-faculty contact, cooperation among students, active learning, prompt feedback, time on task, high expectations, and respect for diverse talents and ways of learning. The more students participate in activities where these conditions were present, the more they learned (Astin, 1984, 1993; Berger & Milem, 1999; Chickering & Reisser, 1993; Kuh & Hu, 2003; Pascarella & Terenzini, 1991, 2005; Pike, 1995). Faculty and staff are often responsible for creating conditions or activities that foster this success. With the growing expectations of college graduates, creating conditions that foster success has never been more important. Co-curricular involvement is one area where this potential exists. The following section provides greater detail on the theory of student involvement, including research and its relationship to cognitive skill development.
**Student Involvement Theory**

With the calls for accountability, changes in economic conditions and declining public trust, colleges need ongoing research to inform their practice. Who the students are (sex, race or socioeconomic status), where they go to school (type of institution) and what they do while enrolled at the institution (coursework or co-curricular activities) all impact how students change during college. This change “refers only to alternations over time in students’ cognitive skills, affective characteristics, attitudes, values, or behaviors” (Pascarella & Terenzini, 2005, p. 17). Research on college impact focuses on finding the source of this change (Astin, 1993; Pascarella & Terenzini, 2005). Identifying the source allows faculty and staff to see what interventions or activities are hindering or contributing to the desired outcomes of college. Past research identified student involvement as an important tool that impacts student learning and development (Astin, 1993; Pascarella & Terenzini, 1991, 2005). The following section explains student involvement in more detail.

How students connect with and expend energy within the college environment continues to be a significant area of exploration in higher education research (Astin, 1984; Kuh, 2001; Kuh et al., 2005; Pace, 1984). Data show that students spend on average six to ten hours per week on academic work outside of class (NSSE, 2009). Combined with the amount of hours students spend in class on a daily basis, academic work only accounts for 10% of a student’s time each day. Most colleges and universities offer student involvement opportunities and activities as a way to provide structure to college students’ free time with the goal of complementing their classroom learning.
The initial work on student involvement and the impact of college environment on learning was conducted by Pace in the 1970s (Pace, 1984). Through his research using the College Student Experiences Questionnaire (CSEQ), he found learning was a function of the amount of time and quality of effort that students invested in educational experiences. He limited his research on involvement to only observable behaviors, excluding student attitudes or the psychological aspects of student involvement (Pace, 1984).

Expanding on Pace’s research, Alexander Astin (1984) developed the theory of involvement. Astin’s theory referred to the “quantity and quality of the physical and psychological energy that students invest in the college experience” (Astin, 1984, p. 528). He believed involvement was the link between student inputs and college outcomes (the more a student puts into college, the more he or she will get out). For example, students who interact frequently with peers report greater cognitive gains than those who do not (Astin, 1996). To help others understand this notion, Astin (1984) articulates the five basic postulates of student involvement theory:

1. “Involvement refers to the investment of physical and psychological energy in various objects. The objects may be highly generalized (the student experience) or highly specific (preparing for a chemistry examination)” (p. 298). “Regardless of its object, involvement occurs along a continuum; that is, different students manifest different degrees of involvement in a given object, and the same student manifests different degrees of involvement in different objects at different times” (p. 298). Involvement is student and experience specific. A student will have different levels of involvement for different experiences. The same student
running a service activity for their organization could be completely uninvolved in the same organization’s election process.

2. “Involvement has both quantitative and qualitative features. The extent of a student’s involvement in academic work, for instance, can be measured quantitatively (how many hours the student spends studying) and qualitatively (whether the student reviews and comprehends reading assignments or simply stares at the textbook and daydreams)” (p. 298). It is not simply the time on task that is important; it is what the student does during that time that is important.

3. “The amount of student learning and personal development associated with any educational program is directly proportional to the quality and quantity of student involvement in that program” (p. 298). The more involved a student is during the educational experience, the more he or she will benefit from the experience.

4. “The effectiveness of any educational policy or practice is directly related to the capacity of that policy or practice to increase student involvement” (p. 298). Effective educational practice fosters student involvement.

The theory of involvement suggests that students need to be active participants in the learning process. The quality and quantity of their involvement impacts the amount of learning and development that occurs (Astin, 1993).

Alexander Astin’s (1984) theory on student involvement spawned a vast amount of research (Astin, 1993; Pascarella & Terenzini, 2001, 2005). Taken together, the results of these studies support the notion that involvement, both in and outside of the classroom, enhances a student’s cognitive, affective and psychosocial development (Astin, 1993; Pascarella & Terenzini, 1991; Pascarella & Terenzini, 2005). The
following section explores the research between co-curricular involvement and cognitive skill development in greater depth.

*Research on Student Involvement*

Past research indicates by focusing on what students do during college we can impact their learning and development (Astin, 1993; Pascarella & Terenzini, 1991, 2005). This includes student involvement both in and outside of the classroom. The following section explores the impact of involvement outside of the classroom on a student’s cognitive growth.

*Student Co-Curricular Involvement and Cognitive Skill Development*

Research conducted on the cognitive outcomes of college focuses either on the mastering of a certain subject area or the development of cognitive competencies and skills not tied to a particular curriculum. Cognitive skills include outcomes like critical thinking or reflective judgment and apply to a wide range of content areas (Pascarella & Terenzini, 1991; 2005). The development of these skills is especially important for college graduates as they enter a world where information and technology are changing at such a rapid pace. In order to help faculty and staff design programs to encourage the development of these skills, research needs to explore where and how these skills develop.

Several studies exist demonstrating the importance of student involvement on the cognitive outcomes of college (Astin, 1993; Cruce, Wolniak, Seifert & Pascarella, 2006; Pascarella & Terenzini, 1991, 2005; and Terenzini, et al., 1996). Pascarella and Terenzini (2005) defined cognitive outcomes as the competencies and skills that allow individuals to:
process and utilize information; communicate effectively; reason objectively and draw objective conclusions from various types of data; evaluate new ideas and techniques efficiently; become more objective about beliefs, attitudes, and values; evaluate arguments and claims critically; and make reasonable decisions in the face of imperfect information (p.155).

Research conducted on involvement and its impact cognitive skills confirms Astin’s (1984) claim that students develop and change during college. Contributing to this growth are a student’s maturation, as well as experiences both in and outside of the classroom. Specifically, experiences involving interactions with peers (Huang & Chang, 2004; Terenzini et al., 1995; Terenzini, Springer, Yaeger, Pascarella, & Nora, 1994; Whitt, Edison, Pascarella, Nora & Terenzini, 1999; Kuh, 1995; Astin, 1993), discussions with peers from different racial, ethnic and/or cultural backgrounds (Kuh, 1995; Pascarella, Edison, Hagedorn, Nora, & Terenzini, 1996), living on campus (Pascarella, Bohr, Nora, Zusman, Inman & Desler, 1993; Prendergast, 1998; and Inman & Pascarella, 1998), living learning communities (Terenzini, Pascarella, & Blimling, 1996), part-time on campus employment (Kuh, 1995; Astin, 1993), involvement in clubs and organizations (Gellin, 2003; Terenzini, Springer, Pascarella & Nora, 1994), and interactions with faculty (Astin, 1993; Terenzini, Springer, Yaeger, Pascarella & Nora, 1994) had the greatest impact on a students’ cognitive growth.

The results of studies differ depending on how cognitive growth is defined and operationalized and whether controls were in place for potentially confounding factors. After a meta analysis of 10 studies that controlled for precollege differences in academic performance, Blimling (1989) found no statistically significant difference between students who lived on campus and those who commuted. He did find that students who lived in residence halls had a slight advantage over those living in Greek housing,
although the advantage was small. Pascarella, Bohr, Nora, et al. (1993) examined students’ first year gains on measures of critical thinking, reading comprehension, and mathematical skills, while controlling for initial levels of development on each of these measures, as well as precollege motivation, age, work responsibilities, and freshman-year credit hours taken. They found students living on campus showed significantly larger gains in critical thinking and reading comprehension than those living off campus.

The effect of out-of-class involvement on the development of cognitive skills is not always positive. Several studies found a negative relationship between involvement and development of critical thinking, math skills or reading comprehension (Astin, 1993; Pascarella, Flowers & Whitt, 2001; Pascarella, Edison, Whitt, et al., 1996; Pascarella, Bohr, Nora & Terenzini, 1995). Using data from the National Study of Student Learning (NSSL), Pascarella, Edison, Whitt, et al. (1996) looked at the impact of Greek affiliation on critical thinking skills during the first year of college. They controlled for potentially confounding influences and found that men who belonged to social fraternities scored lower on critical thinking, reading, and math skills as well as a measure of composite achievement than men who were not affiliated. The same finding did not hold true for women or men of color. Sorority membership had a statistically significant, negative effect only on reading and a composite measure of achievement. For men of color, fraternity membership had a modest, positive influence on all four cognitive outcomes.

By looking at the same participants after three years of college, Pascarella et al. (1999) found that the negative effect of fraternity membership became statistically non-significant. Greek-affiliated women in their second and third year reported greater cognitive gains in understanding science than women who remained independent. They
also reported greater gains in writing and thinking after two years of college. The negative findings seem to apply only to the student’s first year of school.

A common factor running through all of these previous studies is a student’s interaction with peers. This interaction has the potential to influence a variety of outcomes depending on the content of the interactions (Terenzini, Pascarella, & Blimling, 1996). Past research documents that these interactions influence a student’s choice of major and career, critical thinking, openness to diversity, problem solving, plans for a graduate degree and grade point averages (Astin, 1993; Baxter Magolda, 1992; Kuh, 1995; Pascarella, Bohr, Nora & Terenzini, 1995; Pascarella, Edison, Nora, Hagedorn & Terenzini, 1996; Pascarella, Edison, Whitt, et al., 1996; Pascarella, Wolniak, Pierson & Flowers, 2004; Cruce, Wolniak, Seifert & Pascarella, 2006). In some cases, the influence of this interaction is equal to a student’s formal classroom experience (Terenzini, Springer, Yaeger, Pascarella, & Nora, 1994). Examples of peer activities that contribute to a student’s intellectual development and critical thinking are peer tutoring (Astin, 1993), discussing current events (Astin, 1993) and discussing racial and ethnic issues (Astin, 1993; Kuh, 1995; Terenzini, Springer, Yaeger, Pascarella & Nora, 1994). Astin (1993) hypothesized that tutoring increases student involvement in the learning process and enhances their content mastery. Whether discussing racial issues or class material, “when peer interactions involve educational or intellectual activities or topics, the effects are almost always beneficial to students” (Terenzini et al., 1999, p. 617).

The effects of peer interactions on cognitive skills are discernible as early as the first year of college (Cruce, Wolniak, Seifert & Pascarella, 2006; Pascarella, Bohr, Nora, Desler, & Zusman, 1994; Pascarella, Edison, Hagedorn, Nora, & Terenzini, 1996;
Pascarella & Terenzini, 1991, 2005; & Pascarella, Flowers, & Whitt, 2001). Using data from the National Study of Student Learning, Pascarella, Flowers and Whitt (2001) examined the relationships between peer interactions and cognitive outcomes in a student’s first year of college. The study included students from 23 colleges and universities. Cognitive outcomes included standardized test scores and self-reported gains on critical thinking. A scale measuring peer interactions included course-related and non-course related activities, both in and outside of the classroom. In addition, the researchers controlled for potential confounding factors such as precollege critical thinking, demographic characteristics, enrollment status, hours spent studying, motivation, work responsibilities, coursework taken, and the average academic ability of first-year students at the institutions. The study found the more students were involved with their peers in course- and non-course-related interactions, the greater their cognitive growth. Interactions with peers on non-course-related matters had a substantial net effect on gains in understanding the arts and humanities, and modest but significant positive effects on gains in understanding self and others, gains in writing and thinking skills, and gains in academic preparation for a career.

Another study using data from the National Study of Student Learning (NSSL), (Cruce et al., 2006) investigated the relationship between Chickering and Gamson’s (1987) principles for good practice and a number of cognitive skills such as reading comprehension, mathematics knowledge, and critical thinking skills in a student’s first year of college. The student included students from 23 colleges and universities. The interaction with peers measure contained questions regarding instructional emphasis on cooperative learning, course-related interactions with peers, quality of interactions with
other students, and cultural and interpersonal involvement. Controls were applied for potential confounding factors, such as precollege critical thinking, student demographics, enrollment status, hours spent studying, motivation, work responsibilities, coursework taken, and the average academic ability of first year students at the institutions. This study found involvement with peers in course- and non-course-related interactions had a significant total and direct effect on mathematics knowledge, openness to diversity and challenge, learning for self-understanding, and preference for higher-order cognitive tasks. Taken together, these studies of the impact of peer interactions highlight the relationship between student involvement and cognitive growth in the first year of college.

Student interactions with faculty members also have been found to influence students’ cognitive skill development. The most influential interactions reinforce classroom learning or focus on issues of student development (Astin, 1993; Terenzini, Springer, Yaeger, Pascarella, & Nora, 1994). Using data from the National Study of Student Learning, Terenzini et al (1994) found that faculty perceived by students as being concerned with student development and teaching had a significant, positive effect on the end of first year scores of critical thinking. Other studies found similar positive relationships between students’ out-of-class interactions with faculty members and gains on various measures of cognitive skill development (Astin, 1993; Kuh, 1995). In a qualitative study of 149 students from 12 institutions, Kuh (1995) explored what out-of-class experiences seniors associated with their learning and development. He found women reported more contacts with faculty and were likely to attribute their gains in
interpersonal competence to these contacts. Men, on the other hand, found these interactions to contribute more to gains in cognitive complexity.

**Summary**

Taken as a whole, the research supports the idea that a change in cognitive skills is a result of a student’s involvement in college. Further analysis of these studies found students’ participation in campus organizations, faculty and peer interactions and experiences with diversity created the greatest impact on cognitive competencies and skills described by Pascarella and Terenzini (2005). These documented gains address a few of the concerns expressed by employers regarding the lack of the preparation of recent college graduates, specifically in the areas of teamwork and critical thinking. Research needs to probe further and find what additional skills or competencies students are gaining from these experiences. One area left to explore is the impact involvement has on a student’s motivation to engage in problem solving behaviors. Continuing to explore the impact of student involvement on various cognitive constructs provides administrators with the necessary information for designing educationally effective programs. It is also important that college impact studies start to explore other variables that may influence the aspect of change (Pascarella & Terenzini, 2005). For the purposes of this study, I explored the possibility of conditional effects, including race, sex, and institutional type, on a student’s level of involvement and their need for cognition.
Conditional Effects of Involvement

Research can no longer be based on the assumption that there is one homogeneous undergraduate student population composed of White undergraduates from middle or upper middle class homes, ages 18 to 22, attending four-year institutions full time, living on campus, and not employed (Pascarella & Terenzini, 2005). According to the 2000 census, individuals identifying their ethnicity as “white” accounted for 77.1 percent of the total population in the United States; in 2007, the percentage dropped to 66 percent. During the same period, the Hispanic population, the fastest growing minority population in the United States, is expected to jump from 12 percent of the total population in 1990 (22.4 million) to 24 percent in 2050 (102.6 million) (U.S. Census Bureau, 2009). This estimate coincides with the projection that by 2050, members of minority groups will compose almost half (47 percent) of the workforce (Toosi, 2002).

With the increase of minority populations in society, enrollment in higher education will continue to become more ethnically diverse (AAC&U, 2002). Between 1994 and 2004 minority enrollment in higher education rose by 49 percent, to total more than 4.8 million students, while white students during the same period increased by 6 percent, to total 10.6 million students (Cook & Cordova, 2007). This changing student population presents new challenges for faculty and staff. Students respond differently to their environment, negating a one-size-fits-all approach. A co-curricular involvement opportunity such as student government membership may differ in its magnitude or direction of impact for students with different characteristics.

Changing college student demographics are not going unnoticed by higher education researchers. Increasingly, studies of college impact explore conditional, as
well as general effects. In a recent study, Cruce, Wolniak, Seifert and Pascarella (2006) explored the effects of good practice in undergraduate education on cognitive development, orientation to learning, and educational aspirations of students during their first year of college. Using longitudinal data from 23 institutions allowed the researchers to control for pre-college characteristics and other confounding variables during the first year of college. They included the conditional effects of sex, ethnicity, pre-college cognitive development, pre-college orientations to learning, pre-college educational aspirations, and by institutional type. The study found the effects of good practice in undergraduate education differed by sex and ethnicity. For example, the Effective Teaching and Interaction with Faculty scale had a significant positive relationship with positive attitude toward literacy for Students of Color; the same measure was non-significant for White students. Interactions with peers had a significant effect on first-year reading comprehension for men, but not for women. This research study demonstrates how one experience does not affect all students in the same way. Given our changing demographics, research needs to continue to explore how experiences impact that various student populations.

Involvement does matter. Collectively, past research demonstrates the positive impact involvement has students’ cognitive skills. Researchers found involvement in co-curricular activities impacts critical thinking, reading comprehension, and math achievement; grade point average (GPA); and overall self-reported cognitive growth. While in past decades this level of skill development was enough to succeed in both a graduate’s personal and work life, the demands on a graduate’s ability and disposition have changed. Preparing for high-performing jobs and innovations of the future requires
graduates who can problem solve, take initiative and make decision in different contexts and under varying conditions. Future research needs to build on this research base by exploring the impact involvement has on a student’s motivation to engage in problems or situations that require these cognitive skills. For the purpose of this study, the conditional effects of race, sex and the type of institution students attend were also considered during the exploration of the relationship between co-curricular involvement and the need for cognition.

**Need for Cognition**

Researchers, faculty and staff have long expressed interest in how students develop cognitive skills in the college setting. As stated in the previous section, research has explored the impact of co-curricular involvement on cognitive skills like critical thinking, reading comprehension, and math skills. In today’s society where information and technology are changing at a rapid pace, employers are looking for graduates who are “intrinsically motivated, self-directed learners” (Kuhn, 2003, p. 18). To succeed graduates must have both the skills to handle complex problems and the inclination to want to solve them (AALE, 2005). Cacioppo and Petty (1982) labeled this inclination as an individual’s need for cognition.

An interest in information processing and intrinsic motivation led Cacioppo and Petty (1982) to investigate the notion that people “engage in active information search and effortful problem solving as they steer their course through the environment” (Cacioppo, Petty, Feinstein, Jarvis, 1996). Their initial research on this idea indicated that much of people’s tendency to engage in and enjoy cognitive activities could be represented by a single factor called the need for cognition. Cacioppo et al. (1996) noted
that the need for cognition is “derived from past experience, buttressed by accessible memories and behavioral histories, manifest in current experience, and influential in the acquisition or processing of information relevant to dilemmas or problems” (p. 197).

Simply stated, life experiences can change an individual’s need for cognition. This change is relevant in this study because students who participate in co-curricular involvements could experience a change in their desire to engage in effortful thinking.

Cacioppo et al. (1996) believe all people try to make sense of the world in which they live, but low and high need for cognition individuals do so in different ways. Individuals high in need for cognition tend to seek, acquire, process, and reflect back information to make sense of the world. In contrast, individuals low in need for cognition are more likely to rely on others to provide this structure (Cacioppo & Petty, 1982). Individuals high in need for cognition are “characterized generally by active, exploring minds and, through their senses and intellect, reach and draw out information from their environment” (Cacioppo, Petty, Feinstein & Jarvis, 1996, p. 199). These individuals are motivated to put forth effort on information acquisition, reasoning, and problem solving to cope with changes in their world. They have a positive attitude toward activities that require problem solving (i.e. exams), more experience using technologies requiring thinking (i.e. computer-aided instruction), and a successful history of effective problem solving (Cacioppo & Petty, 1984). They tend to be intrinsically motivated and desire new experiences that stimulate thinking and often doing extra work without being asked to do so (Cacioppo et al., 1996). In contrast, individuals with a low need for cognition have a relative “absence of the motivation for effortful cognitive activities that defines high need for cognition” (Cacioppo, Petty, Feinstein & Jarvis,
These individuals are more likely to rely on intuition or the advice of others to understand their environment. To measure this construct this study used the Need for Cognition scale designed by Cacioppo & Petty (1982).

*Need for Cognition Scale*

Cacioppo and Petty (1982) designed the Need for Cognition scale (Cacioppo & Petty, 1982) to measure the need for cognition. Since its creation in 1982, the Need for Cognition Scale has been used in over 100 studies. Rooted in motivation theory, the original scale contained 34-items (long form) designed to measure an individual’s internal desire to perform on a cognitively effortful endeavor (Cacioppo et al., 1996). After replicating the initial study, Cacioppo, Petty and Kao (1984) found that the Cronbach alpha reached an asymptote after entering the 18-items with the highest factor loadings. They created a smaller scale with these 18-items and found them to be highly correlated with the original 34-item scale ($r = .95, p < .001$), with an internal consistency of $\alpha = .90$ (the internal consistency of the long version was $\alpha = .91$). Both scales were used in a variety of empirical studies, investigating how the need for cognition relates to other constructs like intelligence, identity, personality and demographic variables. Specifically, the Cronbach alphas for the 18-item scale have generally been at .85 or above (Cacioppo et al., 1996).

*Research on the Need for Cognition*

Since its inception, the Need for Cognition scale has been used to explore the relationship between need for cognition and other variables. Researchers found the need for cognition to be negatively related to a need for structure (Newberg & Newsom, 1993); the tendency to avoid, ignore or distort new information (Venkantraman, Marlino,
Kardes & Sklar, 1990); and the need for closure, closed mindedness, and preference for order and predictability (Petty & Jarvis, 1996). Past research studies also found people who are high in the need for cognition are more likely than people who are low in cognition: to be curious (Osberg, 1987); to have more confidence in their opinions (Barden & Petty, 2008); solve complex problems (Nair & Rumnurayan, 2000); have higher levels of metacognition (Coutinho, 2006); to show a desire to maximize information gained from an experience (Sorrentino, Short & Raynor, 1984); have higher levels of identity development (Njus & Johnson, 2008); to seek out and elaborate on relevant information when performing a task (Berzonsky & Sullivan, 1992); to show willingness to focus their attention on a task at hand (Osberg, 1987); have higher levels of life satisfaction (Coutinho & Wollery, 2004); to desire new experiences that stimulate thinking (Venkatramn & Prince, 1990); have higher levels of verbal ability (Bors, Vigneau & Lalande, 2006); to seek, evaluate, and use relevant information for decision making and problem solving (Berzonsky & Sullivan, 1992); make thoughtful judgments (Verplanken, 1989); pay more attention to the quality of information available (Cacioppo, Petty, Kao, & Rodriguez, 1986); and to be intrinsically motivated (Steinhart & Wyer, 2009; Olson, Campu & Fuller, 1984).

Although the need for cognition measures a cognitive motivation rather than intellectual ability, several studies have found a relationship between need for cognition and cognitive ability. Research found the need for cognition to be related to but distinguishable from verbal intelligence (Cacioppo, Petty, Kao & Rodriguez, 1986; Cacioppo et al, 1996); ACT scores (Cacioppo & Petty, 1982; 1984; Olson et al, 1984; and Petty & Jarvis, 1996); high school grade point average (Gulgoz, 2001; Petty & Jarvis,
Based on these studies, it is evident that the individual differences in the need for cognition help to understand how people process information but also how they behave. Basically, individuals high in the need for cognition compared to those classified as low in the need for cognition think more about information, current events and problems.

Although most studies using the need for cognition scale have been conducted in the disciplines of communication and psychology, a few studies have explored the need for cognition in undergraduate education. In two studies, Spotts (1994) found a relationship between education level and the need for cognition. He conducted his first study on 201 adults from local civic groups, senior citizen centers, and university staff personnel, measuring both the need for cognition and participants educational level. The second study involved 165 community residents. Both studies found the need for cognition and educational level to be positively correlated ($r = .46$ and $.43, p < .001$).

Jensen (1998) also studied the relationship between education level and the need for cognition in 81 graduate and undergraduate students. Jensen found that the need for cognition scores between first and senior year students differed by -8.93 ($p < .05$); she found an even more significant difference between first year undergraduate and graduate students (-12.06, $p < .001$). It is unknown if this relationship reflects a process of self-selection (those high in need for cognition are more likely to pursue further education), an effect of education on an individual’s level of need for cognition, or more intelligent individuals are more likely to attain higher levels of education and need for cognition (Cacioppo et al, 1996). This study explored what impact, if any, co-curricular
involvement had on a student’s need for cognition as they progress through their undergraduate career.

Leone and Dalton (1988) studied the relationship between the need for cognition and course grades. With a sample of 35 men and 52 women, they found a statistically insignificant relationship between the initial variables. They did find that the need for cognition scores predicted the comprehension of class materials requiring effortful thinking. In a study also examining the relationship between the need for cognition and academic performance, Sadowski and Gulgoz (1996) found students with a high need for cognition did better academically. Different from Leon and Dalton, this study used three multiple-choice tests to measure academic performance. They concluded that students with a high need for cognition used elaborative learning strategies which translated into a deeper understanding of information and good academic performance (Sadowski & Gulgoz, 1996).

Data from studies using the need for cognition scale also have indicated that an individual’s need for cognition changes over time (Cacioppo et al., 1996). Cacioppo et al. (1996, p. 246) believed that “the development of the need for cognition, therefore, may benefit from the construction of contingencies (i.e. educational settings) that fosters both cognitive development and feelings of enjoyment, competence, and mastery of thinking.’’ Learning environments and opportunities in the university setting have the potential to be conducive for growth. This includes learning both in the curricular and co-curricular setting.

Studies using the need for cognition as an outcome measure are limited. McKeachie, Pintrich, and Lin (1985) conducted a study to explore whether the teaching
strategies in one college class would affect student’s motivation for learning. Using a test and a control group the research team surveyed 439 students in an introductory psychology course. Each group completed the need for cognition scale at the beginning and end of the semester. Results indicated that the students enrolled in the “Learning to Learn” course increased on their need for cognition scores over the semester, while numbers decreased for the control group. These results support Cacioppo and Petty’s (1982) earlier claim that the need for cognition is a constructed that can change or develop over time. Participants in this study were not chosen based on random assignment and the study still waits for replication.

In a recent study, Goodman (2011) examined the influence of structural diversity, the psychological climate for diversity, and students’ behavior on the need for cognition for African-American, Asian-American, Latino/a, and White students in their first year of college. Of particular interest is the behavior outcome measure that included students’ involvement in diverse activities both in and outside of the classroom. Using the data collected as part of the Wabash National Study of Liberal Arts Education (WNSLAE), Goodman found some of the behavior variables to positively influence the need for cognition for African-American and White students. She found taking a diversity course to positively influence African-American students’ need for cognition. White students were the only group to have co-curricular experiences, including interacting with diverse others and participating in a racial/cultural workshop, to positively influence their need for cognition.

Building on Goodman’s (2011) research that used the need for cognition as an outcome measure, this study explored students’ general co-curricular involvement on
their need for cognition. These activities include, but are not limited to, organizations, campus publications, student government, fraternity or sorority membership, and intercollegiate or intramural sports. Based on what we know about student involvement and the need for cognition as a learning outcome, I hypothesized that co-curricular involvement would positively impact students’ need for cognition.

**Conceptual Framework**

This study sought to understand the effects of student involvement on the need for cognition. The framework for this study is based on Pascarella's General Model for Assessing Change (Pascarella, 1985). This college impact model suggests that growth in student learning and cognitive development is a function of five main sets of variables: 1) student background/precollege traits 2) structural/organizational characteristics of institutions, 3) institutional environment, 4) interactions with agents of socialization, and 5) quality of student effort (Pascarella & Terenzini, 2005).

Based on Pascarella’s model and previous research on student development, the following conceptual model was created for this study (see Figure 1 at the end of this chapter). The model provides a framework that helps isolate the effects of involvement and college environment on need for cognition. This study incorporates four clusters of variables: 1) student background characteristics, 2) co-curricular experiences, 3) institutional type, and 4) other college experiences. In this model, the first two blocks of variables, institutional type and student background/precollege characteristics, influence a student’s involvement. Another block, other college experiences, is influenced by student background/precollege characteristics. Individually and collectively the clusters of student background characteristics/precollege traits, institutional type, co-curricular
involvement and other college experiences have the potential to impact a student’s need for cognition.

By controlling for the effects of precollege student characteristics, other college experiences, and institutional type, the unique effects of co-curricular involvement on a student’s need for cognition can be isolated. The model also investigated if any conditional effects of co-curricular involvement on need for cognition exist. In other words, change or lack of change in the need for cognition differ for students based on ethnicity, sex, or amount of involvement?

Chapter 3 discusses research methods and the design used to study the conceptual model. In this chapter, the study design, variable definition and data analysis are explained.
Figure 1. Conceptual model of study.
CHAPTER III – METHODS

The purpose of this study was to examine the effects of co-curricular involvement on students’ need for cognition and whether the effects of involvement vary based on students’ sex, race and the type of institution they attend. Specifically, the following research questions guided this study:

1. Controlling for background and precollege characteristics, what are the effects of co-curricular involvement on students’ need for cognition?
2. Does the effect of co-curricular involvement on need for cognition differ based on the amount of involvement?
3. Are the effects of co-curricular involvements on students’ need for cognition the same for all students or do they differ by student’s sex, race, and type of institution they attend?

This chapter of the study is broken down into five sections. Described are the institutional and student sample; the data collection methods for the Wabash National Student of Liberal Arts Education; the independent, control and dependent variables used in this study; the methods used for data analysis and, finally, the limitations of the study are addressed.

Data Set and Analytic Sample

The sample for this study consisted of students at 17 four-year institutions representing 11 different states. The overall study, the Wabash National Study of Liberal Arts Education (WNSLAE), received funding from the Center of Inquiry in the Liberal Arts at Wabash College. The main purpose was to investigate “the effects of liberal arts colleges and liberal arts experiences on the cognitive and personal outcomes theoretically
associated with a liberal arts education” (www.liberalarts.wabash.edu/study-overview/, retrieved January 26, 2010). Specifically focusing on the following outcomes associated with undergraduate liberal arts education: critical thinking, need for cognition, interest in and attitudes about diversity, leadership, moral reasoning, and well-being. Essentially, it sought to discover the extent to which college experiences affect a student’s development on these six outcomes and identify ways liberal arts institutions can enhance their impact on a student’s development (http://www.liberalarts.wabash.edu/study-overview/, retrieved July 1, 2011). From this large, longitudinal data set, this dissertation examined the effects of student involvement on the need for cognition. The following sections describe the institutions and student samples.

Institutional Sample

Institutions were selected from 60 institutions that responded to a national invitation to participate in the Wabash National Study of Liberal Arts Education (WNSLAE). To diversify the sample institutions varied in their geographic region, institutional size, student population, and academic selectivity. The institutional sample included three research universities, three regional (non-doctoral granting), and 11 liberal arts colleges. Due to the nature of the study, liberal arts colleges were purposefully over-represented. In return for their participation, the institutions the received a report based on the data the research team collected during the study. The institutional sample for this study included research, regional and liberal arts colleges. Community colleges were not included due to nature of the institution and the low retention rate of students over the three-year data collection period.
Student Sample

The sample was composed of full-time undergraduate students enrolled at the 17 chosen institutions. To assess the impact of college on students at these institutions, first-year students were surveyed in the fall of 2006 and then again in the spring of 2010, at the end of their fourth year at the institution. For the larger institutions, the sample was randomly selected from the incoming 2006 first-year class at each institution. One exception was the largest participating institution, where the sample was randomly selected from the incoming class in the College of Arts and Sciences. For the smallest institutions in the study, all classified as liberal arts colleges, the sample was the entire incoming 2006 first-year class. Once chosen, the students were invited to participate in a longitudinal study examining how college affects students. Participants received a cash stipend at the time of data collection and were assured their responses would remain confidential.

Instruments and Data Collection

Administered by ACT, the first wave of data collection began in the fall of 2006, with the final collection occurring during the spring semester of 2010. The initial collection lasted between 90-100 minutes and participants received a $50 stipend for their participation. Every student completed a WNSLAE precollege survey, including demographic information, family background, high school experiences, political orientation, and educational degree plan, all helping to establish pre-test information. In addition, students completed a number of instruments, including the Need for Cognition scale, measuring dimensions of personal and intellectual development usually associated
with a liberal arts education. For this phase, 4,193 students, representing 17 institutions completed the distributed surveys and instruments.

For a complete examination of college impact, follow-up data collection occurred in spring 2010. For their two hours of participation, students again received a $50 stipend. The surveys included the National Survey of Student Engagement (NSSE), WNSLAE Student Experiences Survey (WSES) and the same instruments used at time one to measure personal and intellectual development, including the Need for Cognition scale.

The National Survey of Student Engagement (NSSE), the Student Experiences Survey and The Need for Cognition Scale (Cacioppo & Petty, 1982) are all instruments used in this study. Each instrument is forced-choice and closed ended. Students must choose among several responses instead of answering in their own words. Both the National Survey of Student Engagement and the Student Experiences Survey were designed to gather information about a student’s participation in or exposure to good practices in undergraduate education. Pascarella, et al. (2004) defined these practices as exposure to effective teaching, quality of nonclassroom interactions with faculty, frequency of interaction with faculty, teaching clarity and organization, academic challenge, cooperative learning, diversity experiences, active learning/time on task, integrative experiences, influential interactions with other students, and high expectations. The Need for Cognition scale measured the tendency for an individual to engage in and enjoy thinking (Cacioppo & Petty, 1982). The following sections describe these scales in more detail.
Variables

Provided in this section are operational definitions for the independent variable, control variables and the dependent variable used for this study. A list of the variables used in this study can be found on Table 2 at the end of this chapter.

Independent Variable

The concept of involvement is well known by higher education practitioners and researchers focusing on college impact. As mentioned in chapter 1, involvement is defined as “as the amount of physical and psychological energy that a student devotes to that academic experience” (Astin, 1984, p. 297). The basic premise is the more students are involved in the various aspects of college life, the more they will benefit in terms of learning and development (Astin, 1999). The theory of student involvement provides a framework for analyzing the relationship between college experiences and outcomes like a student’s need for cognition.

For the purpose of this study involvement consisted of one reported item from the National Survey of Student Engagement (NSSE). The question asked students to estimate about how many hours they spend in a typical 7-day week participating in co-curricular activities (organizations, campus publications, student government, fraternity or sorority, intercollegiate or intramural sports, etc.). Responses, in 5-hour increments, ranged from 0 to more than 30 hours. To make this a continuous measure, the midpoint value of each increment was used (1 = 0 hours, 2 = 2.5 hours, 3 = 8 hours, 4 = 13 hours, 5 = 18 hours, 6 = 23 hours, 7 = 28 hours, 8 = 45 plus).
Control Variables

Astin (1993) and Pascarella (1985) in their model for assessing change indicated four different types of influence that must be considered when estimating the effects of college on students. The areas of influence include: 1) student demographic or pre-college characteristics, 2) college environment, 3) students’ academic experiences, and 4) students’ non-academic experiences. Research shows that these variables do impact learning, causing an overestimation of the effects of involvement on the learning outcome, in this case the need for cognition (Astin, 1977; Astin, 1993). The longitudinal nature of the Wabash Study, allows for the use of a wide range of statistical controls. Below are the control measures used for this study.

Background and Pre-College Characteristics

Because the larger Wabash study was not a randomized experiment, statistical controls and pre-test measures of the outcome are the best way to accurately assess the net effects of college experiences (Pascarella, 2006). In this study, the institution, not the student, provided the necessary information for two of the control variables. The dichotomous question regarding the student’s acceptance of a federal grant was used a proxy for socioeconomic status (SES). The federal government determines student’s eligibility to receive this money based on their completion of the Free Application for Federal Student Aid (FAFSA). Due to the explicit requirements for students to receive this money, past research studies found this question to be a sufficient proxy for SES (Padgett, 2011; Salisbury, Paulsen & Pascarella, 2011). The institution also provided students’ ACT score or SAT equivalent score. These scores were used to control for precollege academic ability.
Several of the controls that described individual background characteristics are found in the WNSLAE pre-college survey. Students completed this survey in the fall of 2006, during their first year. From this survey, dummy variables were created for the dichotomous and categorical variables such as sex (0 = female vs. 1 = male) and ethnicity (0 = white vs. 1 = non-white).

Student’s involvement in high school and pre-college academic motivation were also included as pre-college characteristic control measures. The high school involvement scale was included to control for the potential influence of any pre-college involvement experiences on a student’s need for cognition. Controlling for these experiences allows any change in the need for cognition to be attributed to a student’s college, not high school, involvement experiences. The scale included items asking students how often they participated in the following activities: studying with a friends, socializing with friends, community service/volunteer work, talking with teachers outside of class, and extracurricular activities will be used. The internal consistency reliability for the scale is .60.

As stated in chapter 2, the need for cognition originated from Cacioppo and Petty’s (1982) research on information processing and intrinsic motivation. In order to attribute changes in the need for cognition to college experiences, a control for pre-college intrinsic motivation needs to be included in the model. An eight question, pre-college academic motivation scale was developed from the Wabash Student Experiences Scale. Items from this scale, measuring intrinsic motivation, include: the extent to which the respondent is willing to work hard in a course to learn the material even if it will not lead to a higher grade; the extent to which respondent does well on a test because they are
well-prepared not because the test is easy; the extent to which in high school respondent frequently did more reading in a class than was required simple because it interested them; the extent to which in high school respondent frequently talked to teachers outside of class about ideas present during class; the extent to which getting the best grades is important to them; the extent to which the respondent enjoys the challenge of learning complicated new material; the extent to which respondent agrees that academic experiences (i.e., courses, labs, studying, discussion with faculty) will be the most important part of college; and the extent to which respondent agrees that academic experiences (i.e., courses, labs, studying, discussion with faculty) will be the most enjoyable part of college. The internal consistency reliability of the scale is 0.73, based on the 2006 fall data collection.

To minimize the practice effect, this study uses the Need for Cognition pretest (fall 2006) and testing at time two (spring 2007) as additional pre-college control variables. By using a pre-test control, any changes in the need for cognition posttest can be more confidently attributed to the independent variable, co-curricular involvement (Pascarella, 2006) and not the influence of taking the test multiple times. Since the Need for Cognition pretest (fall 2006) was administered at the beginning of student’s first year it also provides a starting measure of the outcome, giving us the information necessary to assess actual gains. Collectively, the background and pre-college control variables help guide the model for assessing change in this research study.

**College Institutional Variables**

Including institutional characteristics, like institutional type, in the analytical model allows the researcher to explore the possible unique differences between
institutional environments (Pascarella & Terenzini, 2005). For example, The National Survey of Student Engagement (2003), found liberal arts colleges, compared to their counterparts, to engage students more frequently in co-curricular activities that complement their curricular experiences. The National Study of Student Learning (NSSL) and the Wabash National Study of Liberal Arts Education (WNSLAE) (Seifert, Pascarella, Goodman, Salisbury & Blaich, 2008) found that compared to other institutions, liberal arts colleges do foster a range of good practices in higher education including interactions with faculty, focus on cooperative learning, prompt feedback to students, quality teaching, high academic expectations, and student academic effort and time on task. Based on these national studies, the student experience should vary across the institutional types. In this study, institutions were divided into three groups, based on the Carnegie Classification system. Using a set of dichotomies, regional and research institutions are compared to the reference group, liberal arts colleges. Again, community colleges were not included due to the low retention rate of students over the four-year data collection period.

Students’ Academic Experiences

Research suggests that liberal arts majors, versus those majoring in a pre-professional major/occupation, have the freedom to pursue learning for its own sake, increasing their intellectual curiosity and laying the groundwork for lifelong learning skills (Astin, 1993; Kuh, 1999). To control for the effects of major on a student’s need for cognition, a dichotomous variables measuring major (liberal arts vs. other) was included within the model.
An important aspect of a student’s academic experience is their interaction with faculty. Research reveals interactions with faculty both inside and outside of the classroom enhance a student’s learning and development outcomes (Astin, 1993; Kuh, 1995; Kuh & Hu, 2001; Strauss & Terenzini, 2007; Terenzini, Springer, Yaeger, Pascarella, & Nora, 1994). To control for this effect, the scales measuring the quality and impact of nonclassroom interactions with faculty and the overall exposure to clear and organized instruction were included in the analytical model. The quality and impact of nonclassroom interactions with faculty measures the extent to which nonclassroom interactions with faculty have had an impact on: intellectual growth and interest in items; personal growth, values, and attitudes; and career goals and aspirations. The response options were: 5 = strongly agree, 4 = agree, 3 = not sure, 2 = disagree, and 1 = strongly disagree. The alpha reliability = .87. The overall exposure to clear and organized instruction measures the frequency that faculty give clear explanation, frequency that faculty make good use of examples and illustration to explain difficult points, frequency that class time was used effectively, frequency that course goals and requirements were clearly explained. The response options were: 4 = very often, 3 = often, 2 = occasionally, and 1 = never. The alpha reliability = .89.

Students’ Non-Academic Experiences

Although the research on the effects of work on college outcomes is inconclusive, one study found work to have a positive effect on the development of leadership skills (Salisbury, Pascarella, & Padgett, 2010). Despite the limitations employment places on the time available to participate in co-curricular involvement opportunities, past studies suggests the two commitments produce very similar results. Work, like co-curricular
involvement, augments what students are learning in the classroom. Given these recent findings, an item controlling for both on and off campus employment was included in the analytical model. This measure consists of two questions: how many hours in a typical week did the respondent spend working for pay on campus and working for pay off campus. Reponses, in 5-hour increments, ranged from 0 to more than 30 hours. To make this a continuous measure, the midpoint value of each increment was used (1 = 0 hours, 2 = 2.5 hours, 3 = 8 hours, 4 = 13 hours, 5 = 18 hours, 6 = 23 hours, 7 = 28 hours, 8 = 45 plus).

Residence halls are also recognized as another venue for student learning, growth and development. Pascarella and Terenzini (2005, p. 603) found that “living on campus, however, appears to foster change indirectly, by maximizing the opportunities for social, cultural, and extra-curricular engagement.” Specifically, LaNasa, Olsen and Alleman (2007) found on-campus students were significantly more likely to engage in co-curricular activities, experience diverse interactions, and increase their academic effort. Given these research findings, a dichotomous variable measuring on-campus residence (versus off-campus residence) was included within the model.

**Dependent Variable**

This study examined the effects of involvement on a student’s need for cognition. In 1982, Cacioppo and Petty proposed that there were “stable individual difference in people’s tendency to engage in and enjoy effortful cognitive activity” (Cacioppo, Petty, Feinstein, & Jarvis, 1996, p. 197). They labeled this difference as a person’s need for cognition. Those with a high need for cognition “tend to seek, acquire, think about, reflect back on information to make sense of stimuli, relationships, and events in their
world” (p. 198). On the other spectrum, those with low need for cognition are more likely to rely on others (celebrities or experts), cognitive heuristics, or social comparison processes to make sense of their world. This need for cognition reflects an intrinsic motivation that can be developed or changed. The emphasis is on measuring the process, individuals’ enjoyment and tendency to engage in cognitive activity, rather than the outcome of the activity.

In 1982, Cacioppo and Petty measured this construct in a 34-item, Likert-scale called the Need for Cognition Scale (NCS). This scale was “designed to assess people’s tendencies to engage in or to enjoy effortful cognitive endeavors” (Cacioppo, Petty, Feinstein & Jarvis, 1996, p. 199). After the initial study, Cacioppo and Petty (1984) found that the 18 items with the highest factor loading were highly correlated with the original 34-item scale ($r = .95$, $p < .001$), possessed high internal consistency ($\alpha = .90$), and had one dominant factor accounting for 37% of the variance (Cacioppo, et al., 1996). This led Cacioppo and Petty to create an 18-item, shortened version of the NFC scale.

The shortened Need for Cognition Scale asked individuals to rate the satisfaction they gain from thinking. A few of the items included are: “I would prefer complex to simple problems;” “I only think as hard as I have to;” and “The idea of relying on thought to make my way to the top appeals to me” (Cacioppo et al., 1984). A complete list of scale items can be found on Table 3.1. Participants were asked to rate the extent they agreed with each statement. For the purposes of the Wabash National Study, responses were limited to a 5-point scale. The response choices were: extremely characteristic, somewhat characteristic, uncertain, somewhat uncharacteristic, and extremely
uncharacteristic. Using this scale the highest possible score on the Need for Cognition scale is 90 (18 items multiplied by 5) and the lowest is 18 (18 items multiplied by 1). Out of the 18 items on the scale, nine are reverse scored. Past researchers who used the NFC in samples of undergraduate students reported reliabilities ranging from .83 to .91 (Berzonsky & Sullivan, 1992; Cacioppo, Petty & Kao, 1984; Furlong, 1993, Kernis, Grannemann & Barclay, 1992; Miller, Omens & Delvadia, 1991; Sadowski, 1993; Sadowski & Gulgoz, 1992; and Venkatraman, Marlino, Kardes, & Sklar, 1990). Based on the 2006 and 2010 WNS data collections, the reliabilities of the scale are .886 and .891 respectfully.
Table 1

Need for Cognition Scale Items

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Item Wording</th>
<th>Item Scoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I would prefer complex to simple problems</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>I like to have the responsibility of handling a situation that requires a lot of thinking</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Thinking is not my idea of fun</td>
<td>Reverse scored</td>
</tr>
<tr>
<td>4.</td>
<td>I would rather do something that requires little thought than something that is sure to challenge my thinking abilities.</td>
<td>Reverse scored</td>
</tr>
<tr>
<td>5.</td>
<td>I try to anticipate and avoid situations where there is likely a chance I will have to think in depth about something</td>
<td>Reverse scored</td>
</tr>
<tr>
<td>6.</td>
<td>I find satisfaction in deliberating hard and for long hours</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>I only think as hard as I have to</td>
<td>Reverse scored</td>
</tr>
<tr>
<td>8.</td>
<td>I prefer to think about small, daily projects to long-term ones</td>
<td>Reverse scored</td>
</tr>
<tr>
<td>9.</td>
<td>I like tasks that require little thought once I’ve learned them</td>
<td>Reverse scored</td>
</tr>
<tr>
<td>10.</td>
<td>The idea of relying on thought to make my way to the top appeals to me</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>I really enjoy a task that involves coming up with new solutions to problems</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Learning new ways to think doesn’t excite me very much</td>
<td>Reverse scored</td>
</tr>
<tr>
<td>13.</td>
<td>I prefer my life to be filled with puzzles that I must solve</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>The notion of thinking abstractly is appealing to me</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>I feel relief rather than satisfaction after completing a task that required a lot of mental effort</td>
<td>Reverse scored</td>
</tr>
<tr>
<td>17.</td>
<td>It’s enough for me that something gets the job done; I don’t care how or why it works</td>
<td>Reverse scored</td>
</tr>
<tr>
<td>18.</td>
<td>I usually end up deliberating about issues even when they do not affect me personally</td>
<td></td>
</tr>
</tbody>
</table>
Data Analyses

Past research demonstrates the importance of co-curricular involvement on students’ cognitive growth and development during college. This research is not without limitations. Several of these studies are not longitudinal and lack the controls necessary to accurately attribute change in the outcome measure to co-curricular involvement. This study contributed to this research area by expanding the idea of cognitive growth to include students’ tendency to engage in and enjoy effortful cognitive activity. This study sought to answer the following questions:

1. Controlling for background and precollege characteristics, what are the effects of co-curricular involvement on students’ need for cognition?

2. Does the effect of co-curricular involvement on need for cognition differ based on the amount of involvement?

3. Are the effects of co-curricular involvements on students’ need for cognition the same for all students or do they differ by student’s sex, race, and type of institution they attend?

In the first stage of analysis, I ran descriptive statistics for all the variables included in the model. The frequency, percentage, mean, standard deviation, maximum score and minimum score for each variable can be found in chapter 4, Table 4. For the independent variable, co-curricular involvement, I looked at the frequency, percentage and cumulative percentage for each block of hours (see chapter 4, Table 3). I also ran correlations between all the variables included in the model. Table 5, in chapter 4, shows the Pearson correlations and indicates that multicollinearity was not a concern.
In the second stage of analysis, I used multiple regression to determine if there were significant net effects of involvement on the need for cognition. Multiple regression was used “to identify (a) how much total variance a set of predictors can account for in criterion variable and (b) which predictors can explain more variance in the criterion” (Heppner & Heppner, 2004, p. 263). In the first model, the need for cognition scores (spring 2010) were regressed on co-curricular involvement plus all the precollege and background control variables (sex, race, NFC pre-test, socio-economic status, high school involvement, pre-college academic motivation, precollege academic ability). This model explored the possibility of any indirect effects. Are the effects of involvement possibly mediated thru another variable(s)? The second model, looking for a direct effect, included all items from the first model plus additional control variables (institutional type, residential status, major, hours worked, nonclassroom interactions with faculty, kind of instruction, and need for cognition spring 2007).

The final stage of analysis explored if the net effects of co-curricular involvement on need for cognition were conditional based on a student’s race, sex or the type of institution they attended. First, I created cross-product terms, multiplying involvement with race, sex, and institutional type, respectively. Once created, each cross product term was added to the general effects model individually. If entering these cross-products provided a statistically significant increase in explained variance (R²), above the general effects model, then the conditional effects were further examined.
Limitations

Three limitations should be kept in mind when thinking about this study. The 17 institutions in the WNSLAE study were not sampled; each institution chose to participate due to their interest in undergraduate education. We do not know if the experiences at these institutions differ from those institutions that chose not to participate.

The second limitation deals with generalizability. As anticipated, response rates declined for the follow-up data collection. During the third data collection 2205 students completed the Need for Cognition scale, this was down from the 4191 students that completed the present in 2006, a 53% response rate. While an unavoidable situation, the attrition rate from time one to time three is still a limitation. Also, each institution, in conjunction with ACT, determined how surveys were administered at the beginning of the year, which in many cases was not done by random sampling. The non-random sampling and variation in response rates suggests we cannot generalize the results of this study to the entire undergraduate student population.

The final limitation is small number of students of color participating in the study. Students of color were not oversampled so the percentage of respondents in each racial group is not representative of that group’s presence among all undergraduate students. While the number of students identifying themselves as Asian/Pacific Islander, Black and Hispanic is small, there is no data from Native American Indian students. They surveys also did not provide students with a “multiracial” category. Instead, students were forced to choose one racial category.
Summary

In this study, I investigated the relationship between co-curricular involvement and the need for cognition, controlling for various background characteristics, precollege measures, and college experiences. I also analyzed whether race, sex or institutional type influenced the effect of co-curricular involvement on the need for cognition. This chapter provided information regarding the sample, data collection, independent and dependent variables, and the analyses plan. In the next chapter, I will present the results of the analyses.
Table 2

Summary of Variable Definitions

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institutional Type</td>
<td>Research university, liberal arts college, and regional university</td>
</tr>
<tr>
<td>Socio-Economic Status</td>
<td>The student’s acceptance of a federal grant was used a proxy for socioeconomic status (SES). 0 = yes, 1 = no</td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td>0 = white, 1 = non-white</td>
</tr>
<tr>
<td>Sex</td>
<td>0 = female, 1 = male</td>
</tr>
<tr>
<td>Precollege Academic Ability</td>
<td>Individual’s score on the ACT exam or SAT equivalent score. Each institution provided the scores.</td>
</tr>
<tr>
<td>High School Involvement Scale</td>
<td>The scale included items asking students how often they participated in the following activities: studying with friends, socializing with friends, community service/volunteer work, talking with teachers outside of class, and extra curricular activities.</td>
</tr>
<tr>
<td><strong>Alpha = .60</strong></td>
<td></td>
</tr>
<tr>
<td>Precollege Academic Motivation Scale</td>
<td>An eight-item scale measuring precollege academic motivation.</td>
</tr>
<tr>
<td><strong>Alpha = .73</strong></td>
<td>Questions:</td>
</tr>
<tr>
<td></td>
<td>Indicate the extent to which you agree/disagree with each of the following statements about your views or perspectives in general.</td>
</tr>
<tr>
<td></td>
<td>I am willing to work hard in a course to learn the material even if it will not lead to a higher grade.</td>
</tr>
<tr>
<td></td>
<td>When I do well on a test because they are well-prepared not because the test is easy.</td>
</tr>
<tr>
<td></td>
<td>I frequently do more reading in a class than was required simple because it interested them.</td>
</tr>
<tr>
<td></td>
<td>I frequently talk to faculty outside of class about ideas present during class.</td>
</tr>
<tr>
<td></td>
<td>Getting the best grades is important to me.</td>
</tr>
<tr>
<td></td>
<td>I enjoy the challenge of learning complicated new material.</td>
</tr>
<tr>
<td></td>
<td>My academic experiences (i.e., courses, labs, studying, discussion with faculty) will be the most important part of college.</td>
</tr>
<tr>
<td></td>
<td>My academic experiences (i.e., courses, labs, studying, discussion with faculty) will be the most enjoyable part of college.</td>
</tr>
<tr>
<td></td>
<td>The response options were: 5 = strongly agree, 4 = agree, 3 = not sure, 2 = disagree, and 1 = strongly disagree.</td>
</tr>
<tr>
<td>Need for Cognition Pre-test</td>
<td>Individual score on the NFC at the beginning of a student’s first year (fall 2006).</td>
</tr>
<tr>
<td>Need for Cognition Time 2</td>
<td>Individual score on the NFC on the end of a student’s first year (spring 2007).</td>
</tr>
<tr>
<td>Residential Status</td>
<td>0 = off campus; 1 = on campus</td>
</tr>
<tr>
<td>Major</td>
<td>0 = other; 1 = liberal arts</td>
</tr>
</tbody>
</table>
| Quality of Nonclassroom Interactions with Faculty | A three-item scale measuring the quality and impact of nonclassroom interactions with faculty. Questions:  
1. My non-classroom interactions with faculty have had a positive influence on my personal growth, values, and attitudes.  
2. My non-classroom interactions with faculty have had a positive influence on my career goals and aspirations.  
3. My non-classroom interactions with faculty have had a positive influence on my career goals and aspirations.  
The response options were: 5 = strongly agree, 4 = agree, 3 = not sure, 2 = disagree, and 1 = strongly disagree. |
| Kind of Instruction Scale | A 10-item scale measuring the overall exposure to clear and organized instruction. Questions:  
1. Faculty gave clear explanations.  
2. Faculty made good use of examples and illustrations to explain difficult points.  
3. Faculty effectively reviewed and summarized the material.  
4. Faculty interpreted abstract ideas and theories clearly.  
5. Faculty gave assignments that helped in learning the course material.  
6. The presentation of material was well organized.  
7. Faculty were well prepared for class.  
8. Class time was used effectively.  
9. Course goals and requirements were clearly explained.  
10. Faculty had a good command of what they were teaching.  
The response options were: 4 = very often, 3 = often, 2 = occasionally, and 1 = never. |
| Co-curricular Involvement | Question measuring the amount of co-curricular involvement. Question: About how many hours do you spend in a typical 7-day week doing each of the following? Participating in co-curricular activities (organizations, campus publications, student government, fraternity or sorority, intercollegiate or intramural sports, etc.). To make this a continuous measure, the midpoint value of each increment was used (1 = 0 hours, 2 = 2.5 hours, 3 = 8 hours, 4 = 13 hours, 5 = 18 hours, 6 = 23 hours, 7 = 28 hours, 8 = 45 plus). |
CHAPTER IV – RESEARCH QUESTIONS AND RESULTS

Introduction

This chapter details the results of the study, examining the effects of co-curricular involvement on students’ need for cognition, and whether the results vary based on sex, race and institution type. Following a brief summary of the methodology used for this study, the results are organized by each of the three research questions.

Methodology Summary

Data for this study is from the Wabash National Study of Liberal Arts Education (WNSLAE). The main purpose of the national study is to investigate “the effects of liberal arts colleges and liberal arts experiences on the cognitive and personal outcomes theoretically associated with a liberal arts education” (www.liberalarts.wabash.edu/study-overview/, retrieved January 26, 2010). This study looks at students who participated in the larger study, completing testing during the fall of their first year, 2006, and again in the spring of their fourth year, 2010. This longitudinal, pretest-posttest design allows examination of the relationship between involvement and the need for cognition with statistical controls, improving the internal validity of the study. This type of design provides the most reliable body of evidence on college impact (Astin, 1993; Pascarella & Terenzini, 1991, 2005).

Three questions guided framework for the study. When controlling for student background characteristics/precollege traits, institutional type and other college experiences: (1) What are the effects of co-curricular involvement on students’ need for cognition? (2) Does the effect of co-curricular involvement on need for cognition differ based on the amount of involvement? (3) Are the effects of co-curricular involvements
on students’ need for cognition the same for all students or do they differ by student’s sex, race, and type of institution they attend?

The analytical model addresses these questions by incorporating aspects of Astin (1993) and Pascarella (1985) models for assessing change and past research on undergraduate student co-curricular involvement. Look at Table 2, at the end of chapter 3, for a list of each variable. Multiple regression was used to explore the effect of the independent/predictor variables on the dependent variable, the need for cognition. Using this statistical procedure allowed for the examination of a single variable or multiple variables with or without the effects of other variables taken into account (Cohen, Cohen, West, & Aiken, 2003). A number of statistical adjustments and controls measures were added to more accurately measure the effects of co-curricular involvement on a student’s need for cognition. The results of the study are found in Table 6.

**Descriptive Analyses**

Table 2 details the descriptive statistics cross the sample of students who completed the surveys both at time 1 (2006) and time 3 (2010). The final analytical sample consisted of 2205 undergraduate students. Of the respondents, 27% were male, 63% were female, 75% were white, 25% were nonwhite, 13% received a federal grant, 56% attended a liberal arts institution, 42% lived on campus, and 31% were liberal arts majors.

The survey measuring the need for cognition, the dependent variable, was given in the fall of 2006, spring of 2007 and spring of 2010. The mean scores of this scale were 3.54, 3.52, and 3.72 respectfully. The independent variable of interest, college co-curricular involvement, had a mean value of 6.99 hours with 76% of respondents
participating in co-curricular activities 10 hours or less per week. Table 3 details the hours of involvement, including percentage of student participating in each grouping.

Table 3
Hours of Involvement  \((n= 2205)\)

<table>
<thead>
<tr>
<th>Variable Breakdown</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 Hours</td>
<td>397</td>
<td>18.0</td>
<td>18.0</td>
</tr>
<tr>
<td>1 – 5 Hours</td>
<td>832</td>
<td>37.7</td>
<td>55.7</td>
</tr>
<tr>
<td>6 – 10 Hours</td>
<td>442</td>
<td>20.0</td>
<td>75.8</td>
</tr>
<tr>
<td>11 – 15 Hours</td>
<td>215</td>
<td>9.8</td>
<td>85.5</td>
</tr>
<tr>
<td>16 – 20 Hours</td>
<td>158</td>
<td>7.2</td>
<td>92.7</td>
</tr>
<tr>
<td>21 – 25 Hours</td>
<td>89</td>
<td>4.0</td>
<td>96.7</td>
</tr>
<tr>
<td>26 – 30 Hours</td>
<td>24</td>
<td>1.1</td>
<td>97.8</td>
</tr>
<tr>
<td>More than 30 Hours</td>
<td>48</td>
<td>2.2</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Results

Analyses were based on the model illustrated in Figure 1. This model contains five different blocks of variables that were entered into SPSS to estimate their impact on the need for cognition. The different blocks included: (a) precollege/student background traits, (b) institutional type, (c) other college experiences, (d) need for cognition test time 2, and (e) co-curricular involvement. To control for clustering, analyses were limited to using 16 variables (i.e., \(N – 1\)). Descriptive data for all the variables is in Table 4.

Table 5 contains all the variable correlations in the analytical model.

Multicollinearity occurs when independent variables are high correlated with each other and it is difficult to estimate how individual variables affect the dependent variable (Field, 2005). These correlations suggest that multicollinearity was not a problem. An alpha level of .05 was used to denote statistical significance in the study.
Table 4
Descriptive Statistics on Precollege and College-Level Variables using the Wabash National Study of Liberal Arts Education

<table>
<thead>
<tr>
<th>Variables (n = 2205)</th>
<th>Mean</th>
<th>SD</th>
<th>Freq.</th>
<th>%</th>
<th>Min.</th>
<th>Max.</th>
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<td></td>
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Table 5. Correlation Matrix

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<th>16</th>
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<td>2. Nonwhite</td>
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<td>4. Sex</td>
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<td>6. High School Involvement</td>
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<td>0.048*</td>
<td>0.163*</td>
<td>0.235*</td>
<td>0.015*</td>
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<tr>
<td>7. ACT Composite Score</td>
<td>0.249*</td>
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<td>8. Precollege Academic Motivation</td>
<td>0.474*</td>
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<td>0.080*</td>
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<td>9. College Involvement</td>
<td>0.039*</td>
<td>-0.054*</td>
<td>0.035*</td>
<td>-0.126*</td>
<td>-0.015*</td>
<td>0.084*</td>
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<tr>
<td>10. Institutional Type</td>
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<td>0.033</td>
<td>-0.063*</td>
<td>0.042*</td>
<td>0.047*</td>
<td>-0.096*</td>
<td>-0.395*</td>
<td>0.103*</td>
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<td>11. Hours Worked</td>
<td>-0.029</td>
<td>0.111*</td>
<td>-0.052*</td>
<td>0.064*</td>
<td>0.139*</td>
<td>0.048*</td>
<td>-0.210</td>
<td>0.010</td>
<td>-0.008*</td>
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<tr>
<td>12. Lives on Campus</td>
<td>0.092*</td>
<td>0.012</td>
<td>0.130*</td>
<td>0.034</td>
<td>0.025*</td>
<td>0.061*</td>
<td>0.100*</td>
<td>0.095*</td>
<td>0.055*</td>
<td>0.006</td>
<td>-0.098*</td>
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<tr>
<td>13. Liberal Arts Major</td>
<td>0.143*</td>
<td>-0.028</td>
<td>0.151*</td>
<td>-0.019</td>
<td>0.015</td>
<td>0.009</td>
<td>0.057*</td>
<td>0.034</td>
<td>-0.009</td>
<td>0.024</td>
<td>-0.006</td>
<td>0.080*</td>
<td>1.000</td>
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<td></td>
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</tr>
<tr>
<td>14. Teaching Clarity and Organization</td>
<td>0.256*</td>
<td>-0.053*</td>
<td>0.121*</td>
<td>0.003</td>
<td>-0.042</td>
<td>0.079*</td>
<td>0.122*</td>
<td>0.301*</td>
<td>0.046*</td>
<td>-0.041*</td>
<td>-0.021</td>
<td>0.087*</td>
<td>0.027</td>
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<tr>
<td>15. Nonclassroom Interactions w/Faculty</td>
<td>0.317*</td>
<td>-0.080*</td>
<td>0.186*</td>
<td>0.020</td>
<td>-0.007</td>
<td>0.179*</td>
<td>0.036*</td>
<td>0.431*</td>
<td>0.102*</td>
<td>0.092*</td>
<td>0.023</td>
<td>0.115*</td>
<td>0.075*</td>
<td>0.375*</td>
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<tr>
<td>16. Need for Cognition T2</td>
<td>0.614*</td>
<td>-0.034</td>
<td>0.690*</td>
<td>-0.026</td>
<td>-0.028</td>
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<td>0.023</td>
<td>-0.62*</td>
<td>-0.64*</td>
<td>0.107*</td>
<td>0.136*</td>
<td>0.139*</td>
<td>0.197*</td>
<td>1.000</td>
</tr>
</tbody>
</table>

*p < 0.05
Research Questions

Research Question One. The initial question guiding the research study was, “Controlling for background and precollege characteristics, what are the effects of co-curricular involvement on students’ need for cognition?” In model 1, research on college impact and the variables college co-curricular involvement and need for cognition guided the selection of background and precollege characteristics. The variables included sex, race, high school involvement, ACT composite score, precollege academic motivation, receiving a federal grant, need for cognition pretest, and co-curricular involvement. The need for cognition pretest was included to account for a student’s need for cognition prior to attending college. Co-curricular involvement was included in this model to begin exploring the possibility of indirect effects between co-curricular involvement and the need for cognition. In this model, the coefficient for co-curricular involvement did not change (unstandardized regression coefficient = .002; \( p > .05\)) which lead me to believe indirect effects were not present so no further action was required.

Collectively, the variables in model 1 resulted in an \( R^2 = .476, F (8, 2189) = 248.477, p < .001. \) “The \( R^2 \) refers to the percentage of the variance in the criterion explained by predictors in total, which would be equivalent to the estimate of the effect sizes” (Heppner & Heppner, 2004, p. 261). The variables that significantly contributed to the explained variance in the need for cognition were the need for cognition pretest 2006 (unstandardized regression coefficient = .461; \( p < .001\)) and precollege academic motivation (unstandardized regression coefficient = .358; \( p < .001\)). The higher coefficient for the pretest is not surprising because the pretest should account for a significant portion of the variance in the need for cognition test time three.
In model 2, including every item in model 1 plus institutional type and other college experiences, resulted in an $R^2 = .537$, $F (7, 2180) = 40.729$, $p < .001$. Specifically, the variables institutional type, hours worked, living on/off campus, major, teaching clarity and organization, Need for Cognition spring 2007 (time 2), and quality of nonclassroom interactions with faculty were added into the model. Adding these variables explained approximately 6% more variance in the Need for Cognition. The variables that significantly contributed to the explained variance in the Need for Cognition were the Need for Cognition pretest 2006 (unstandardized regression coefficient = .258; $p < .001$), precollege academic motivation (unstandardized regression coefficient = .271; $p < .001$), and Need for Cognition spring 2007 (unstandardized regression coefficient = .328; $p < .001$).

Both models had variables that were significant but had small contributions to the overall variance in the model. Table 6 details the variables, their unstandardized regression coefficients and significance levels.
Table 6. Coefficients

<table>
<thead>
<tr>
<th>Outcome: Need for Cognition</th>
<th>Variable</th>
<th>Model One</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Race</td>
<td>-.045*</td>
<td>-.030</td>
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<tr>
<td></td>
<td>Need for Cognition T1</td>
<td>.461***</td>
<td>.258***</td>
</tr>
<tr>
<td></td>
<td>Sex</td>
<td>-.093***</td>
<td>-.081***</td>
</tr>
<tr>
<td></td>
<td>Federal Grant</td>
<td>-.014</td>
<td>-.004</td>
</tr>
<tr>
<td></td>
<td>High School Involvement</td>
<td>-.042*</td>
<td>-.052**</td>
</tr>
<tr>
<td></td>
<td>ACT Composite Score</td>
<td>.016***</td>
<td>.013***</td>
</tr>
<tr>
<td></td>
<td>Precollege Academic Motivation</td>
<td>.358***</td>
<td>.217***</td>
</tr>
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<td>College Co-Curricular Involvement</td>
<td>.002</td>
<td>.002</td>
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<td>Institutional Type</td>
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<td>.004</td>
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<td>Hours Worked</td>
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<td></td>
<td>Major</td>
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<td>.053**</td>
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<td>Live On/Off Campus</td>
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<td>Teaching Clarity and Organization</td>
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<td>.056***</td>
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<td>Nonclassroom Interactions</td>
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<td>.048***</td>
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<td>with Faculty</td>
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<td></td>
<td>Need for Cognition T2</td>
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<tr>
<td></td>
<td>R²</td>
<td>.476</td>
<td>.537</td>
</tr>
</tbody>
</table>

*p < 0.05, **p < 0.01, ***p < 0.001

**Research question two.** The next question guiding the research study was, “Does the effect of co-curricular involvement on need for cognition vary based on the amount of involvement?” Looking at both model 1 and model 2, the coefficient for co-curricular involvement remains unchanged and statistically not significant (unstandardized regression coefficient = .002; *p > .05*). This coefficient indicates that co-curricular involvement, no matter what the amount, is not statistically significant in relation to the need for cognition in this study.

**Research question three.** The last question guiding the research study was, “Are the effects of students’ co-curricular involvements on students’ need for cognition the
same for all students or do they differ by student’s sex, race, and type of institution they attend? As illustrated by Table 6, the main variable of interest, co-curricular involvement, did not significantly impact a student’s need for cognition. The final step of analyses examined the extent to which effect, or lack there of, of co-curricular involvement on need for cognition was conditional. In other words, does the involvement experience have the same impact for all students or does it differ in direction for students with different characteristics (Pascarella, 2006). The conditional effects were analyzed by creating cross products of the variables of interest (Hardy, 1993). For the purposes of this study, the variables of interest were sex, race, and institutional type. To test for conditional effects, involvement was multiplied by each variable and individually added to the analytical model.

The addition of the two of the cross products, institutional type and involvement and sex and involvement, resulted in a statistically non-significant, unchanged $R^2$. The results of this analysis are shown in Table 7. Both the unchanged $R^2$ and the non-significance of interaction effect indicate an absence of these conditional effects. The only cross-product term to reach statistical significance was race and involvement (unstandardized regression coefficient = .006). This term increased the $R^2$ slightly, confirming the presence of an interaction effect. The analysis revealed that involvement in co-curricular involvement had different effect sizes on the need for cognition outcome for white and non-white students.
Due to the statistical significance of the race*involvement cross-product, a regression analysis was run based on statistically significant cross-products (e.g., white only, non-white only) to determine the effect size. Co-curricular involvement has a .006 stronger effect size for non-white students than for white students who are involved. Although the effect size is small, it is important to note that for white students co-curricular involvement remained statistically non-significant in the regression model. The results of this analysis are reported in Table 8.

Table 7. Conditional Effects

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<thead>
<tr>
<th>Model</th>
<th>R²</th>
<th>Significance</th>
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<td>.001</td>
</tr>
<tr>
<td>Model 2</td>
<td>.534</td>
<td>.001</td>
</tr>
<tr>
<td>Model 3 (institution*involvement)</td>
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<td>.785</td>
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<td>Model 4 (sex*involvement)</td>
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<td>.100</td>
</tr>
<tr>
<td>Model 5 (race*involvement)</td>
<td>.538</td>
<td>.043</td>
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Table 8
Linear Regression Model Predicting Conditional Effects of Involvement for White and Non-White Students

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<tr>
<th></th>
<th>White B</th>
<th>Std. Error</th>
<th>Non-White B</th>
<th>Std. Error</th>
</tr>
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<td>(Constant)</td>
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<td>.135</td>
<td>.657</td>
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<td>.236***</td>
<td>.025</td>
<td>.315***</td>
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<tr>
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<td>-.078***</td>
<td>.022</td>
<td>-.105***</td>
<td>.041</td>
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<td>.035</td>
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<td>-.050**</td>
<td>.021</td>
<td>-.066*</td>
<td>.038</td>
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<td>Precollege Academic Ability</td>
<td>.014***</td>
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<td>.011**</td>
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<td>Academic Motivation</td>
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<td>.000</td>
<td>.001</td>
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<td>.001</td>
<td>.000</td>
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<td>.022</td>
<td>.062</td>
<td>.042</td>
</tr>
<tr>
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<td>.021</td>
<td>-.044</td>
<td>.039</td>
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<td>.015</td>
<td>.016***</td>
<td>.025</td>
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<td>Teaching Clarity and Organization</td>
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<td>.016</td>
<td>.084</td>
<td>.027</td>
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<tr>
<td>Need for Cognition T2</td>
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<td>.026</td>
<td>.346***</td>
<td>.044</td>
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Model Statistics

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<tr>
<td>R²</td>
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<td>.561***</td>
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<tr>
<td>Adjusted R²</td>
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<td>.549***</td>
</tr>
<tr>
<td>Number of Cases</td>
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*p < 0.05, **p < 0.01, ***p < 0.001.

Summary

This chapter contains results from multiple regression analyses that explored the relationship between co-curricular involvement and the need for cognition. Also presented are the results of the conditional effects, including race, sex and institutional type, and their influence on the effect of co-curricular involvement on the need for cognition.

Collectively, the results indicated that co-curricular involvement does not significantly contribute to a student’s need for cognition. Additional analysis revealed conditional effects for race but not for sex or institutional type. Essentially, co-curricular
involvement had a different effect size on need for cognition for white and non-white students, with non-white students being positively affected by their involvement.

The next chapter will discuss the key results, implications of the research, and recommendations for student affairs practice and future research.
CHAPTER V – SUMMARY AND DISCUSSION

The purpose of this research study was to examine the influence of co-curricular involvement on the need for cognition (Cacioppo et al., 1996). This study sought to build on past research involving co-curricular involvement and its possible relationship to new outcomes, including people’s tendencies to engage in or to enjoy effortful cognitive endeavors. The longitudinal nature of the Wabash National Study of Liberal Arts Education (WNSLAE) allows researchers to incorporate a variety of controls, including a pre-test/post test design, into analyses of data. Therefore, I analyzed the relationship between co-curricular involvement and the need for cognition while controlling for sex, race, pretest, precollege academic motivation, SES, precollege academic ability, high school involvement, institutional type, work, residence, major, non-classroom interactions with faculty, and kind of instruction. I also considered whether race, sex, or institutional type further influenced the effect of involvement on the need for cognition. In this chapter, I provide a review of the study and conclusions drawn from the analysis described in the previous chapter, and explore possible implications of my research for future research, theory development, and practice.

Background and Research Problem

As stated in chapter 2, due to the demands of the 21st century, employers are increasing their expectations of college graduates. In today’s market, information is increasingly complex and accessible, technology is constantly changing, and our markets are more globally dependent than ever. This change is occurring so rapidly that the content-specific information students receive during college might be obsolete by the time of graduation. Employers need graduates to possess both a strong knowledge base
and the willingness and motivation to engage in activities that continue their skill
development. Researchers are left to explore where and how this development of
motivation and skills occurs in the college setting.

Student involvement outside of the classroom is one area of college life that has
the potential to influence student learning and skill development. Referred to in this
study as co-curricular involvement, this aspect of student life includes, but is not limited
to, student organizations, Greek life, campus publications, intramural athletics, residence
life, or orientation. Past research found that the impact of any educational program, such
coop-curricular activities, is directly proportional to the quantity and quality of a student’s
involvement in that program (Pascarella and Terenzini, 1991, 2005). The time and energy
students devote to educationally purposeful activities predicts the amount of learning and
development they experience (Astin, 1993; Pascarella & Terenzini, 1991, 2005). According to Astin’s theory of involvement, by encouraging students to be more
involved and helping construct environments that encourage active participation, faculty
and staff have the potential to affect the ways students spend their time and, in turn,
impact their learning (Astin, 1999).

Research on the impact of co-curricular involvement on learning is not new. Past
studies explored the impact of co-curricular involvement on such cognitive skills as
critical thinking, math skills or reading comprehension (Astin, 1993; Pascarella, Flowers
& Whitt, 2001; Pascarella, Edison, Whitt, et al., 1996; Pascarella, Bohr, Nora &
Terenzini, 1995). Although several of these studies found co-curricular involvement to
be a positive influence on students’ cognitive development, new areas of research are still
needed. One area left unexplored is students’ motivation. What impact, if any, does co-
curricular involvement have on students’ motivation to engage in activities that require
cognitive effort? Cacioppo and Petty (1982) labeled the motivation to engage in
activities that require cognitive effort as an individual’s ‘need for cognition.’ Given the
demands of our society and work environments, it behooves us to expand our research on
the impact of co-curricular involvement to include concepts such as the need for cognition.
The more we know about what motivates students to learn, the better we can prepare
students for the reality of our world.

Research Methods

Using Pascarella’s General Model for Assessing Change (Pascarella, 1985), I
explored the effects of co-curricular involvement on the need for cognition. I also
examined whether (1) the amount of involvement changed the outcome and (2) sex, race
or institutional type moderated the effects of co-curricular involvement on the need for
cognition. The following specific questions guided this study:

1. Controlling for background and precollege characteristics, what are the
effects of co-curricular involvement on students’ need for cognition?

2. Does the effect of co-curricular involvement on need for cognition
differ based on the amount of involvement?

3. Are the effects of co-curricular involvements on students’ need for
cognition the same for all students or do they differ by student’s sex,
race, and type of institution they attend?

For this study, I used longitudinal data collected as part of the Wabash National
Study of Liberal Arts Education (WNSLAE). The sample included 2205 students from
17 four-year institutions. The first battery of tests was completed during the fall of the
students’ first year in college (2006) and the final testing period was four year later (spring of 2010). Testing over this four-year period allowed researchers to estimate how much an individual changed between the two testing periods (Seifert, Pascarella, Erkel, & Goodman, 2010). The longitudinal nature of the data allowed me to establish a baseline measure through the need for cognition pretest. By controlling for this pretest, I was able to measure the impact co-curricular involvement had on the need for cognition during students’ time at college.

Cacioppo and Petty (1982) developed the Need for Cognition (NFC) scale as a way to measure an individual’s “tendency to engage in and enjoy effortful cognitive activity” (Cacioppo et al., 1996, p. 197). Past research found individuals who score high on the Need for Cognition (NFC) scale, in contrast to those who scored low, are better at remembering previously presented information (Lassiter et al., 1991), take greater pleasure in difficult tasks and show a stronger desire to search for new information (Cacioppo et al., 1996), are more likely to engage in metacognition (Petty et al., 2007), have more confidence in their opinions (Barden & Petty, 2008), and tend to think more about available options before making a decision (Levin, Huneke, & Jasper, 2000). While research explains the difference between individuals scoring high versus low on the Need for Cognition scale, it is unknown what influences the development of this motivation to engage in activities requiring cognitive effort.

Using data from the Wabash National Study of Liberal Arts Education, I conducted multiple regression to estimate the effects of co-curricular involvement on students’ need for cognition. The analytical model included the following control variables: sex, race, need for cognition pre-test in the fall of 2006, socio-economic status,
high school involvement, pre-college academic motivation, precollege academic ability, institutional type, residential status, major, hours worked, non-classroom interactions with faculty, kind of instruction, and need for cognition test in the spring of 2007. All of these variables are defined in Table 2, chapter 3. In the final stage of analysis, I explored if the net effects of co-curricular involvement on need for cognition were conditional based on a student’s race, sex or the type of institution they attended.

**Results**

In this section, I answer the research questions using results from the data analyses presented in chapter 3.

1. Controlling for background and precollege characteristics, what are the effects of co-curricular involvement on students’ need for cognition?

To address this question, I regressed the co-curricular involvement measure on the need for cognition scale while statistically controlling for potential confounding variables. When including all aforementioned controls, the model was significant and explained 53% of the variance in the need for cognition variable. Although the model was significant, co-curricular involvement did not have a statistically significant effect on the need for cognition. Results are reported in chapter 4, Table 6.

Since the need for cognition can be viewed as a learning outcome associated with cognitive growth, my analytical model was guided by past research that explored the relationship between co-curricular involvement and cognitive growth. The lack of significant effects is inconsistent with past research that found co-curricular involvement to have an impact, either positive or negative, on a cognitive outcome (Astin, 1993; Cruce, Wolniak, Seifert & Pascarella, 2006; Pascarella, Flowers & Whitt, 2001;
Pascarella, Edison, Whitt, et al., 1996; Pascarella Bohr, Nora & Terenzini, 1995; Pascarella & Terenzini, 1991, 2005; and Terenzini, et al., 1996). The results of this study contradict decades of research that found co-curricular involvement to impact cognitive development.

This study is the first to explore the relationship between co-curricular involvement and the need for cognition. Based on this single study, we cannot assume a relationship does not exist between these variables. All we can conclude from this study is that with regard to the need for cognition, co-curricular involvement is not statistically significant. Given the lack of research linking these two variables, replication studies are warranted to see if these results are supported or rejected.

Until recently, most studies of need for cognition used the construct as a predictor variable (Barden & Petty, 2008; Cacioppo & Petty, 1982; Cacioppo et al., 1996; Day et al., 2007; Gulgoz, 1996; Gulgoz, 2001; Lassiter et al., 1991; Leone & Dalton, 1988; Levin, Huneke, & Jasper, 2000; Petty et al., 2007; and Sadowski & Gulgoz, 1996). Recent research using the need for cognition as an outcome variable found interactions with faculty members to have a negative impact on the need for cognition for first generation students (Padgett et al., 2010). Goodman (2011), on the other hand, found campus climate for diversity variables (i.e. taking a diversity course, interacting with diverse others, and participating in a racial/cultural workshop) to positively influence the need for cognition. With these two studies, we only begin to understand the need for cognition as an outcome measure. Replication and additional research would provide a clearer picture regarding what impacts the development of this construct.
2. Does the effect of co-curricular involvement on need for cognition differ based on the amount of involvement?

The coefficient for co-curricular involvement remains unchanged and statistically not significant (unstandardized regression coefficient = .002; \( p > .05 \)), indicating that co-curricular involvement, no matter what the amount, does not have a statistically reliable effect on the change in the need for cognition.

3. Are the effects of co-curricular involvements on students’ need for cognition the same for all students or do they differ by student’s sex, race, and type of institution they attend?

To determine if there were conditional effects by race, sex or institutional type, additional analyses were conducted. No conditional effects emerged based on sex or institutional type. The only conditional effect of statistical significance was based on race. For non-white students, co-curricular involvement had a small significant and positive net effect on the need for cognition (unstandardized regression coefficient = .006, \( p < .05 \)). For white students, co-curricular involvement had no effect on the need for cognition (unstandardized regression coefficient = .000, \( p > .10 \)). This finding suggests that when students from different racial groups are considered, co-curricular involvement is positively associated with gains in the need for cognition for non-white students.

The results should be interpreted with caution. Although statistically significant, the effect size was .006. Cohen (1988) describes any effect size of 0.0 – 0.1 as trivial and insubstantial. According to Cohen, an effect size of .006 indicates that the distribution of scores for non-white students overlaps completely with the distribution of scores for
white students. Although the effect size is trivial, past research states that race does matter on a variety of outcomes (Pascarella & Terenzini, 1991, 2005), including the need for cognition (Goodman, 2011). Given past research studies, this finding warrants further exploration. A next step may be to conduct a study separating the non-white sample into specific racial categories. Placing all non-white students into one category, as done in this study, may have masked an effect of co-curricular involvement on the need for cognition for African American, Asian-American, Native American, and/or Latino/a students.

This study found that in the general effects model, co-curricular involvement did not significantly affect need for cognition. I did find that being involved had a small, but positive, statistically significant impact on the need for cognition for non-white students. On the other hand, sex and institutional type did not significantly impact the effects of involvement on the need for cognition. Collectively, these findings add to a body of research that uses the need for cognition as an outcome measure.

No recommendations for student affairs practice were included due to the (1) limited research on the need for cognition as an outcome measure and (2) lack of research exploring the impact of co-curricular involvement on the need for cognition. I did not want to assume a relationship should exist between these variables and that experiences like co-curricular involvement could develop or change the need for cognition over time. In the next section, several implications for future research are discussed.
Recommendations for Future Research on the Need for Cognition

The purpose of this study was to explore the impact of co-curricular involvement on the need for cognition. Although the main variable of interest was not significant in the general effects model, this study still contributes to a growing body of literature on the need for cognition as an outcome measure. Below are a number of recommendations for future research:

1. Studies should attempt to replicate these findings. As Pascarella (2006) suggested, “Findings are ultimately accepted as valid by the scientific community only to the extent they are replicable” (p. 510). A replication study has the potential to support the results of this study, either by clarifying issues raised during analysis or by extending its generalizability. Although co-curricular involvement did not have a statistically significant effect on the need for cognition, future research may reveal some important distinctions based on the type of involvement. For this study, involvement was explored as a collective experience. Looking at the entire involvement experience may hide the impact of certain involvement opportunities on the need for cognition. All involvement opportunities may not provide the same impact for students. It is worthwhile to explore specific areas of involvement, such as living/learning communities or Greek life, and their impact on the need for cognition. Replicating this study, including studies exploring specific areas of involvement provides a more complete picture of the relationship, or lack their of, between co-curricular involvement and the need for cognition.
2. Research on the need for cognition as an outcome measure is limited. Future studies should explore what college experiences may or may not impact this construct. A larger body of research would demonstrate if the need for cognition is a construct that can change or develop over time.

3. Finding non-significance in the general effects model but significance in the conditional effect of race raises an important point. Given the changing undergraduate demographics, Pascarella (2006) stresses the importance of investigating whether the impact of college experiences differs for different types of students. To provide a better understanding of what possibly impacts the need for cognition, future research needs to go beyond the conditional effects of racial diversity and include topics like first generation, socio-economic, and pre-college academic ability. Including these variables in research studies provides a greater understanding of student characteristics and how they relate to outcome measures, like the need for cognition (Kuh et al., 2000). Student affairs professionals can use the results of these studies to inform their practice as they create co-curricular experiences for specific student populations.

4. Is the need for cognition a state or trait variable? Since the need for cognition is a fairly new outcome measure, future research needs to explore both possibilities. Recent research found that traits are flexible, change over one’s lifetime, and are shaped by experience. If the need for cognition is a personality trait variable, does it change over a person’s lifetime or is there a
time during a person’s life where we would see the most change? Also, under what conditions and in what direction does it change?

5. This research study assumed that the need for cognition is an overall attribute, but is this assumption correct? Can students be high in the need for cognition in math, but low in other subject areas? Is the need for cognition domain specific? Future research needs to explore this variable in more detail.

6. It is the responsibility of educators to use their resources to educate and prepare students for the challenges of our world. To satisfy the expectations of graduates and employers we have to assess what we are doing and change our work to meet the needs of the 21st century. Specifically, we need to know when, how, why, where and what students are learning from co-curricular involvements. We need to collect data about the effectiveness of co-curricular involvement and be open to changing our practices based on these data. This study indicates that co-curricular involvement did not have significant net effects on the need for cognition. By conducting qualitative research, like interviews, we can probe further and ask students what they are learning from co-curricular experiences. Faculty and staff can use both the results of qualitative research and the expectations of graduates and employers to better inform their practice.

**Summary**

The purpose of this research was to examine the influence of co-curricular involvement on the need for cognition. Using multiple regression, I analyzed the relationship between co-curricular involvement and the need for cognition while
controlling for sex, race, pretest, precollege academic motivation, SES, precollege academic ability, high school involvement, institutional type, work, residence, major, non-classroom interactions with faculty, and the kind of instruction. I also analyzed whether race, sex, or institutional type further influenced the effect of involvement on the need for cognition.

The main effects model found the impact of involvement on the need for cognition to be statistically non-significant. While looking at conditional effects, I found being involved had a small, but positive, statistically significant impact on the need for cognition for non-white students. Also during this exploration I found sex and institutional type did not significantly impact the effects of involvement on the need for cognition. The suggestions for future research include replicating the current study and examining the impact of specific co-curricular involvement opportunities; following-up this study with a qualitative study to discover what students are gaining from co-curricular involvement; looking for additional conditional effects; and exploring what other college experiences impact the need for cognition.

With the impact of scientific and technological innovations, global interdependence, and demographic changes to our economy, employers are looking for employees who are competent with the job responsibilities, adaptable to the changing work environment, and motivated to seek out opportunities to improve their skill. To effectively prepare students for this environment, faculty and staff need to be aware of what experiences contribute to students’ skill development and motivation. Past research found co-curricular experiences to impact the development of cognitive skills like critical thinking. A lack of research exists examining the impact of these experiences on
students’ motivation to learn. While this study found the impact of co-curricular involvement on the need for cognition to be statistically non-significant, it did begin the exploration of the impact of college on students’ need for cognition.
REFERENCES


