PREDICTING COLLEGE STUDENT SUCCESS: A HISTORICAL

AND PREDICTIVE EXAMINATION OF HIGH SCHOOL

ACTIVITIES AND ACCOMPLISHMENTS

by

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ABSTRACT

According to generational theorists, the interests and experiences of incoming students have fluctuated over time, with Millennial students being more engaged and accomplished than their predecessors. This project explored data from 1974-2007 to determine the actual trends in engagement and accomplishments for three generations of students. Over three million Student Profile Section data sets were randomly selected from complete ACT College Entrance Exam records. Given the existence of significant random variability among states, all trend analyses were conducted using hierarchical linear modeling. The primary finding of this study is that current students are becoming less engaged in high school activities and attaining fewer accomplishments during high school than students of the previous generation. Specifically for activities, men and students from larger class sizes were less engaged, and students with higher socioeconomic statuses, higher grade point averages, and higher ACT scores were more engaged. Overall, the results of this dissertation suggest that student affairs professionals should use theorizing about Millennial students only as general guidelines, and pay greater attention to measured trends and student background characteristics.

In order to improve the practical utility of these results, a convenience sample of records was drawn from selected four-year institutions, which collected data regarding college readiness, student engagement, and college outcomes, and was paired with ACT College Entrance Exams records. A wide range of relationships between high school and

first-year college activities were measured with only some types of engagement (e.g., religious, sports/fitness, community service) having continuity into the college years. In addition, this study built on the current knowledge about college student outcomes by testing the ability of high school activities and accomplishments to incrementally add to the prediction of first-year GPA and first-to-second year retention in conjunction with other known cognitive, noncognitive, and college engagement predictors. Using hierarchical linear and logistical regression, number of high school activities was able to capture additional variance in first-year GPA, but did not hold predictive utility for first-to-second year retention. Hence, student affairs professionals should consider the implications of decreasing high school engagement when both planning for college activities and predicting college student outcomes.

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CHAPTER 1

INTRODUCTION

According to Arnett (2000; 2004), the experiences of adolescents and young

adults have changed dramatically over the past thirty years as a result of a societal shift.

In the past, adolescents became adults shortly after high school, often leaving home for

work or marriage in their early twenties (Arnett, 2004). Now, 18 to 30-year-olds likely

experience a new stage of life labeled "emerging adulthood" (Arnett, 2004). This stage is

commonly marked by leaving one's home, pursuing an education, and exploring potential

matches in love and careers to a greater extent than previous generations have (Arnett,

2000). Changes observed in higher education student populations reflect this societal

shift.

Currently 66% of individuals enter some form of higher education in the year

after completing high school (Planty et al., 2008). This percentage reflects the increasing

importance that high school students place on obtaining a college degree to achieve their

career goals (Pryor, Hurtado, Saenz, Santos, & Korn, 2007). The students entering higher

education have also become more demographically representative of the U.S. population

as civil rights movements have shaped history (Pryor, Hurtado, Saenz et al.). In 1971,

White Americans represented 91% of incoming students, and as of 2006, represented

only 76.5% of incoming students (Pryor, Hurtado, Saenz et al.). Moreover, women

constituted only 45% of incoming students in 1971, and now make up the majority of

incoming students (Pryor, Hurtado, Saenz et al.). These statistics coincide with changing social conditions and major historical events such as the Civil Rights and Women's Rights Movements (Pryor, Hurtado, Saenz et al.). Students with disabilities are also now more represented in colleges. Since 1983, incoming students have increasingly reported having learning disabilities (Pryor, Hurtado, Saenz et al.). It is evident that this increase mirrors the historical rise of awareness of disability discrimination that resulted from the Disability Awareness Movement (Olkin & Pledger, 2003). Observed patterns such as these provide an informative lens for understanding the changing characteristics of college students (Astin, 1991).

An understanding of historical change plays a valuable role in the field of college student development. Coomes (2004) stated, "Using history to understand the lives of students and tracking popular culture forms and trends will offer student affairs educators important tools for working with these students in the future" (p. 29). Published research on trends in first-year student attitudes and behaviors provides information about both changing social conditions and generations of student populations (Astin, 1998; Pryor, Hurtado, Saenz et al., 2007). However, major gaps in the literature exist, specifically with regard to high school engagement. Moreover, the existing literature on trends is not connected to the broader picture of student affairs and college student success.

Historically, institutions of higher education have been charged with promoting both academic and social growth in college students (Thelin, 2003). Not only do students learn to think critically during their college years (Belenky, Clinchy, Goldberger, & Tarule, 1997; Perry, 1999), they also develop psychosocially by developing competence, managing emotions, moving toward interdependent relationships, creating a sense of self,

and developing a sense of purpose (Chickering & Reisser, 1993). Pascarella and

Terenzini (1991; 2005) studied the actual impact of college environments on student

development and found that the college years are critical for multifaceted student change.

By participating in academics, students gain knowledge, develop cognitively, increase

autonomy, and develop a sense of moral reasoning, to name only a few of the benefits

(Pascarella & Terenzini). Students are also changing by engaging in their environment

and interpersonal interactions with the result being improved intellectual functioning as

well as development of attitudes, values, and psychosocial functioning (Pascarella &

Terenzini).

  Student success implies that students are developing broadly and being influenced

in holistic ways by college and university environments (Braxton, 2003; Terenzini,

Pascarella, & Blimling, 1999). The field of student affairs embraces this role by

developing an atmosphere to meet students' needs, and is intricately involved in

providing appropriate extracurricular and cocurricular activities (Nuss, 2003). According

to Cole, Kennedy, and Ben-Avie (2009), understanding the changing nature of students'

high school engagement and the relationship of high school engagement to college

engagement could greatly enhance the ability of student affairs to: meet students'

expectations, develop strategic plans, design first-year experience programs, help train

faculty, inform advisors, and create a richer college student experience (p. 62).

  Applying information about high school engagement to the prediction of college

student success could also be advantageous for university administrators. Colleges and

universities currently use many predictors of college success when determining

admissions decisions so as to maximize student outcomes, i.e., performance and

persistence (Larose, Robertson, Roy, & Legault, 1998; Peterson, Casillas, & Robbins, 2006; Robbins, Lauver, Le, Davis, Langley, & Carlstrom, 2004). Astin (2005) hypothesized that up to 70% of the variance in institution's degree completion rates may be predicted by incoming student characteristics. Significant research exists detailing the importance of cognitive predictors, noncognitive predictors, and engagement in both high school and college as they independently relate to academic success and attainment (Astin, 1984; Kuh, Kinzie, Schuh, & Whitt, 2005; Marsh & Kleitman, 2003; Mathiasen, 1984; Mouw & Khanna, 1993; Robbins et al., 2004; Tinto, 1993; Youniss, McLellan, Su, &Yates, 1999). Essentially, each of these factors relates to outcomes when studied in isolation or in minor combinations, but research is lacking that integrates all of these elements. More typically, the predictors are researched independently and published in separate, but related literatures.

Purpose of Dissertation

The purpose of this dissertation was to expand the field's current knowledge in three main ways. First, this project measured trends in high school engagement over time, in order to expand student affairs professionals' knowledge of student trends and the relationship of these trends to hypothesized generational shifts in student characteristics. Second, this project estimated the relationships between measured high school engagement and anticipated college engagement, measured high school engagement and measured college engagement, and anticipated and measured college engagement for a sample of students who entered higher education in the past five years. This created an indication of the weight that information about high school engagement should carry in planning for incoming students' needs. Third, this project tested the ability of high school

engagement to additively predict college student outcomes in conjunction with cognitive, noncognitive, and college engagement factors, again providing an application to the information regarding trends in high school engagement. Though high school engagement may defined a number of ways, for this dissertation it will be operationalized as participation in any of 16 high school activities or 63 types of out-of-class accomplishments as measured by the ACT college entrance exam.

Literature Review

This portion of the dissertation reviews research relevant to the three goals explicated above. First, the reader is informed about the current status of trend research, including information about theories of generational trends. This provides a background in the dialogue regarding changing student characteristics over time. Next, the reader is informed about previously measured relationships between high school and college engagement. Third, the multiple predictors of performance and persistence (i.e., cognitive, noncognitive, and engagement) are described in depth so that the reader has a sense of current prediction research. A brief discussion of incremental validity follows to show how these factors have greater value when considered additively rather than separately. Next, the interrelationships between categories of predictors are considered, hence recognizing the need to study these in conjunction. A conceptual model is provided to demonstrate the hypothesized relationships of the predictor categories. Finally, a summation of this project and research questions are proposed.

Changing Student Characteristics

Overview of Representative Trends

Since 1966, the Higher Education Research Institute has been providing first-year college students with surveys, and tracked some of the changing trends over time (Pryor, Hurtado, Saenz et al., 2007). These trends cover a variety of student behaviors and attitudes, but do not include a broad synopsis of high school engagement in out-of-class activities and accomplishments (Pryor, Hurtado, Saenz et al.). Hence, trends related broadly to changing student behaviors and attitudes are detailed here in order to provide a lens to how incoming college students have changed over time.

Researchers have observed significant shifts in behaviors of college students. Astin (1998) first recognized rapid changes in student activity during the late 1960s and early 1970s. As students were engaged in political activism regarding the Vietnam War and civil and women's rights, Astin observed a trend of decreased interest in community level political activities. Students also exhibited significant decreases in their participation in high school activity during this time, according to Astin. Simultaneously, students endorsed significantly fewer traditional roles of women in society and fewer plans for marriage after college (Astin). This also coincided with more women entering historically nontraditional majors and greater numbers pursuing graduate degrees (Astin). Upon analysis, Astin acknowledged the great influence that social conditions, e.g., the Vietnam War and the women's movement, can have on behaviors of incoming college students.

In addition, students' attitudes have noticeably shifted over time. When the Cooperative Institutional Research Program began collecting survey data, 85.8% of

students endorsed "developing a meaningful philosophy of life" as being essential or very important (Pryor, Hurtado, Saenz et al., 2007, p.32). Over time, researchers have measured a dramatic change in this attitude, so that only 39.3% of students viewed it as essential or very important in 2003 (Pryor, Hurtado, Saenz et al.). Conversely, students have viewed "being very well off financially" as increasingly essential or very important, rising from 42.2% in 1966 to 74.1% in 1987 (Pryor, Hurtado, Saenz et al.). This trend has remained stable since the late 1980s with 74.4% of students endorsing the item in 2007 (Pryor, Hurtado, Sharkness, & Korn, 2007). In addition to student values, student attitudes about higher educational experiences have changed. Beginning in the early 1990s, students have reported increased concern for finances, increased stress, and more educational aspirations (Astin, 1998).

A frequently researched area looking at the combination of behaviors and attitudes relates to students' participation in helping behaviors and altruism. After 25 years of collecting data, Astin (1991) concluded that students were becoming progressively less altruistic over time, as evidenced by decreased interest in majoring in helping fields, such as nursing, teaching, clergy, etc. In 1998, Astin countered this observation by stating that students were reporting more participation in volunteer activities, and a strong intent to continue community service into the college years. The trend becomes even more complex when considering 40 years of data. Pryor, Hurtado, Saenz and colleagues (2007) found that in 1987 only 44% students reported engaging in volunteer work in a typical week; yet, by 2006, 71% of students reported engaging in volunteer work in a typical week. Moreover, 75% of students participated in community service in 1987 (Pryor, Hurtado, Saenz et al.), whereas 83% of students did so in 2007

(Pryor, Hurtado, Sharkness et al., 2007). Sax (2003) found a similar 82.6% of incoming students reported engaging in community service in the previous year, though only about a third of these students attended a school requiring this type of service participation. Finally, Pryor, Hurtado, Saenz and colleagues examined the same helping professions as Astin (1991) and found that interest in teaching and nursing had fluctuated since 1991 with a net gain, whereas social work had continued to decrease. Considering all this data, these researchers concluded that students are becoming more altruistic in both attitudes and behaviors with more focused weight on the overall increase in desire to help those who are less fortunate through service and helping professions (Pryor, Hurtado, Saenz et al.).

Synopsis of Generational Theories and Research

In order to understand trend observations, some theorists consider the influence of generations, which has resulted in a large body of literature on student generations on college campuses (Eskilson & Wiley, 1999; Gozzi, 1995; Grayson & Medalie, 1988/89; Guardo, 1982; Haworth, 1997; Sacks, 1996; Seymour & Richardson, 1972; Strauss & Howe, 2003). The premise of this is that students are being shaped by their place in history, which in turn influences attitudes, values, and behaviors (Guardo). The generational theorists Strauss and Howe have provided a unifying conceptualization about student generations throughout the history of the United States (Strauss & Howe, 1991). This theory provides much of the language and theorizing regarding changing student characteristics.

According to Howe (2005), generations are not direct extensions of each other, but are instead influenced by the combination of historical influences, changing social

contexts, and family members from previous generations (Strauss & Howe, 1991).

Strauss and Howe (1991) defined a generation as a "cohort-group whose length approximates that of a basic phase of life" (p. 34), most recently accounting for twenty years of a lifecycle. Generations are shaped by their location in history and the events occurring prior to and during their lifetimes (Strauss & Howe).

Through tracking generations over time, Strauss and Howe (1991) have indentified four generational types, which have alternated in cycles throughout history. There are both dominant and recessive generations, with dominant generations tending to focus on regulation of the public sphere and submissive generations focusing more on their relationships within the private sphere (Strauss & Howe). Strauss and Howe have labeled two types of dominant and submissive generations throughout history, and created a hypothesized pattern for how each generation relates to the next. Within each four generation cycle, first is a dominant Idealist generation focused on the public sphere of rhetoric and culture (Strauss & Howe). Next is a recessive Reactive generation focused on increasing protectiveness within relationships (Strauss & Howe). Following this is a dominant Civic generation focused on the technology and institutions of the public sphere (Strauss & Howe). Finally, a recessive Adaptive generation arrives that focuses on restoring balance and increasing permissiveness in relationships (Strauss & Howe). Strauss and Howe (1991) synopsized the cycle of these generations in the following way:

> Idealist generations tend to live what we might label a prophetic lifecycle of vision and values; Reactives a picaresque lifecycle of survival and adventure; Civics a heroic lifecycle of secular achievement and reward; and Adaptives a genteel lifecycle of expertise and amelioration (p. 74).

The current cycle is labeled Millennial, and includes Boomers, Thirteeners, Millennials, and an unknown fourth generation in its grouping (Strauss & Howe).

According to Strauss and Howe (1991), Boomers are an Idealist generation who were born from 1943 to 1960. They were the focus of attention during childhood with mothers who were devoted to providing great care (Strauss & Howe). In Idealist fashion, these individuals were encouraged to focus on the self and place individual awareness over community (Strauss & Howe). Hence, Boomers tended to search for self-meaning and develop values based on individualized experiences (Strauss & Howe).

Students from the Boomer generation arrived on campuses in the early 1960s. Guardo (1982) describes early Boomers as a transition group that shifted the focus onto pursuits of self-meaning. The mid-Boomer years were punctuated by student protests and great activity in social causes (Guardo). With events like the Vietnam War, seventies protests, and the sexual revolution, Boomers were known to fight for social change and engaged in violence if necessary to bring about these changes (Strauss & Howe, 1991). According to Strauss and Howe, this outward focus of energy resulted in a diminished interest in traditional extracurricular activities. Additionally, Boomers were perceived as viewing higher education as less important in a search for self-transformation than their predecessors did, creating one of many generation gaps seen over time on college campuses (Seymour & Richardson, 1972). By the late Boomer years, another shift was becoming apparent with students rebelling less against policies and paving the way for the next generation of students, the Thirteeners (Guardo).

Members of the Thirteener generation were born from 1961 to 1981, and are classified as Reactives, meaning their focus is on survival and adventure (Strauss &

Howe, 1991). This generation represents the 13th generation in the United States since

1700 (Strauss & Howe). Early children of this generation were born during the 1960s

sexual revolution, and were often members of divorced homes, single parents, or

unhappy marriages (Strauss & Howe). Social recognition of increased suicide and crime

rates, lower test scores, and tendencies of Thirteeners to work in service-oriented jobs

created a negative social perception of the capabilities and the lack of worth of this

generation (Strauss & Howe). Media images of this generation as lazy and slackers also

contributed to the negative perception (Haworth, 1997). In fact, subjective assessment

and observed social actions have left these individuals referred to as whiners, numb,

blank, and other negative descriptives (Gozzi, 1995; Haworth; Strauss & Howe).

However, data about these students does not confirm this image.

On campus, students from the Thirteenth generation have demonstrated consistent

generational characteristics. As compared to Boomers, Thirteeners have been labeled as

being less concerned about social ills and more concerned about self and close

relationships (Guardo, 1982). While at times this is criticized (Guardo), this focus inward

is typical of submissive generations and critical to the flow of successive generations

(Strauss & Howe, 1991). In survey research, Eskilson and Wiley (1999) questioned 462

college students from four different universities about their values and goals. They found

that Thirteeners endorsed caring relationships, vocational mastery, financial security,

connections with family, and physical health as the most important elements for future

satisfaction (Eskilson & Wiley). These values have been criticized in the past for being

selfish (Guardo), but they are again consistent with the traditional role that a Reactive

generation plays in society, according to Strauss and Howe. Academically, Gozzi (1995)

criticized Thirteeners as less well read and less academically prepared than Boomers. However, Haworth (1997) challenged this view stating that Thirteeners demonstrate equivalent commitment to work and education as previous generations, and even higher levels of local community activism than Boomers. She encouraged professors to recognize the different yet equal value of this generation as it relates to college campuses (Haworth).

Thirteeners are also often compared to the most recently labeled generation called Millennial. This generation includes individuals who were born from 1982 to the early 2000's (Strauss & Howe, 1991). Millennials are hypothesized to be sheltered and protected, given that they were born during a resurgence of focus on children, family, safety, and education (Strauss & Howe). Millennials are members of a Civic generation with a primary focus on technology and changing social institutions, and perceived to have a heroic personality (Strauss & Howe). Hence, Strauss and Howe (1991) described these youth as being raised to be "smart and powerful and dutiful" (p.342). Lastly, based on trends in past Civic generations, Howe and Strauss (2000) hypothesized that women and men in the Millennial generation will be more socially minded and will demonstrate more gender equivalent engagement. This means that compared to previous generations, Millennials' personal ambition and desire to reach goals should make them more likely to utilize academic opportunities and extracurricular activities provided for them (DeBard, 2004; Howe, 2005).

In initial studies, researchers have found that Millennials fill resumes (with the assistance of parents) for colleges and jobs with significant breadth and depth of experiences demonstrating their talents and versatility (Brooks, 2001; Lowery, 2004).

Given the rumors of overbearing parents with this generation, the Cooperative

Institutional Research Program recently began asking incoming students questions about

their opinions of parental involvement (Pryor, Hurtado, Saenz, et al., 2007). For the

incoming 2007 class, approximately 23% of students endorsed having too little parental

involvement in picking college courses and activities, and approximately 17% of students

endorsed too little parental involvement with college officials (Pryor, Hurtado,

Sharkness, et al., 2007). Thus, students rarely perceive parents as being too involved and

instead see them as still under involved.

Also recognizing the importance of technology in today's generation, Pryor,

Hurtado, Sharkness and colleagues (2007) evaluated the current levels of social

networking engaged in by Millennial students. They found that 86% of incoming students

visit social networking sites at least once a week, and most commonly spend a total of

one to five hours per week in this activity (Pryor, Hurtado, Sharkness et al.). They also

found that students spent more time engaging in social networking than in other common

pursuits, such as academics, work, or interpersonal socializing (Pryor, Hurtado,

Sharkness et al.). Putnam (2000) chronicled this trend in depth in *Bowling Alone*. He

tracked the shifts over time in social capital, or social connections that benefit both

individual and community well-being (Putnam). In his discussion of the ebb and flow of

social capital over time, he acknowledged the link to generations, and detailed the

increasing ebb in social capital that has happened in the past several decades as

individuals like Millennials have increasingly relied on technology for connection

(Putnam). Though some research, particularly with regard to parental involvement and

technology, has been conducted about Millennial students, broad research on their

attitudes and behaviors, specifically regarding engagement in activities and
accomplishments has yet to be published.

Though much of the trend research supports the concept of distinct generations,
researchers have also found that some hypothesized characteristics of generations
actually began in previous generations. Based on work conducted at the Higher
Education Research Institute, it appears likely that attributes associated with the
Millennial generation may actually have begun prior to the arrival of this generation on
college campuses (Pryor, Hurtado, Saenz, et al., 2007). Over the past thirty years,
students have increasingly viewed college as necessary to make more money and
invested more energy in applying to and finding finances to support educational
endeavors (Pryor, Hurtado, Saenz et al.). Additionally, individuals have endorsed
increased intellectual self-confidence and drive to achieve since the mid-1980s (Pryor,
Hurtado, Saenz et al.). These characteristics have only been attributed to students of the
Millennial generation, but the trend pattern actually indicates that the greatest rise in
these attributes occurred over twenty years ago in the Thirteenth generation (Pryor,
Hurtado, Saenz et al.). Also according to Pryor, Hurtado, Saenz and colleagues,
individuals throughout both the Thirteenth and Millennial generations have endorsed
spending less time on homework and less time talking with teachers outside of class,
coinciding with increased amounts of coursework in key subject areas and less need for
remedial coursework in college. This suggests that Millennials may actually be less
academically engaged than earlier generations, contradictory to other research (Brooks,
2001; Lowery, 2004). Thus, it is evident that additional explication of trends in

engagement would assist student affairs professionals to appropriately understand the needs of incoming students.

A further consideration of trend research is the influence of sociodemographic variables, such as gender, race, socioeconomic status, academic ability, and others. Several researchers (Eskilson & Wiley, 1999; Marsh & Kleitman, 2002; Pryor, Hurtado, Saenz et al., 2007; Pryor, Hurtado, Sharkness et al., 2007) have noted the importance of examining the interaction between sociodemographics and trend data. Considerations of race and gender have most commonly been used when describing trend data (Eskilson & Wiley; Pryor, Hurtado, Saenz et al.; Pryor, Hurtado, Sharkness et al.); however, the most common interaction effects when considering high school engagement activities are found with SES (Marsh & Kleitman). Overall, trend interpretation is most valuable when considered broadly and with secondary analysis incorporating a variety of sociodemographic variables.

The purpose of this project was to shed light on the trends in high school out-of-class activities and accomplishments, and provide confirming or disconfirming evidence for generational theories. Though valuable in its own right, this information was applied in two main ways: by examining continuity of engagement into the college years and by examining the usefulness of high school engagement data for predicting college outcomes. The literature related to these areas is reviewed next.

Continued Engagement Beyond High School

Many theorists have discussed the importance of student "involvement" (Astin, 1984), "integration" (Tinto, 1993), or "engagement" (Kuh et al., 2005) on college campuses as it relates to completing college degrees. Depending on the researcher,

engagement encompasses many factors such as living on campus, affiliating with Greek

life, working at an on or off-campus job, interacting with faculty members, and being

involved in student activities, to name only a few (Terenzini et al., 1999). When

discussing high school engagement, co-curricular and extracurricular activities could be

defined as those directly connected with a specific curriculum or school environment

(Kleiber & Powell, 2005). These definitions obviously vary though the concepts are

similar. As described earlier, high school engagement for this project included 16

possible activities connected with either coursework or school environment. Given the

desire to measure continuation of these activities into the college years, these same

activities are the subset of college engagement variables considered. The literature

reviewed here reflects this selection.

It is evident that students self-select into a variety of activities during high school

and college (Hart, Donnelly, Youniss, & Atkins, 2007; Kuh, 2007; Raymore, Barber,

Eccles, & Godbey., 1999). Moreover it seems logical that students' interests in activities

would persist over time (Cole et al., 2009). This is especially the case because students'

personal preferences are interacting with similar educational environments (Cole et al.).

Several researchers have examined this relationship both globally and for specific

activities (Hart et al., 2007; Kuh, 2007; Raymore et al., 1999). As an example, Raymore

and colleagues (1999) studied longitudinal data of adolescents' activities with the final

wave of data collection occurring two to three years after high school completion.

Specifically, they investigated the impact of life transitions on educational and leisure

behavior and found that 42% of women and 45% of men demonstrated stable patterns of

leisure regardless of entering college or experiencing other life transitions (Raymore et

al., 1999). In a follow-up study, Raymore, Barber, and Eccles (2001) used the same data but grouped activities into patterns of engagement, i.e., positive active, undifferentiated, risky, or home-based. They concluded that most commonly participants maintained the same pattern of behaviors after high school graduation into the traditional college age years (Raymore et al., 2001). Thus, if overall patterns of leisure engagement remain intact, it seems likely that specific choices in activities would persist beyond high school into college as well.

This possible continuity of specific types of activities has been examined in depth. Perkins, Jacobs, Barber, and Eccles (2004) studied athletics and exercise behavior at ages 12, 17, and 25 years with more than 600 individuals. They found that adolescent engagement in athletics was a significant predictor of athletic and fitness engagement in college and young adult years (Perkins et al.).

This pattern holds for altruistic activities as well. Hart and colleagues (2007) found that individuals who volunteered during high school were more likely to vote in local and presidential elections, and participate in specific types of community service eight years following high school. The amount of service performed was a stronger indicator for continuity than if the service had been required, meaning that more consistent participation in high school predicted greater participation in adulthood even if the service had been mandated originally (Hart et al.).

Sax (2000) provided a caution when interpreting this research given that even though engagement is proven to relate between high school and young adult years, behaviors during high school and college may also be fleeting and more temporary in nature than anticipated by other researchers. She found that students' likelihood of

engaging in altruistic activities dropped during the college years, even if they had done these voluntarily during high school (Sax). However, she acknowledged that these same behaviors may rebound later in adult years (Sax). Hence, mixed evidence exists regarding how high school participation relates to college participation for similar activities. Thus, the relationship between high school and college engagement needs to be examined in more depth to provide student affairs professionals with valuable information regarding student expectations for college experiences (Cole et al., 2009).

Review of Predictive Research

Cognitive, noncognitive, and engagement variables are all known predictors of college student outcomes. This section details the research findings regarding the worth of each of these categories as predictors of outcomes. In this section, the importance of incremental validity and the relationships between cognitive, noncognitive, high school engagement, and college engagement variables is also discussed. A visual representation of predictive relationships and interrelationships is included.

Cognitive Predictors and College Outcomes

Definitive and clear evidence exists demonstrating the ability of cognitive factors to predict performance and persistence in college academics (Astin, 2005; Brown, Tramayne, Hoxha, Telander, Fan, & Lent, 2008; DeBerard, Spielmans, & Julka, 2004; Hamilton, 1990; Lleras, 2008; Pettijohn, 1995; Wolfe & Johnson, 1995; Zwick & Sklar, 2005). Specifically, demonstrated academic achievement is a well known predictor of current and later academic success (Harackiewicz, Barron, Tauer, & Elliot, 2002). Given this, it is no surprise that high school GPA is a strong predictor for first-year GPA (Astin;

Robbins et al., 2004; Ting & Robinson, 1998); with college admissions test scores adding

additional significant variance for first-year GPA and degree completion rates (Astin;

Hamilton; Pettijohn). Examples of these relationships were delineated by Wolfe and

Johnson, Ting and Robinson, and Lleras. In a study of 201 undergraduate students, Wolfe

and Johnson found that average high school grades accounted for approximately 20% of

the variance in college GPA, with standardized admissions test scores adding an

additional 3-5% of variance captured. Similarly, Ting and Robinson studied the ability of

cognitive and noncognitive factors to predict college GPA in 2,600 first-year students,

and found that high school GPA was the most substantial predictor of first and second

semester college GPA. Lastly in 2008, Lleras considered the ability of standardized

admission tests to predict retention. She found that for a one-standard-deviation increase

in ACT composite score students are 2.2 times more likely to complete additional years

of education (Lleras). These represent only a few of the many studies demonstrating

predictive utility. Hence, the resounding conclusion of the educational literature is that

both high school GPA and college admissions test scores are significant predictors of

both performance and persistence.

Noncognitive Predictors and College Outcomes

 In addition to cognitive markers that have long served as predictors of college

outcomes, several researchers in the psychology and education literatures have also

examined how noncognitive factors relate to educational outcomes (Robbins et al., 2004).

Specifically, Tinto (1993) has long theorized that individual characteristics are relevant to

student retention. One study testing this hypothesis was by Wolfe and Johnson in 1995.

They investigated many personality correlates and cognitive factors to determine the best

combination of predictors for college outcomes and found that items such as self-efficacy, self-control, and conscientiousness were important correlates in capturing college outcome variance beyond that explained by cognitive predictors (Wolfe & Johnson). In another study, Harackiewicz and colleagues (2002) studied first-semester freshmen to determine how goal behavior related to later outcomes. Follow-up measurements were conducted three weeks, several months, and seven years after initial measurement (Harackiewicz et al.). They found that students who set first-semester college goals and committed to reach them demonstrated greater proximal and distal college outcomes (Harackiewicz et al.). Thus, noncognitive predictors appear to be important predictors of success, but the literature describing these lacked structure and a common language until recently.

In 2004, Robbins and colleagues conducted a meta-analysis to consolidate the literature on noncognitive predictors. They drew from theorists like Tinto (1993), Bean (1980, 1985), Covington (2000), Dweck, (1999), and Eccles and Wigfield (2002) in order to discover the primary noncognitive predictors of college student success (Robbins et al.). They identified nine major psychosocial and study skills factors, i.e., achievement motivation, academic goals, institutional commitment, social support, social involvement, academic self-efficacy, general self-concept, academic-related skills, and contextual influences, and found that these variables contributed incrementally to predictions for retention and grade point average beyond traditional cognitive predictors (Robbins et al.). Overall, the psychosocial and study skills factors accounted for 8% of the variance in retention and 4% of the variance in GPA (Robbins et al.). Best predictors varied depending on outcome desired. For example, academic goals, self-efficacy and academic-

related skills accounted for the most variance in retention, whereas achievement motivation captured the most in GPA (Robbins et al.).

Though researchers like Astin (2005), Larose and colleagues (1998), Tinto (1993), and others have long argued for the power of noncognitive predictors, only recently has the field gained momentum enough to develop a specific instrument. Based on the findings of the meta-analysis done by Robbins and colleagues (2004), Le, Casillas, Robbins, and Langley (2005) developed the Student Readiness Inventory (SRI). The SRI measures ten noncognitive predictors (i.e., Academic Discipline, General Determination, Goal Striving, Commitment to College, Study Skills, Communication Skills, Social Connection, Social Activity, Academic Self-Confidence, and Emotional Control) of students' readiness for college (Le et al.) Tests done by Robbins, Allen, Casillas, Peterson, and Le (2006) found that multiple scales on the SRI are able to predict GPA, persistence, and course performance even after controlling for demographics, institutional environment, and prior academic achievement. Specifically, Academic Discipline, Social Activity, and Emotional Control were predictive of both GPA and retention, with Commitment to College and Social Connection providing additional predictive ability of retention (Robbins et al., 2006). Peterson and colleagues (2006) furthered this line of research and found that the SRI was able to account for more variance in GPA than instruments assessing other personality correlates, such as the Big Five Inventory. Most recently, Lleras (2008) found that study skills, conscientiousness, and social skills all related to greater educational attainment. Based on the recent research detailing the predictive power of noncognitive variables, it is clear that they warrant consideration in future college student outcome research.

Student Engagement and College Outcomes

Another area of research focuses on the importance of engagement. The knowledge regarding the value of engagement comes from two distinct literatures: educational research and college student success research. Here the literatures are considered separately as they relate to college outcomes.

High School Engagement and College Outcomes

A long history of research exists regarding the relationship between participation in high school activities and educational and occupational attainments, even after controlling for student variables like achievement and GPA (Otto, 1975; Otto, 1976, Otto & Alwin, 1977). A representative example is that of Marsh and Kleitman (2002) who studied students at grades 10 and 12, and two years post-graduation to determine the relationship between school-based activities and educational outcomes. They determined that more extracurricular participation was positively associated with several proximal behaviors, like spending time on homework and completing college applications (Marsh & Kleitman). At post-graduation follow-up, participating in high school activities was also positively related to distal outcomes, such as being enrolled in college and higher education attainment (Marsh & Kleitman). In this study, engagement in high school activities positively related to high school outcomes as well as college GPA and retention.

Some evidence to the contrary regarding first-to-second year retention also exists. Perkhounkova, Noble, and McLaughlin (2006) studied the ability of seventeen variables, including traditional cognitive predictors, a composite score of high school activities, and nine accomplishment scores, to predict first-to-second year retention in both first-year

and transfer students. They determined that activities and accomplishments were not significant predictors beyond other variables entered, and were thus dropped from the prediction equation (Perkhounkova et al.). Given their emphasis on total engagement, it is also useful to consider the utility of specific types of activities and accomplishments when predicting GPA and retention.

By far, athletic participation has been the most researched of all activities (Barber, Eccles, & Stone, 2001; Barber, Stone, & Eccles, 2005; Marsh & Kleitman, 2003; Troutman & Dufur, 2007). The broad consensus of this research is represented by Marsh and Kleitman's findings that students who participate in athletics are more likely to have higher grades and persist in college beyond the first year (Marsh & Kleitman). In fact, Lleras (2008) found that students' participation in at least one sport led to greater odds of completing more years of higher education. Darling, Caldwell, and Smith (2005) also found that students who participated in athletics excelled beyond those who did not. A significant body of research shows that athletic participation is beneficial, but it is important to consider other types of activities as well.

School clubs and services organizations are two common non-athletic activities also extensively researched. Fredricks and Eccles (2006) studied adolescents who participated in school clubs, organized sports, and prosocial activities. They found that students who attend school clubs have higher GPAs and educational expectations, even after controlling for background factors (Fredricks & Eccles). Also, prediction of higher education retention was enhanced by adding school club participation as a predictor even after controlling for high school achievement scores (Fredricks & Eccles). In contrast, participation in service related activities did not capture any additional variance for years

in higher education after cognitive predictors were included (Fredricks & Eccles). In a separate study, Astin (2005) found that a small, but significant portion of variance in college graduation rates is captured by engaging in volunteer work and attending religious services. Hence, the predictive utility of prosocial activity participation varies depending on student population, and it has some evidence for predictive utility.

The impact of participation is clearly complex. Researchers (Fredricks & Eccles, 2006; Gardner, Roth, & Brooks-Gunn, 2008) continue to find a positive (though small) relationship with extracurricular activities and years of education, finances, and college GPA, even after accounting for known predictors of achievement, motivation, and academic success (Fredricks & Eccles). Additionally, it appears that the relationship between participation and traditional outcomes is cumulative so that individuals who engage more have better outcomes (Fredricks & Eccles). In conclusion, the research strongly suggests that high school engagement activities are able to predict educational outcomes beyond cognitive predictors, yet it is unclear the exact relationship of these variables in conjunction with noncognitive and college engagement factors.

College Engagement and College Outcomes

In 1982, Vincent Tinto theorized about the possible reasons that students may leave college early. He recognized that students enter college with personal variations which relate to their ability to persist through college and utilize services in the college environment (Tinto, 1982). He later identified first to second year dropout as largely stemming from a combination of personal characteristics and lack of integration into the college environment, and suggested that post-entry activities weigh more heavily in student retention than pre-entry activities (Tinto, 2006).

George Kuh, another researcher in the area of student engagement, is well known for his belief that student involvement during college relates to college student success (Kuh et al., 2005). To test this, Carini, Kuh, and Klein (2006) studied 1058 students at 14 colleges and universities to determine the relationship between college engagement and traditional academic markers. They found that significant variance in GPA was captured by standardized test scores, but a substantial portion of variance was unexplained (Carini et al.). They hypothesized that this variance could potentially be captured by adding student engagement measures, especially since student engagement had accounted for significant variance in college GPA in their past studies (Carini et al.). When testing their hypothesis, they determined that students can obtain significant benefits from college engagement, and this is reflected in their learning outcomes, e.g., critical thinking, grade point average, etc. (Carini et al.). Kuh, Cruce, Shoup, Kinzie, and Gonyea (2007) again tested the predictive utility of college engagement with 6,193 first-year students from 18 different institutions. They found that college engagement accounted for 13% additional variance in first-year GPA beyond that of cognitive predictors. Furthermore, they determined that entry of college engagement factors into a predictive model diminished (but did not eliminate) the predictive power of precollege characteristics and behaviors (Kuh et al., 2007).

Purposeful engagement by college students clearly relates positively to college student outcomes (Kuh, Hu, & Vesper, 2000; Kuh et al., 2005; Kuh et al., 2007). However, this relationship has yet to be tested simultaneously with cognitive, noncognitive, and high school engagement predictors.

Incremental Validity

The previous synopsis of current research strongly suggests the importance of the independent relationships between cognitive, noncognitive, and engagement predictors with college outcomes. However, to date few studies (e.g., Kuh et al., 2007; Perkhounkova et al., 2006) have examined the combined utility of multiple categories of predictors. Incremental validity is the "degree to which a measure explains or predicts some phenomena of interest, relative to other measures" (Haynes & Lench, 2003, p. 457). Conceptually, incremental validity is measured by determining the overlap in variance between elements to determine the ability of each one to account for unique variance beyond what is already predictable (Haynes & Lench). The ability to predict a criterion beyond what is possible by existing data or methods is critical to ongoing development of research according to Hunsley (2003). The hope of using incremental validity is to combine constructs in order to better predict a criterion (Hunsley). Thus, it is also important to consider the interrelationships among predictors.

Interrelationships of Predictor Categories

Each of the major categories of predictors of college outcomes have been considered above. Additionally, the ability of these variables to incrementally add to predictions of student outcomes has been discussed. However, before envisioning a model of these predictors, it is important to recognize that they also interrelate.

Cognitive Predictors and Student Engagement

Positive relationships exist between cognitive predictors and both high school engagement and college engagement. First, regarding high school engagement, Metzger,

Crean, and Forbes-Jones (2009) found that participation in any high school out-of-class

activity related to better high school outcomes. Specifically, as reviewed earlier,

participation in particular activities (like athletics) relates positively to proximal and

distal educational outcomes (Marsh & Kleitman, 2002). A similar relationship exists for

participation in part-time work and prosocial activities proximally. Youniss and

colleagues (1999) examined the predictive power of part-time work and community

service, and found that each added predictive utility to high school outcomes beyond

background characteristics. Schmidt, Shumow, and Kackar (2007) observed a similar

relationship for prosocial activities using a different sample, so that any service

participation corresponded with a 12% increase in grades. Finally, students who engage

in multiple activities receive incrementally more benefit, so that more activities relate to

higher high school GPA (Darling et al., 2005).

A positive relationship also exists between cognitive predictors and college

engagement, so that students with higher incoming GPAs engage in more college

activities (Kuh et al., 2005). Kuh and colleagues observed this relationship for both

educational (e.g., talking with professors, etc.) and out-of-class (e.g., exercising,

attending events on campus, etc.) engagement activities. Astin (2005) described this

positive relationship as one that is reciprocal so that cognitive characteristics of incoming

students interact with these students' choice to engage. Here again it is evident that

students' precollege activities and achievement influence ongoing choices during the

college years.

Cognitive and Noncognitive Predictors

When conducting their meta-analysis, Robbins and colleagues (2004) identified several relationships between noncognitive predictors and traditional cognitive predictors, i.e., high school grade point average and standardized test scores. First, they reported that study skills have a known relationship to both high school GPA and standardized test scores (Robbins et al.). Specifically, study skills are directly related to course grades, and this relationship mediates the relationship of study skills to standardized test scores (Robbins et al.). Second, they examined the interrelationships of eight of the noncognitive constructs and found that high school GPA correlated positively with all, i.e., achievement motivation, academic goals, institutional commitment, social support, social involvement, academic self-efficacy, general self-concept, and academic-related skills (Robbins et al.). Standardized test scores correlated positively with all the predictors except institutional commitment and social involvement, which had small negative correlations (Robbins et al.). Later, when developing the Student Readiness Inventory, Le and colleagues (2005) found that Commitment to College, Social Connection, Academic Discipline, and Academic Self-Confidence correlated positively with high school GPA, and only Academic Self-Confidence correlated significantly with standardized test scores ($r = .32$; Le et al.). Hence, it is clear that several interrelationships between cognitive and noncognitive predictors exist, and will likely exist in future research.

Noncognitive Predictors and Student Engagement

Well known developmental theorists like Chickering and Reisser (1993) stated that developing interpersonal skills and a sense of self are major developmental tasks for

adolescents and young adults. Holland and Andre (1987) stated that high school

engagement can assist with the necessary acquisition of life skills. This is because

individuals, others, and the environment interconnect to challenge and support

individuals' growth in relationships and society (Barber et al., 2005). Specific evidence

exists supporting this hypothesized relationship as well (Blomfield & Barber, 2009;

Eccles; Raymore et al., 1999; Tieu & Pancer, 2009).

In longitudinal research on the value of high school participation, Barber and

colleagues (2001; 2005) found a positive relationship between participation and self-

efficacy, achievement, and educational attainment. They also determined that

participation promoted development of interpersonal skills, social engagement, and

critical thinking skills (Barber et al., 2001). It appears that participation encompassing a

mix of activities is best (Blomfield & Barber, 2009). Students participating in a variety of

activities exhibited higher levels of social self-concept, academic self-concept, and

general self-worth than students participating in only one type of activity or no activity

(Blomfield & Barber). Tieu and Pancer (2009) found similar relationships so that broad

involvement was related positively to self-esteem and social skills. Participation in a

range of activities also has the potential to improve adolescents' social networks and

embrace them as members of a school community, which may increase school identity

and commitment (Eccles & Barber, 1999). Specifically, athletic participation has been

found to be positively related to higher self-esteem (Marsh & Kleitman, 2003), and

increased school commitment (Eccles, Barber, Stone, & Hunt, 2003; Marsh & Kleitman,

2002), notably similar to constructs measured by the Student Readiness Inventory, e.g.,

school commitment vs. Commitment to College. Hence, it seems likely that participation

in high school activities will relate positively to students' readiness for college as measured by the SRI, though these correlations have not yet been reported in the literature.

Visual Representation of Predictors and Outcomes

When considering the vastness of research on college student outcomes, it is clear that several factors have been found to relate to both outcomes and each other. Figure 1 visually represents the potential relationships that were discussed as related to college outcomes. Then, Figure 2 illustrates how the groupings of predictors may interrelate regardless of college outcomes.

Several things are noteworthy about these representations. First, each of the predictors discussed above has a direct hypothesized relationship with college outcomes. However, when they are considered additively, some of these relationships may become insignificant. Second, several interrelationships are hypothesized as well. These are demonstrated solely as correlations. This conceptual model is meant only to show
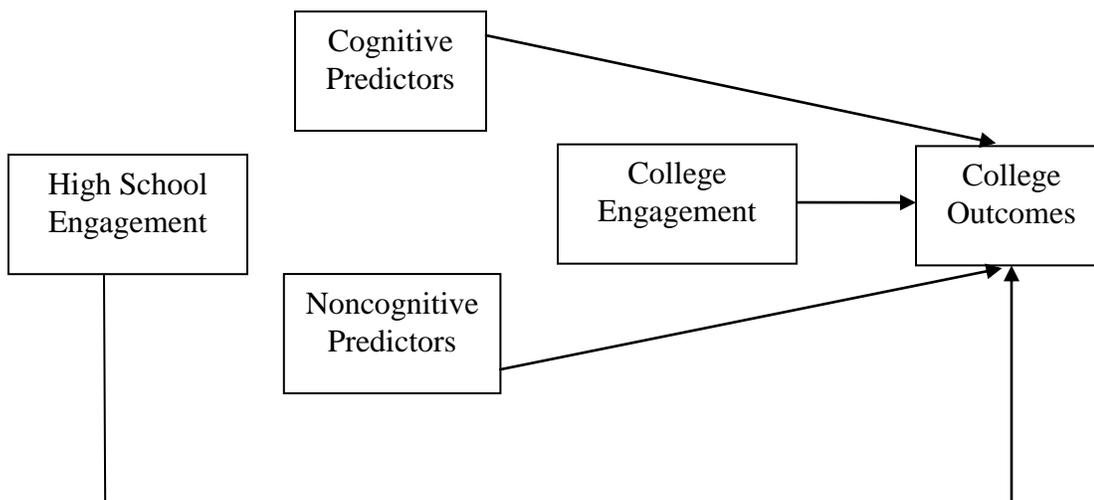
Figure 1. Predicted Conceptual Model
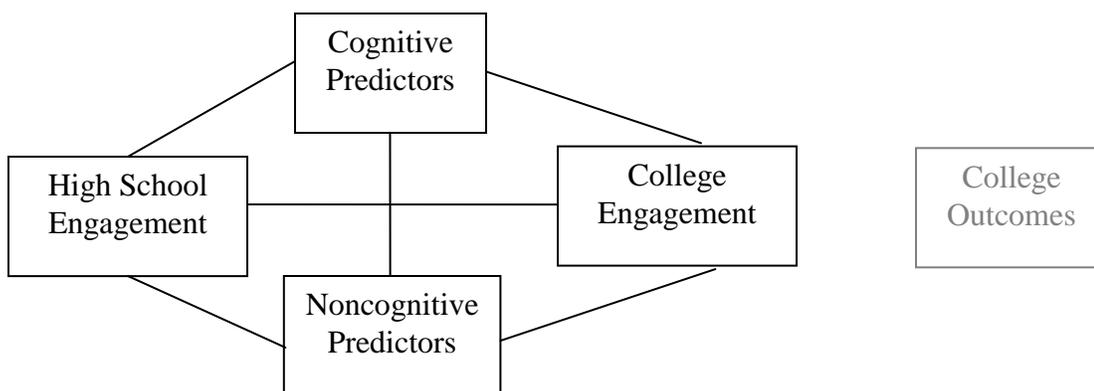
Figure 2. Predicted Interrelationships

groupings of predictors and provide visual organization for the predictive literature summarized above.

Restatement of the Problem and Research Questions

Trends in student characteristics clearly exist and coincide with changing social contexts, historical events, and generational progressions. Student affairs professionals largely rely on projections and theorizations about trends to plan for and enhance college student experiences (Cole et al., 2009). A major gap exists in the literature regarding historical trends in high school activities and out-of-class accomplishments. Thus, the first goal of this project was to detail the changing student trends in high school engagement and its relationship with other student variables. The following research questions were proposed in response to this goal:

1. What trends in high school activities and out-of-class accomplishments exist for the past thirty-five years?

2. Do these trends vary as a function of participants' sociodemographic variables?

While this information clearly adds to the literature, two applications of this data were proposed to enhance the clinical usefulness of this project. The first application was to analyze the relationships between measured high school engagement and anticipated college engagement, measured high school engagement and measured college engagement, and anticipated and measured college engagement. This application answers Cole and colleagues' (2009) request for this information to assist student affairs professionals to: meet students' expectations, develop strategic plans, design first-year experience programs, help train faculty, inform advisors, and create a richer college student experience (p. 62). The following research question was proposed in response to this goal:

3. What is the relationship between high school engagement and college engagement for individual students?

The second application was to enhance the predictive utility of high school engagement. Conceptual models were presented earlier in this dissertation that visually demonstrated how independent predictive categories may all relate to college outcomes, and how these categories may also correlate with each other. This project added to the current literature by integrating previously independent literatures in an attempt to determine the relationship of college outcomes with cognitive predictors, noncognitive predictors, and high school and college engagement. The following research questions were proposed for this third goal:

4. What are the interrelationships of cognitive predictors, noncognitive predictors, college engagement, and high school engagement?

5. How do cognitive predictors, noncognitive predictors, college engagement, and high school engagement incrementally predict college student outcomes?

CHAPTER 2

METHODS

Participants

Two sets of participants were utilized in this study. The first set included all

individuals who completed the ACT College Entrance Exam between 1974 and 2007.

They were used for consideration of trends in high school activities and out-of-class

accomplishments. Participants resided in all fifty states and the District of Columbia, and

represented a wide range of demographic characteristics for socioeconomic status,

gender, race, community size, graduating class size, and high school achievement.

Ten percent of individuals with complete engagement records were selected from

each year resulting in increasing numbers over the years. Students with invalid

graduation years were then excluded. Based on the need to classify students by both year

and generation, students were also grouped into generations based on Strauss and Howe's

(1991) generational theory. Students with birth years of 1943-1960 traditionally represent

the Boomer generation, and likely graduated high school in 1974-1978. Next, students

born 1961-1981 typically graduated in 1979-1999, and represented the Thirteenth

generation. Millennial students were born starting in 1982 and graduated in 2000-2007.

The second set of participants was used for the second and third application-

oriented goals of this project. Participants' records were drawn from selected four-year

institutions (i.e., Northern Arizona University, Southern Illinois University, and

University of Utah), which collected data regarding college readiness, student engagement, and college outcomes (i.e., first-year GPA, first- to second-year retention). Of these participants, those who had not previously completed the ACT College Entrance Exam were excluded.

Participants were selected from these institutions based on a convenience sampling principle. The dissertation director for the project previously worked at ACT, Inc., and had approved access to historical data files. The director also had working relationships with faculty and staff conducting institutional research at Northern Arizona University, Southern Illinois University, and University of Utah. Hence, all participant records included in this project were based on convenience rather than random selection. The implication of using data from these institutions is addressed in the discussion section as appropriate.

Design

This study utilized a descriptive design containing archival survey data and archival institutional data. The study is correlational in nature and is thus designed to identify relationships between variables rather than infer causation.

Measures

ACT College Entrance Exam Archival Database

ACT, Inc., was established in 1959 and was originally named American College Testing (http://www.act.org/aboutact/index.html). It was developed to provide institutions with standardized information about college students' qualifications for admission (http://www.act.org). The ACT College Entrance Exam contains a student

profile section, demographic information, and sections of cognitive predictors for

Reading, Mathematics, Science, and English (http://www.act.org). The profile section

contains 190 questions, of which 79 questions relate directly to high school activities and

out-of-class accomplishments (ACT, Inc., 1995). The questions related to activities

represent a broad range from a variety of disciplines and interest areas, e.g., instrumental

music, vocal music, student government, etc., and are answered in yes/no format (ACT,

Inc.). The questions related specifically to accomplishments are further classified into

categories related to leadership, music, speech, art, writing, science, athletics, community

service, and work experience (ACT, Inc.). Students' responses in the profile section were

primarily utilized to determine breadth and depth of high school engagement. In the

profile section, individuals also self-reported estimated parental income before taxes,

community size, racial background, number of students in graduating class, and overall

high school grade point average. Individuals reported gender when registering for the

exam and this is also included in their record. (See Appendix A for selected items used in

analysis.)

In addition students had two markers of cognitive prediction in the ACT archival

database: self-reported high school GPA and the ACT achievement composite.

According to Maxey and Ormsby (1971), students' self- and school-reported grades

correlated between .81 and .86. Moreover, students did not differ based on demographic

characteristics for accuracy (Maxey & Ormsby). Maxey and Ormsby assessed the

accuracy of reported extracurricular activities as well and determined that self-reports of

activities and achievements were also valid. The second element used for cognitive

prediction was the ACT achievement score. Responses in the four sections of cognitive

achievement in Reading, Mathematics, Science, and English yielded a composite score of prediction (http://www.act.org). ACT had algorithmically calculated the composite scores and included them in the archival database for each student.

Student Readiness Inventory

The Student Readiness Inventory (SRI) has 108 items with a 6-point response scale ranging from Strongly Disagree to Strongly Agree measuring students' noncognitive characteristics (Le et al., 2005). It was developed by Le and colleagues based on the 2004 meta-analysis conducted by Robbins and colleagues. Le and colleagues utilized the noncognitive constructs identified by Robbins and colleagues to develop their scales through a rational-empirical approach. The finalized constructs were labeled: Academic Discipline, General Determination, Goal Striving, Commitment to College, Study Skills, Communication Skills, Social Connection, Social Activity, Academic Self-Confidence, and Emotional Control (Le et al.). The purpose of the construction was to develop an instrument for predicting college performance and persistence from noncognitive predictors (Le et al.). (See Appendix B for a list of scales and sample items.)

Evidence for validity and reliability of the instrument was a crucial part of the development process. Le and colleagues (2005) initially used exploratory factor analysis and discovered eleven factors, but dropped one that lacked a coherent construct, opting to maintain the ten factor structure hypothesized from Robbins and colleagues' (2004) results. The researchers then determined through confirmatory factor analysis that the ten factor structure was a good fit for a larger set of responses (χ^2 = 10,486.72, df = 10,250, p =.05). Le and colleagues also concluded that initial evidence existed for internal

consistency of the factors with Cronbach alpha estimates ranging from .72 to .87, with a

median of .82, demonstrating that initial evidence of content and construct validity

existed for the instrument. Additionally, Le and colleagues found initial evidence of

convergent and discriminant validity, but noted that a greater understanding of the scores'

predictive ability and additional convergent and discriminant evidence was needed.

Finally, Le and colleagues tested potential instrument bias, and determined that outcome

data from the factors was consistent across subgroups, given that no clinically significant

differences between subgroups based on gender, race/ethnicity, or educational status were

found.

Since Le and colleagues' (2005) development of the instrument, other researchers

have built on the evidence for reliability and validity. Peterson and colleagues (2006)

found additional support for construct and predictive validity by comparing the SRI to

known measures of personality traits. Specifically, these researchers compared scales on

the SRI to factors on the Big Five Inventory, such as Social Activity to extraversion

(Peterson et al.). The strong relationships between like factors further strengthened the

evidence for convergent and construct validities of the SRI (Peterson et al.). Robbins and

colleagues (2006) further explored the predictive ability of the SRI by measuring the

ability of the noncognitive factors on the SRI to predict college persistence and

performance. They determined that the SRI has the ability to add incrementally to the

predictive ability of high school GPA for college outcomes.

National Survey of Student Engagement

The National Survey of Student Engagement (NSSE) measures students' current patterns of engagement in educationally purposeful activities (Carini et al., 2006). Each year, students are randomly selected at a variety of institutions to complete the NSSE. The NSSE contains 70 items, with varying item choice responses (Kuh, 2003). Just as Maxey and Ormsby (1971) determined that students self-report grades accurately, Carini and colleagues determined that students self-report valid and accurate data on the NSSE.

Questions on the NSSE are divided into clusters about Academic and Intellectual Experiences, Mental Activities, Reading and Writing, Problem Sets, Examinations, Additional Collegiate Experiences, Enriching Educational Experiences, Quality of Relationships, Time Usage, Institutional Environment, Educational and Personal Growth, Academic Advising, and Satisfaction (National Survey of Student Engagement, 2007). Responses from these categories are grouped into five benchmarks of effective educational practice, i.e., Level of Academic Challenge, Active and Collaborative Learning, Student Faculty Interactions, Enriching Educational Experiences, and Supportive Campus Environment (Kuh, 2003).

Broadly speaking, Kuh (2003) has identified significant evidence for reliability and validity of the overall instrument and scale scores. Kuh reported that scores for the NSSE remain consistent over time with a test-retest coefficient of .83. Moreover, scores on the NSSE are stable from year to year and individuals reliably interpret the items to hold the same meaning (Kuh; Kuh et al., 2001). Thus, Kuh concluded that though student engagement is constantly changing, the NSSE scores hold evidence for reliability. Additionally, the clusters on the NSSE are internally consistent, with alpha coefficients

ranging from .84 to .90 for items on College Activities, Educational and Personal

Growth, and Opinions About Your School (Kuh; Kuh et al.). Individual items from all

the clusters also correlate with students' responses on other similar items adding evidence

for convergent validity (Kuh). Each type of evidence summarized above adds supporting

evidence for the construct validity of the instrument. Thus, the NSSE demonstrates strong

support for reliability, and predictive and construct validities.

Most frequently, administrators use the amalgamated data of many respondents to

understand how students are engaging at their institution. Yet, a student response set

actually yields both institutional and student level data. Gordon, Ludlum, and Hoey

(2008) recently explored how NSSE responses may also be used at the student level to

predict freshman GPA, freshman retention, senior GPA, graduation, and employment

following graduation at Georgia Institute of Technology. These researchers examined the

ability of the benchmarks, scales, and individual items to predict these traditional college

outcomes (Gordon et al). Their findings revealed that though some benchmarks (i.e.,

Level of Academic Challenge, Active and Collaborative Learning, and Enriching

Educational experiences for freshman GPA, and Enriching Educational Experiences for

freshman retention) were able to capture predictive variance, groupings of individual

items on the NSSE were the best predictors of college outcomes. The researchers then

tested this same model with another sample and determined that the same individual

items were able to capture similar variance (8.4% vs. 10. 5%) in freshman GPA (Gordon

et al.). However, the items previously found to positively predict freshman retention did

not do so in the new sample, and in fact correlated negatively. The researchers speculated

that the item grouping for freshman GPA is consistently predictive, but further research is

needed testing the relationship between individual items and freshman retention (Gordon et al.). The implication for this project was that individual items from the NSSE with a history of proven utility were selected in testing the conceptual model rather than benchmarks or scales. (See Appendix C for selected items and previous predictive results.)

College Student Outcomes

Robbins and colleagues (2004) identified performance and persistence as two major domains of college student outcomes. Performance is generally understood as students' academic grade point average (Braxton, 2003). While this is measured throughout students' college careers, first-year GPA commonly serves as an outcome variable of interest.

Persistence is synonymous with retention (Braxton, 2003). Of the 66% of high school graduates currently entering some form of higher education (Planty et al., 2008), 25% of them will depart after their first year (National Center for Higher Education Management Systems, 2005; Tinto, 1993). Moreover, only 55% of students will complete a degree within six years at their institution of entrance (U.S. Department of Education, 2003). Hence, students' continuation from first to second year is of major interest to institutions of higher education, given that almost half of departers leave during this transition.

Procedure

In order to fully understand the procedure needed, it is important to review the goals of this project. The goals were: to evaluate the changing trends in high school

engagement, to estimate the relationship between high school engagement and college engagement, and to estimate the ability of high school engagement to incrementally add to the prediction of college outcomes.

Obtainment of the first goal required charting of trends in high school activities as observed in historical data files of participants who completed the ACT College Entrance Exam instrument. The dissertation director for this project previously worked for ACT, and had ACT approved access to the historical data files, which currently contained no identifying information and no coding mechanism with which to identity individuals through subsequent efforts. Copies of these files were provided to the doctoral student for this capacity only.

To achieve the next two goals, institutional archival data was used. Different institutions held different constellations of variables of interest. The doctoral student and dissertation director worked together to contact ACT, Inc., and the institutions (i.e., University of Utah, Northern Arizona University, Southern Illinois University), who held subsets of the archival data of interest (Student Readiness Inventory scores, National Survey of Student Engagement, and student academic records). All parties then worked with institutional researchers to transfer files via standard encryption protocols in order to link records. Following matching, all personal identifying information was stripped, leaving the doctoral student with matched data records containing only unidentifiable cases for use in this study.

Thus, data used in this study contained no personal identifying information that permitted any investigator to identify individuals, nor was there capability to seek information from ACT, Inc., or the selected institutions in order to obtain personal

identifying information. Thus, data used for these two project goals was stripped of all capacity to identify participants. Concern related to the transferring of academic records to ACT for the purpose of matching to ACT exam records was minimal as both institutions already conduct such transfers for the purposes of institutional enrollment planning, admissions, and under existing agreements for data sharing for the purpose of ACT research.

<center>Analysis</center>

Three primary sets of analysis were conducted with this project in order to achieve the previously summarized goals. First, a trend analysis was conducted to determine existing trends in high school activities and out-of-class accomplishments. Second, the relationship between high school engagement and college engagement was assessed through bivariate correlations. Third, linear and logistic regression was utilized to determine the additive predictive utility of cognitive, noncognitive, high school engagement and college engagement factors.

To begin, it is important to note that the first and third analyses contained hierarchical data, i.e., students nested in schools, in institutions, and in states. Correctly accounting for nesting is critical to obtaining valid results (Fields, 2006). In an unpublished doctoral dissertation, Fields tested if multiple levels of nesting must be included to obtain valid results. He determined that including only the highest level was necessary to capture the group variance for all subsequent levels (Fields). Hence, in this project, state was used as the highest nesting variable in the trend analysis, and institution was used as the highest in the predictive analysis. For both of these analyses, the investigator conducted preliminary tests to check for the existence of significant random

variability at the level of state or institution. If significant random variability was found, all subsequent analyses were conducted in two-level hierarchical models, based on Raudenbush and Bryk's (2002) suggestions and research. Potential state-level educational characteristics (Knapp, Kelly-Reid, Ginder, & Miller, 2008) were included to capture random variability as needed. When significant variability was not found, traditional one-level analyses were conducted. Given that hierarchical levels were not a focus of this study, analyses will only be discussed as is relevant to study questions herein.

In accordance with the research questions presented earlier, the first data analysis was conducted for the purpose of uncovering historical trends in high school activities and accomplishments. For this analysis, the investigator followed the recommended trend analysis model using both visual and statistical means (Keppel & Wickens, 2004). Rosenberg (1997) stated that visual inspection of the data in any trend analysis is a crucial step in determining the characteristics of the data and the appropriate statistical method to use to determine the nature of the trend. Shadish, Cook, and Campbell (2002) stated that many researchers only rely on visual inspection of trend data, but visual analysis only may reflect researchers' biases (Furlong & Wampold, 1981). Therefore visual inspection was first conducted, and then followed by statistical analysis.

A series of statistical analyses were used. To begin, a chi square analysis was conducted to test for the existence of state-level variability in student activities and out-of-class accomplishments. If this test was significant, all subsequent tests would be done using hierarchical linear modeling. Within this structure, simultaneous multiple regression was used to test the existence of trends within student activities and accomplishments. First, the significance of measurement year was tested to determine

annual trends. Next, year squared was tested to determine if the trends changed direction over time. Third, generation was tested to determine if changes in magnitude existed between generations. Fourth, interactions between type of activity or accomplishment and year were tested to determine if the trend varied as a result of specific engagement type. Secondary analyses were then conducted to explore the sociodemographic influences on engagement. Race, gender, socioeconomic status, graduating class size, community size, high school GPA, and ACT composite score were entered as sociodemographic variables of interest into models for both activities and accomplishments. Finally, proportion of variance captured and intraclass correlation coefficients, ("the proportion of the total variance in the dependent variable that arises from variations between the higher-level units," Adewale et al., 2007, p. S42), were computed in order to obtain an understanding of effect size.

The next set of analyses was conducted to meet the second goal of this project testing the relationship between high school and college engagement. First, items of interest were identified from the ACT college entrance exam database and from the National Survey of Student Engagement. Items were selected from the NSSE based on similarity of activity to the ACT profile section. After selection of items, bivariate correlations were computed using SPSS 16. (See Appendix D for a list of selected items.)

The final set of analyses used both linear and logistic regression strategies: linear for college grade point average as outcome and logistic for retention as outcome. This selection of data contained five groupings of variables: two cognitive predictors, ten noncognitive predictors, one high school activities engagement variable, ten high school accomplishments variables, eighteen college engagement variables (thirteen for GPA and

five for retention) and two college outcomes. (See Appendix E for a list of variables used in this analysis). Subsets of these variables, maximizing possible sample sizes, were selected for analysis.

Tests to determine the relationships between predictors was conducted first with bivariate correlations. Next, given the presence of nesting, a test for significant level two variability was conducted with each subset. If level two variability existed, simultaneous multiple regression was utilized in HLM 6.06 to test the significance of variables of interest. Publicly available institutional characteristics were included if necessary. However, if no group level variability existed, both stepwise and simultaneous multiple regression techniques were utilized in SPSS 16 to determine the best predictive model for the outcome of interest. All analyses were conducted chronologically based on previous research, so that first cognitive predictors were studied, followed by noncognitive and engagement predictors, with the full model being tested last. One data set from Northern Arizona University contained all data points and was utilized for full model testing.

CHAPTER 3

RESULTS

Trend Analysis

Two research questions were proposed for the analysis of trends in engagement

activities and out-of-class accomplishments. The first asked what trends exist in high

school activities and out-of-class accomplishments for the past thirty-five years. The

second asked if trend results were influenced by sociodemographic variables.

Participants' demographics will be considered first, followed by results for high school

activities, and then out-of-class accomplishments.

Participants

Ten percent of complete data sets from each year were selected, resulting in

3,193,370 cases. From this, 27,430 cases were eliminated due to either an invalid

graduation year or a graduation year outside of the study period, i.e., prior to 1973 or

after 2007. This resulted in a total of 3,165,940 cases. A significant test of between group

variability necessitated the use of hierarchical linear modeling, meaning that group-level

variables must be entered to account for differences between groups. A total of 9,035

participants were from outside of the United States, and did not have group-level data

available. Hence, the final set of participants included in subsequent hierarchical trend

analysis totaled 3,156,905.

Participants represented all 50 states and the District of Columbia. Fifty-seven percent of the participants identified as female, forty-three percent identified as male. Regarding racial background, 76% of students identified as White, 21% as a racial minority, and 3% did not provide information. The participants reported being from a full range of socioeconomic statuses, from $0 to $100,000+ annual parental income. Finally, participants endorsed living in a wide range of community sizes from farm country to urban density. For a full description of descriptive characteristics, see Appendix F.

High School Activities

A test for between group variability was positive, ($\chi^2 = 92732.307$, df = 50, p < .001), necessitating two-level modeling of trends. Essentially this result informs the researcher that a student's number of activities or achievements will be a function of that student's state mean plus significant level one predictors (e.g., year, gender, etc.) for that student's state plus an error component. The state mean is an important factor to consider. In this case, the interclass correlation was calculated as .023, meaning that 2.3% of variance in total activities arises from variance between states. Estimates for state-level graduation rate and ACT scores were added to the level two model, as well as number of participants per state. These variables were able to explain 56% of the reliable level two variance; however, significant variability still existed, $\chi^2 = 19089.731$, df = 47, p < .001. Additional variables of interest, i.e., proportion of students receiving free or reduced lunch, per pupil spending, and average teacher-to-student ratio were not able to capture additional level two variability. This means that variability continued to exist between states which may bias results when looking at between participant differences. Hence, a

stricter standard of $p < .001$ and final estimation of fixed effects with robust standard errors were utilized for level one interpretation.

The test for homogeneity of level one variance was also significant, $\chi^2 = 5962.128$, df =50, p< .001, meaning that there is a risk that the homogeneity assumption may be violated. Follow-up visual tests with a q-q plot showed that level one variance was primarily consistent with expected values. Nonlinear variability was present only at the ends of the distribution. Thus, a normally distributed assumption was reasonable.

As shown in Table 1, the average number of activities at the median year (1990-91), was 4.261, t = 130.869, df = 47, p < .001. This average varied as a function of statewide ACT score, so that students attending high school in states with higher ACT scores also engaged in more activities, t = 3.739, df = 47, p = .001. In addition, the amount of activities varied as a function of year and generation. For every year measured, students participated in .013 fewer activities, t = -5.428, df = 49, p < .001. For every generation, there was an average decrease of .058 activities, t = -4.607, df = 49, p < .001.

Table 1

Significant Coefficients for Trends in Activities (with robust standard errors)

Variable	Coefficient	Standard error	T-ratio	df	P-value
Intercept	4.261	0.033	130.869	47	.000
Avg ACT	0.115	0.506	3.739	47	.001
# Participants	-0.000	0.031	-6.421	47	.000
Year	-0.013	0.002	-5.428	49	.000
Generation	-0.058	0.013	-4.607	49	.000

The interaction of specific types of activities with year was also tested. No significant relationships were found for student government, publications (newspaper, yearbook, literary magazine), or fraternity/sorority/social clubs. A nonsignificant result indicates no interaction with measured year. Significant results were found for instrumental music, vocal music, debate, departmental clubs, dramatics/theater, religious organizations, racial or ethnic organizations, intramural athletics, varsity athletics, political organizations, radio-TV, special interest groups, and school or community service organizations. Visual analysis of the results indicated that the interactions varied greatly. Participation in instrumental music, varsity athletics, and school or community service organizations interacted with the year measured and demonstrated a net increase. Student involvements in the remaining activities had fluctuating interactions with slight to moderate decreases over time.

When computing the influence of entering sociodemographics into the trend analysis equations, an additional 374,279 participants were eliminated due to one or more missing background characteristics. This resulted in a final set of 2,782,626 students. First, gender, racial background, socioeconomic status, graduating class size, and community size were added to the equation. Results for racial background and community size were not significant, and deleted from the model. Given the known relationship between high school grade point average and ACT composite score with high school engagement, these were also entered into the model and yielded significant relationships. The final results indicated the following: men were less engaged than women, students from higher socioeconomic statuses were more engaged, students from larger class sizes were less engaged, students with higher grade point averages were more

engaged, and students with higher ACT scores were more engaged. See Table 2 for

significant results. Also, tests for year and generation remained significant throughout

sociodemographic analyses, indicating the presence of trends beyond variability

associated with background characteristics. Hence, a student's level of high school

engagement was best predicted by considering the student's state mean, graduation year,

generation, gender, socioeconomic status, graduating class size, high school GPA, and

ACT composite score. The final sociodemographic trend model indicated that 41% of the

true score variance between states was explained by level two predictors and 9% of the

within state variability was explained by level one predictors.

The influence of year by sociodemographics was also considered. Crossproducts

of year by each sociodemographic variable, i.e., gender, racial background,

socioeconomic status, class size, community size, high school grade point average, and

Table 2

Significant Coefficients for Sociodemographic Influences (with robust standard errors)

Variable	Coefficient	Standard error	T-ratio	df	P-value
Gender[1]	-0.067	0.011	-5.898	50	.000
Socioeconomic Status[2]	0.049	0.003	16.828	47	.000
Class size[2]	-0.228	0.012	-18.456	46	.000
High school GPA[3]	0.346	0.006	57.489	48	.000
ACT composite	0.045	0.002	24.972	47	.000

[1] 0=Female, 1=Male

[2] See Appendix A for variable scales

[3] Measured in increments of 0.5 on a traditional 4.0 grade scale

ACT score, were considered. Only interactions between racial background and year and between class size and year were significant. Visual inspection of the year by race interaction demonstrated that all students have had decreasing engagement over time; however, those students identifying as White began engaging more in recent years, whereas students identifying as a racial minority have continued to report diminishing engagement. Visual inspection also indicated that different class sizes have different slopes of engagement. Students from smaller classes were very engaged in the 1970s and 1980s, and have shown steeper declines in engagement than students from larger class sizes, whose slopes over time have been less dramatic.

Out-of-Class Accomplishments

The test for between group variability was also positive with out-of-class accomplishments, ($\chi^2 = 38036.608$, df = 50, p < .001), necessitating two level modeling of trends. Again, this positive result conveys that the average number of accomplishments for a student's state needs to be added into the prediction equation in order to obtain statistically sound results. The interclass correlation was calculated as .018, meaning that 1.8% of true score variance in accomplishments arises from variance between states. Level two variables for proportion of students receiving free or reduced lunch, average graduation rate, average ACT composite score, and number of participants per state were added to capture level two variability. These variables were able to explain 57% of the reliable level two variance; however, significant variability still existed, $\chi^2 = 7388.497$, df = 46, p < .001, just as it did with high school activities. Hence, the stricter standard of p < .001 and final estimation of fixed effects with robust standard errors were also utilized for out-of-class accomplishments level one reporting. In addition, the test for

homogeneity of level one variance was significant, $\chi^2 = 10301.711$, df =50, p< .001.

Follow-up visual tests with a q-q plot were also utilized with this data and showed that

level one variance was primarily consistent with expected values. Hence, analyses

proceeded with the conclusion that a normally distributed assumption was reasonable.

Participants reported an average of 14.196 accomplishments aggregated across

states at the median year (1990-91). The tests for trends by year and generation were not

significant, t = .749, df = 50, p > .05; t = .124, df = 50, p > .05. However, as shown in

Table 3, a test for quadratic effect was significant, t = -8.925, df = 48, p < .001.

Participants reported receiving the most accomplishments in the middle of the

distribution and fewest accomplishments at the edges, i.e., years 1974 and 2007. Thus,

the average number of accomplishments at the median year was the highest ever reported

with decreasing amounts for earlier and later years. See Figure 3 for a visual

representation. Note that dots represent state means by year, and the quadratic trend

accounts for group variations.

Main effects for specific types of accomplishments were tested next. No main

effects for type of accomplishment were significant, meaning that no annual or

Table 3

Significant Coefficients for Trends in Accomplishments

Variable	Coefficient	Standard error	T-ratio	df	P-value
Intercept	14.196	0.093	153.228	46	.000
# Participants	-0.000	0.000	-5.376	46	.000
Year Squared	-0.003	0.000	-8.925	48	.000
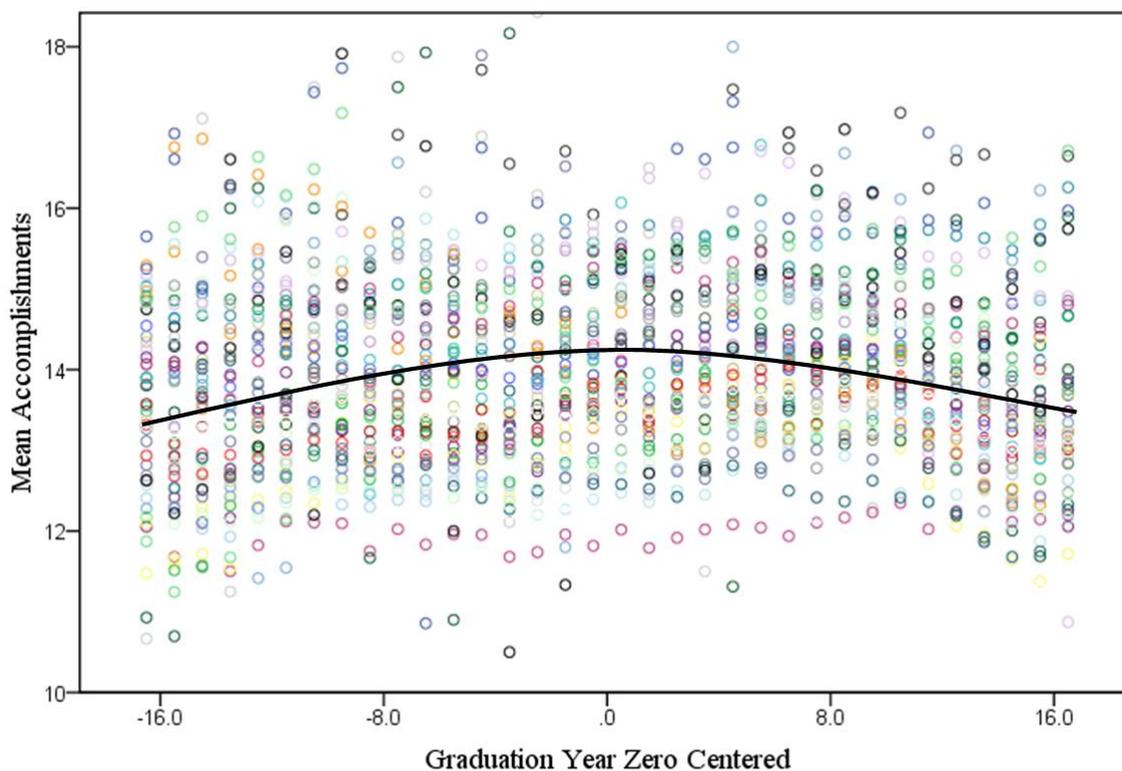
Figure 3 Quadratic Trend in Mean Accomplishments by Graduation Year

generational trends in type of accomplishment were measurable in this data. However, some interaction relationships were significant, so that accomplishments in leadership, speech, writing, science, community service, and work varied as a function of year measured.

Tests for sociodemographic influences on accomplishments also utilized the set of 2,782,626 students with complete background information. Gender, racial background, socioeconomic status, graduating class size, community size, high school grade point average and ACT composite score were entered into the model, and initially yielded significant relationships at level one. However, when additional level two variables were entered, all significant relationships ceased to exist. This means that variance between states accounted for all measurable variance in sociodemographic influences. Similar

results were found with interactions between sociodemographic characteristics and year. Initial entry yielded significant results, but these were not measurably significant once between group variance was partially captured.

<center>Continuity of Engagement</center>

In order to make the information on trends in high school engagement relevant to current professionals, two applications utilizing data on high school engagement were proposed. The first asked about the relationship between high school engagement and college engagement for individual students. The results reported are longitudinal with the same students measured on multiple items. Items for measured high school engagement and anticipated college engagement came from the ACT Student Profile Section (ACT, Inc., 1995), and were measured during students' high school years. Items for measured college engagement were selected from the National Survey of Student Engagement (NSSE; Indiana University Center for Postsecondary Research and Planning, 2008), and were measured during students' first spring semester in college. See Appendix D for a list of included items from the ACT and the NSSE.

The first test was to determine the relationship between measured high school engagement and anticipated college engagement. This test utilized the same 3,156,905 data sets as the trend analyses. See Appendix G for all relationships between measured engagement and anticipated engagement in the same activity, e.g., vocal music in high school and vocal music in college. Responses indicated that students anticipate continuing the same activities from high school into the college years, given that all relationships between measured and anticipated activities were significant. Correlations ranged from .211 to .533, $p < .001$. The most highly correlated activities were vocal

music, varsity athletics, and religious organizations. The least correlated were debate, radio-TV, and fraternity/sorority.

The second test was to determine the relationship between measured high school engagement and measured college engagement. This and the next test utilized responses from a convenience sample of 4,247 students, who entered college between 2003 and 2006. Participating in publications in high school had the fewest relationships to any engagement activity in college. The greatest number of significant correlations to like college activities was found with students who indicated participating in school or community service organizations during high school. College engagement in foreign language coursework, independent study/self-designed major, or on campus work was not related to any high school activities. See Appendix H for all significant results.

The final test examined the relationship between anticipated and measured college engagement. Similar to previous results, planning to participate in publications during college had no significant relationships to any measured college activities. Conversely, anticipated participation in campus or community service organizations was most frequently related to college engagement items. When viewed from the college engagement lens, working on a research project with a faculty member, preparing for class, on campus work, providing care for dependents, or voting in local/state/national elections were not related to any anticipated college activities. See Appendix I for all significant results.

Prediction of College Student Outcomes

The second application of the data on trends answered how high school engagement can incrementally predict college student outcomes when considered with

cognitive predictors, noncognitive predictors, and college engagement variables. After

considering the interrelationships of the predictors, incremental prediction of both first-

year grade point average and first-to-second year retention is reported.

Interrelationships of Predictors

The interrelationships between cognitive, noncognitive, high school engagement,

and college engagement predictors were determined by bivariate correlations. The data

utilized for this question was the same convenience sample of 4,247 students, who

entered college between 2003 and 2006 used in the previous application. These students

were from the University of Utah (N=392), Southern Illinois University (N=765), and

Northern Arizona University (N=3090). Due to missing data, the number of actual

participants included in each correlation was smaller, ranging from 323 to 2,493. See

Appendix J for complete correlation charts.

The first relationship considered was between cognitive and noncognitive

predictors. The cognitive predictor of high school GPA was significantly related to nine

noncognitive predictors. The only exception was a nonsignificant result between GPA

and Social Activity. ACT composite score, as a cognitive predictor, demonstrated a very

different relationship pattern. ACT score yielded only one significant relationship to a

noncognitive predictor, Academic Self-Confidence, $r = .439$, $p < .001$.

Regarding cognitive and high school engagement predictors, high school GPA

related positively to the sum of activities and seven types of accomplishments, with

exceptions for athletics and work experience which had nonsignificant relationships.

ACT composite score also related positively to most high school engagement factors, and

yielded one negative relationship for accomplishments in athletics, $r = -.071$, $p < .05$, and

two nonsignificant relationships for accomplishments in community service,

$r = .033$, n.s., and accomplishments in work experience, $r = -.026$, n.s.

When examining the relationships between cognitive predictors and college engagement, a very different pattern emerged. Recall that different items were utilized for college engagement predictors depending on if the outcome of interest was first-year GPA or first-to-second year retention. High school GPA had only one significant relationship to a college engagement predictor for first-year GPA. It was a positive correlation with "number of problem sets (problem-based homework assignments) that take you MORE than an hour to complete," $r = .091$, $p < .05$. There were no significant relationships between high school GPA and predictors of retention. In contrast, ACT score was significantly related to five college engagement predictors for first-year GPA and one predictor for retention. All of these relationships were negative with the exception of "hours per 7-day week spent relaxing and socializing (watching TV, partying, etc.)," $r = .147$, $p < .001$.

The next pair of consideration was noncognitive and high school engagement predictors. Total number of high school activities was positively related to all noncognitive predictors, except Emotional Control, which yielded a nonsignificant relationship. Total number of out-of-class accomplishments was similarly related positively to Study Skills, Communication Skills, Social Activity, Social Connection, Academic Self-Confidence, and Emotional Control. Types of accomplishments yielded varying patterns of relation to noncognitive predictors. Accomplishments in leadership or community service were most related to these predictors, both yielding positive relationships to Goal Striving, Academic Discipline, General Determination, Study

Skills, Communication Skills, Social Activity, and Social Connection. Accomplishments in music, art, and work experience were least related. Music only had a significant relationship with Academic Self-Confidence, r = .154, p < .001. Art was only related to Communication Skills, r = .087, p < .05. Finally, work experience was only related to Academic Discipline, r = -.111, p < .05.

Noncognitive predictors were also compared to both types of college engagement predictors. Many significant relationships were present in this comparison. The quality of relationships with faculty (predictor of GPA) was related positively to all noncognitive predictors. Students' perception of institutional academic support was also positively related to most noncognitive predictors with the exception of Social Activity. Students' perception of the institution's ability to help them cope with non-academic responsibilities was the least related to noncognitive variables, yielding only one significant relationship between students' perception and Goal Striving, r = .102, p < .05. Noncognitive predictors were also commonly related to college engagement predictors of retention. Talking about career plans with a faculty member or advisor (predictor of retention) was positively related to all noncognitive variables. Moreover, both students' relationships with other students and acquiring job knowledge and skills each positively related to all but one noncognitive variable, Commitment to College and Emotional Control respectively. Finally, students' participation in practicum or internship activities was least related, yielding positive relationships with only Commitment to College, Academic Discipline, and Social Connection.

The final interrelationship analysis was done between high school engagement and known college engagement predictors. Total number of activities in high school was

significantly related to eight college engagement predictors. All these relationships were

positive, except "hours per 7-day week spent relaxing and socializing," r = -.104, p < .05.

Total number of accomplishments was related to four college engagement predictors.

Specific types of accomplishments were related to between one and four college

engagement predictors, often for similar activities. An example is the existence of a

positive relationship between accomplishments in athletics and students who have

exercised or participated in physical fitness activities during college. When viewed from

the college predictor results, engagement in tutoring or practicum activities had the most

frequent significant relationships with a high school engagement or accomplishment

predictor.

First-Year GPA

In order to test the predictive utility of first-year GPA, four subsets of complete

data sets were selected from the convenience sample of 4,247 students described earlier.

These subsets build from a basic model testing limited predictors (just cognitive and high

school engagement) with many students to a full model testing all the predictors with

only a limited sample. See Table 4 for a listing of data availability. This process

demonstrates how new categories of predictors add to each other in an incremental

fashion.

Given the priority of understanding the predictive utility of high school

engagement data, analyses proceeded from this predictor category and added other

known predictors of outcomes beginning with cognitive predictors. Data for this analysis

was drawn from three institutions necessitating initial tests for between group variability.

This test was positive, χ^2 = 17.368, df = 2, p < .001, indicating the need for two level

Table 4

Participants from Each Institution for Predictive Tests of First-Year GPA

Institution	High School Engagement	Cognitive	Noncognitive	College Engagement
Univ of Utah	203	203		174
Southern Illinois	161	161	34	
Northern Arizona	433	433	369	73

modeling. Calculation of an intraclass correlation coefficient yielded .085, meaning that 8.5% of variance in the first-year GPA is due to differences among institutions. Adding average freshman ACT score to the level two model was able to explain 96% of the true score variance between institutions, essentially accounting for each institution's selectivity level. Furthermore, no statistically significant group differences remained after this addition, $\chi^2 = 1.042$, df = 1, p = .308. Cognitive predictors (high school GPA and ACT score), total number of activities, and nine types of accomplishments were added to the level one model using simultaneous multiple regression. Results indicated that high school GPA, ACT score, total number of activities, accomplishments in speech, and accomplishments in work were significant predictors of first-year GPA. See Table 5 for results. Entering these variables at level one explained 22.8% of variance between students within institution.

The next category of predictors entered were the noncognitive characteristics measured by the Student Readiness Inventory. Tests for the existence of between group variability were significant. However, group level variability was not able to be sufficiently modeled. Thus, the 34 available data sets from Southern Illinois University

Table 5

Significant Coefficients for Cognitive and High School Engagement Predictors

Variable	Beta Unstandardized	Standard Error	Beta Standardized	T-ratio	P-value	Tolerance
HS GPA	.315	.029	.353	10.900	.000	.908
ACT	.048	.007	.209	6.531	.000	.907
Activities	.066	.015	.154	4.583	.000	.823
Speech	-.070	.028	-.084	-2.510	.013	.821
Work	-.043	.020	-.066	-2.117	.034	.959

were deleted thereby eliminating any need for hierarchical modeling. Using simultaneous multiple regression, high school GPA, ACT score, total number of high school activities, and Academic Discipline were found to be significant predictors. This model accounted for 31.1% of the variance in outcome, $R = .558$ and $R^2 = .311$, and yielded a significant result for amount of variance explained, $F(22, 346) = 7.094$, $p < .001$. See Table 6 for significant coefficients.

The next test replaced the noncognitive predictors with the college engagement predictors in order to determine how these may add to cognitive and high school engagement predictors differentially. With this analysis, tests for between group variability were negative indicating that level two modeling was not necessary with this data grouping. Stepwise multiple regression was utilized to determine significant predictors. Even though they were added to the equation, the best fitting model actually contained no college engagement predictors. High school GPA, ACT score, and total high school activities accounted for 25.6% of total variance, $R = .506$, $R^2 = .256$, and

Table 6

Significant Coefficients for Cognitive, High School Engagement, and Noncognitive

Predictors

Variable	Beta Unstandardized	Standard Error	Beta Standardized	T-ratio	P-value	Tolerance
HS GPA	.268	.060	.236	4.492	.000	.723
ACT	.067	.013	.289	5.334	.000	.678
Activities	.086	.027	.185	3.141	.002	.573
Acad. Discipline	.011	.002	.334	4.717	.000	.397

yielded a significant test of variance accounted for in outcome, $F(3, 243) = 27.884$, $p <$

.001. See Table 7 for significant coefficients.

The final test for prediction of first-year GPA utilized all available predictors.

This test was conducted with a subset of participants from Northern Arizona University

who held complete data for all predictors. Rather than entering types of accomplishments,

total number of accomplishments was entered to reduce the number of total predictors.

Table 7

Significant Coefficients for Cognitive, High School Engagement, and Noncognitive

Predictors

Variable	Beta Unstandardized	Standard Error	Beta Standardized	T-ratio	P-value	Tolerance
HS GPA	.379	.058	.371	6.484	.000	.934
Activities	.060	.017	.195	3.496	.001	.983
ACT	.031	.011	.171	2.975	.003	.925

Based on simultaneous multiple regression, seven variables were found to be significant

predictors of first-year GPA. They were high school GPA, ACT score, total high school

activities, Academic Discipline, Academic Self-Confidence, relationships with faculty,

and perception of academic support. See Table 8 for significant coefficients. These

predictors additively explained 56.6% of variance in first-year GPA, $R = .753$, $R^2 = .566$.

The amount of variance captured by the model was also significant, $F (27, 40) = 1.934$, p

$< .05$. The final regression equation for first-year college GPA would be:

GPA = (.606)(HS GPA) + (.134)(Activities) + (.080)(ACT) +(.011)(Acad. Discipline) +

 (-.011)(Acad Self-Confidence) + (.214)(Relationships w/faculty) + (-.388)(Perceived

Acad Support) +error.

Table 8

Significant Coefficients for Cognitive, High School Engagement, Noncognitive, and

College Engagement Predictors

Variable	Beta Unstandardized	Standard Error	Beta Standardized	T-ratio	P-value	Tolerance
HS GPA	.606	.149	.535	4.071	.000	.628
Activities	.134	.065	.364	2.074	.045	.351
ACT	.080	.036	.347	2.242	.031	.452
Acad. Discipline	.011	.005	.357	2.109	.041	.379
Acad. Self-Conf.	-.011	.005	-.360	-2.186	.035	.400
Relation w/faculty	.214	.105	.355	2.049	.047	.362
Acad. Support	-.388	.151	-.397	-2.568	.014	.455

First-to-Second Year Retention

The final applied task was to determine the additive utility of high school engagement with other known predictors of first-to-second year retention. Given that retention is a categorical outcome (retained or not), logistic regression was utilized for all analyses. The convenience sample of 4,247 students described earlier was used for retention prediction as well. However, the data availability differed slightly. See Table 9 for a listing of data availability. Note that nine cases with men identifying Latter-Day-Saint as their religion were eliminated from the University of Utah data. This was due to them having a not retained status at year two, and a retained status at year five, indicating they likely attended a religious mission following their first year of college.

The predictive utility of only high school engagement and cognitive predictors was again considered first. Data for this analysis was drawn from three institutions necessitating initial tests for between group variance. This test was positive, $\chi^2 = 9.67248$, df = 2, p < .008, indicating the need for two level modeling. Adding a variable accounting for the varying number of participants from each institution was able to explain 99.98% of the true score variance between institutions, with no significant

Table 9

Participants from Each Institution for Predictive Tests of Retention

Institution	High School Engagement	Cognitive	Noncognitive	College Engagement
Univ of Utah	229	229		198
Southern Illinois	179	179	40	
Northern Arizona	448	448	379	73

variability remaining to be modeled, $\chi^2 = .144$, df = 1, p > .500. Cognitive predictors (high school GPA and ACT score), total number of activities, and nine types of accomplishments were added to the level one model using simultaneous logistic regression. Population average model results indicated that only high school GPA was a significant predictor of retention. As shown in Table 10, high school GPA yielded a beta coefficient of .312, with an odds ratio of 1.366. This result means that higher GPAs increased the odds of retention.

Just as done previously, noncognitive characteristics were entered next. Tests for the existence of between group variability were significant. Again, group level variability was not able to be sufficiently modeled. Therefore, the 40 available data sets from Southern Illinois University were deleted and analysis proceeded using only participants from Northern Arizona University. With the addition of noncognitive predictors, high school GPA was no longer significant. Instead, Academic Discipline, General Determination, and Social Connection were found as significant predictors based on stepwise logistic regression. See Table 11 for significant population-average model coefficients. The test for model coefficients was significant as well, $\chi^2 = 18.095$, df = 3, p < .001.

Table 10

Significant Coefficients for Cognitive and High School Engagement Predictors

Variable	Beta	Standard Error	T-ratio	P-value	Odds Ratio	Tolerance
HS GPA	.312	.076	4.081	.000	1.366	1.000

Table 11

Significant Coefficients for Cognitive, High School Engagement, and Noncognitive

Predictors

Variable	Beta	Standard Error	Wald	P-value	Odds Ratio	Tolerance
Acad. Discipline	.020	.006	11.505	.001	1.020	.525
Gen. Determination	-.022	.006	11.899	.001	.979	.474
Social Connection	.012	.005	5.433	.020	1.012	.818

College engagement predictors next replaced noncognitive predictors to determine the benefit of these instead. With this analysis, tests for between group variability were again significant and unable to be sufficiently modeled. Therefore, data sets from University of Utah and Northern Arizona University were tested separately using stepwise logistic regression. Results from University of Utah indicated only high school GPA as a significant predictor; whereas analysis of Northern Arizona University variables resulted in only one college engagement variable being significant, "talked about career plans with a faculty member or advisor." Population-average model results are reported respectively in Tables 12 and 13.

Table 12

Significant Coefficients for Cognitive, High School Engagement, and College

Engagement Predictors – University of Utah

Variable	Beta	Standard Error	Wald	P-value	Odds Ratio	Tolerance
HS GPA	.440	.223	3.888	.049	1.553	1.000

Table 13

Significant Coefficients for Cognitive, High School Engagement, and College

Engagement Predictors – Northern Arizona University

Variable	Beta	Standard Error	Wald	P-value	Odds Ratio	Tolerance
Career plans	-1.545	.501	9.513	.002	.213	1.000

Just as done previously, the final test for prediction of first-to-second year

retention utilized all available predictors. This test was again conducted with a subset of

participants from Northern Arizona University who held complete data for all predictors.

As determined by stepwise logistic regression, talking about career plans and total

number of high school accomplishments in music were the only significant predictors of

retention. More talk about career plans decreased the odds of retention by 87%, whereas

increasing accomplishment in music increased the odds of retention by 61%. See Table

14 for significant coefficients. This test for model coefficients was significant as well,

$\chi^2 = 19.985$, df = 2, p < .001.

Table 14

Significant Coefficients for Cognitive, High School Engagement, Noncognitive, and

College Engagement Predictors

Variable	Beta	Standard Error	Wald	P-value	Odds Ratio	Tolerance
Career plans	-2.068	.651	10.096	.001	.126	.996
Music	.475	.231	4.241	.039	1.608	.996

CHAPTER 4

DISCUSSION

The primary finding of this study is that current students are becoming less engaged in high school activities and attaining fewer accomplishments during high school than students of the previous generation. It is unclear specifically how students' reduction in high school activities and accomplishments influences engagement in college given the wide range of measured relationships between these variables. Some types of engagement have continuity into the college years whereas others do not. Regardless of the complex relationship between high school and college activities, knowledge of students' participation in high school activities can assist universities to predict first-year college GPA when paired with other traditional predictors.

Implications for Higher Education Professionals

Arnett (2000; 2004) identified a societal shift in the past few decades that produced an extended period of development for adolescents as they transition to adulthood. Arnett identified similar trends in other countries as well. In fact, many postindustrial nations now have similar extended periods for transition, especially for adolescents living in urban areas (Arnett). In this project, students from other countries were eliminated due to missing data describing characteristics of their educational systems needed to account for differences between states and/or countries. Hence, the

concept of generational change that is more specialized to the United States was

prioritized when considering the relevance to the results.

Strauss and Howe (1991; 2003) focus on generations throughout the history of the

United States. Based on this theory, students' interest in activities should have diminished

during the first two generations given that Boomers were engaged in social protest rather

than school activities and Thirteeners were simply not interested (Strauss & Howe). In

contrast, they report that Millennials are very interested in being engaged and

accomplished (Strauss & Howe). Based on this theory, confirming data would have

yielded either an inverted quadratic effect or possibly an overall positive linear trend.

Yet, the actual data showed the opposite of both. Students from the Boomer years and

generation were most engaged, followed by students from the Thirteener years and

generation, with Millennial students being the least engaged. However, it is important to

note that Millennial students are not wholly less engaged. Based on the interaction effects

for certain activities with measurement year, Millennial students are more engaged in

instrumental music, varsity athletics, and community service. This last interaction is

highly consistent with trends in altruism over time (Astin, 1998; Pryor, Hurtado, Saenz et

al., 2007). And true to their generational label as Civic (Strauss & Howe), Millennials are

noticeably concerned about their society.

Researchers have also suggested that Millennials have a strong record of

accomplishments (Brooks, 2001; Howe & Strauss, 2000; Lowery, 2004). Again, the

results from this study challenge the accuracy of this hypothesis. No significant linear

trends in total accomplishments or specific types of accomplishments existed in the data,

even for community service. In fact, the only significant result showed an arched trend in

accomplishments with students from the Boomer and Millennial years being the least

accomplished, and students from Thirteener years being most accomplished. See Figure 3

in Results section.

The results from this study confirm what other researchers have found when

studying trends (Astin, 1991; 1998; Pryor, Hurtado, Saenz et al., 2007). That is, the data

only supports some elements of the theorizing regarding generations of students. Strauss

and Howe (1991) acknowledge that variability exists within each generation, but that

does not preclude the distinct peer personality associated with individuals born in certain

years and circumstances. Some of the variability seen in this study related to differences

between states. When studying trends in accomplishments, this variability actually

accounted for measured differences between generations and student characteristics. It is

clear that given the existence of confirming and disconfirming evidence and the

measurable between state differences that theories about generations should only be used

as general guidelines. Again, this is consistent with other researchers' findings as well

(Pryor, Hurtado, Saenz et al.).

It is also interesting to note that the three generations in this study have had

different reputations on college campuses and in the media (Gozzi, 1995; Guardo, 1982;

Haworth, 1997; Sacks, 1996; Strauss & Howe, 2003). Essentially, Boomers fought both

the system and society for change, Thirteeners were depicted as acquiescent to the point

of laziness; and Millennials engaged and accomplished, though less available

interpersonally due to the existence of technological socializing (Guardo; Putnam, 2000;

Strauss & Howe). Gozzi summarized the overarching view of Thirteeners on campus.

They were seen as blank, less talented than Boomers, and representative of the lowered

social standards of their time (Gozzi). Hence, many university faculty and staff members believed them less worthy of effort and were quick to stereotype them (Gozzi; Haworth). The campus culture surrounding Millennial students is quite different. A number of researchers discuss the need to adapt the campus climate for the Millennial student to a seemingly greater degree than has been done with other generations (Brooks, 2001; DeBard, 2004; Howe, 2005; Lowery, 2004; Strauss & Howe). It is unclear why this is so. Could it be that Millennials have a more positive media image so professionals are more willing to adapt? Or is that professionals have learned from past experiences that adaptation creates the best environment for student success? Maybe it has something to do with the current generation of faculty and staff who primarily come from a Reactive Thirteener generation that values relationships and focuses on intrapersonal needs. Whatever the reason, it is clear that Millennials are different from previous generations in some respects and thus have some different needs.

Another important consideration is the sociodemographic characteristics of the students being measured. Regarding high school activities, differences for gender were found, but not for race or community size. Much of Arnett's (2004) and Astin's (1991; 1998) research highlight the changing characteristics of students by gender. When data was collected in the 1960s and 1970s, women were more likely to be engaged in traditional gender activities and less likely to complete college (Arnett). However, as society has changed, more equality has been measured (Astin). The results in this dissertation show that women are more engaged than men overall. This confirms Mahoney and Cairns' (1997) research that a greater percentage of boys lack engagement in high school activities. Future researchers would be wise to further explore this gender

difference. Darling (2005) measured this on a small scale with a cross-sectional sample and found that men were more often engaged in athletics, but women were more engaged in all other activities. Hence, some gender by activities interactions may exist that would further highlight the importance of considering gender in the overall picture of student engagement.

Arnett (2004) and Pryor, Hurtado, Saenz and colleagues (2007) both described the importance of race in changing student characteristics as well; however, race was not a significant factor when measuring the trends in this study. Only a race by year interaction was supported by the data. In the past several years, students identifying as white have reported a reverse trend with a slight increase in activities, whereas students of color continue to report decreasing levels of engagement. Again, further exploration of this finding could greatly enhance the understanding of trends in engagement and the link to changing social conditions. Moreover, intersections of socioeconomic status, class size, or community size with race may also be important given the knowledge that understanding intersecting identities is critical for obtaining the whole picture of a person's functioning (American Psychological Association, 2003).

A final interesting sociodemographic finding was the nonsignificant effect of community size on high school engagement. Several recent researchers have considered the effect of community size on engaging in activities and attending college (Brown, Copeland, Costello, Erkanli, & Worthman, 2009; King, Elder, & Whitbeck, 1997; Kirkpatrick Johnson, Elder, & Stern, 2005; McGrath, Swisher, Elder, & Conger, 2001). These researchers have generally concluded that community size plus other sociodemographic characteristics can help predict student involvement in some activities

as well as college preparation. However, the results in this study suggest that community size is not predictive of overall amount of engagement in high school activities or attainment of out-of-class accomplishments. Given a strong correlation (r = .399, p < .001) between community size and graduating class size, it may be that some of the information about rural communities was encompassed in findings of the class size by year interaction result.

The value of information in trends is greatly enhanced by understanding how this information translates into the college experience. Students overwhelming anticipate participating in the same activities in college that they did in high school, especially for music, theater, varsity athletics, and religious organizations. In this study, actual continuation of engagement was measured with a different instrument, meaning that some measurable continuity may have been lost in this transition. Regardless, the incidence of actual engagement decreased greatly from intended engagement. When measured in high school, students endorsed strong intent to continue in the same activities. Yet, when actual activities were measured in college, students' actual engagement was much less than would have been expected based on their planned engagement. For example, students reported planning to continue engagement in organizations, publications, government, fraternities/sororities, and sports. Yet when tested with actual engagement, significant correlations existed only for engagement in fraternities/sororities and sports. This means that students who engaged in other types of activities in high school, such as publications, government, and organizations, did not report significant levels of engagement for these activities in college, even if they reported planning to do so. This calls into question students' enactment of engagement

for some activities, which could be due to personal characteristics or possible environmental or psychological barriers. One possible explanation is that the National Survey for Student Engagement is administered in the spring of a student's first year, meaning that perhaps some types of engagement drop initially and rebound in later years as suggested by Sax (2000). Further analysis of the incongruent nature of these results will be important to consider in future research.

Even though the broad trend is for diminished engagement in the same activities, evidence for some continued engagement was also found. Students involved in the performance arts in high school and those who intended to participate in these in college reported significant relationships with attending artistic activities on campuses. Likewise students who participated in intramural and varsity athletics in high school reported significant levels of exercising or participating in physical fitness activities. Additionally, students who participated in community service activities and those who intended to participate in them in college were found to significantly engage in community service and other service-type activities in college. Finally, students' continuation in religious activities was noticeably strong. This result is representative of a larger societal trend depicted by Putnam (2000). He found that even though overall religious involvement is decreasing, individuals strongly immersed in religious culture reported sustained or growth in religious involvement over time (Putnam). In essence, casual religious involvement is decreasing, but devout involvement is not.

The relationship between students' engagement in high school and college is complex and likely partially based on activity type. This result is clearly linked with the trend results. That data showed that engagement in high school is decreasing over time;

and this data show that no clear rule exists for how high school and college engagement relate. If a definitive and clear rule existed, it would be easy to consider the implication of decreasing high school activities on planning for college activities. The absence of a pattern in the relationship leaves college student professionals without strong guidance about how to anticipate student interest in college activities. This represents another necessary area for future research. Perhaps analyzing relationships for specific activities could provide detailed guidance about the potential impact of decreasing high school activities on college activity participation. Another opportunity may be to examine barriers that college students experience in continuing certain activities during their college years and linking these experienced barriers with trend and sociodemographic results.

Even though prescriptive feedback regarding how to plan for college activities was not found in this study, knowledge of participation in high school activities did inform how student affairs professionals can predict college student outcomes. In order to fully consider this, high school activities and accomplishments must considered incrementally with other known categories of prediction for college student outcomes. As stated previously, the prediction of college student outcomes was grounded in previous research, building from a basic model of only cognitive and high school engagement variables to a complex model testing cognitive, high school engagement, noncognitive, and college engagement variables.

In line with other researchers (Fredricks & Eccles, 2006; Gardner et al., 2008; Marsh & Kleitman, 2003), high school GPA and ACT score were consistent predictors of first-year GPA. Moreover, number of high school activities was found to capture

additional variance in college GPA with all the models, basic to complex. When testing

the most basic model with only cognitive and high school engagement predictors,

accomplishments in speech and work were found to relate negatively with the outcome.

Bivariate correlations indicated that both of these types of accomplishments were

negatively related to Academic Discipline, which later replaced them as a significant

predictor in a more complex model considering cognitive, high school engagement, and

noncognitive variables. This significant finding for Academic Discipline strengthens

conclusions drawn by Robbins and colleagues (2006) and Peterson and colleagues (2006)

that Academic Discipline is a significant predictor of college GPA. Conversely, Social

Activity and Emotional Control were not found to be significant like Robbins and

colleagues found in 2006, demonstrating that predictive utility of noncognitive

characteristics varies based on other included predictors and samples utilized.

    The most complex and complete model used a much smaller sample (N = 68)

from Northern Arizona University. Results of this test continued to include high school

GPA, ACT score, total high school activities, and Academic Discipline as significant

predictors, and also found predictive utility for Academic Self-Confidence, relationships

with faculty members, and provision of support needed to succeed academically. Though

these combined items were able to account for 57% of the variance in outcome, two of

the results were negative regression coefficients. Students with more academic self-

confidence and more knowledge of academic support reported lower first-year GPAs,

which warranted further analysis.

    Secondary analysis using scatterplots determined that a curvilinear relationship

existed between Academic Self-Confidence and first-year GPA for this sample. Students

with the most self-confidence had the highest and lowest first-year GPAs. Furthermore, several students with lower high school GPAs reported having more self-confidence than those with moderate high school GPAs. Hence, the outcome may be related to the specific characteristics of this sample. In addition, secondary analysis explored the relationship between outcome and perception of an institution providing the academic support students need to succeed. Students with the lowest high school GPAs reported knowing the most about academic support resources. This is characteristic of Northern Arizona University because as a less selective institution they are attentive to the needs of informing at-risk students about campus resources. Thus, this finding may also be reflective of the sample and may not generalize to institutions with more selectivity and fewer outreach efforts.

Retention represents another important student success marker (Braxton, 2003). The tests for prediction of retention followed a similar order as those for GPA. First, a basic model with only high school GPA, ACT score, and high school engagement were entered as potential predictors. The results indicated that in this model only high school GPA was a significant predictor. For this analysis high school GPA was measured in increments of 0.5 on a standard 4.0 scale. See Appendix A for the item and response options. One increment increase in reported high school GPA increased the odds of retention by 37%. This result is consistent with Perkhounkova and colleagues' (2006) research that tested high school GPA, ACT score and selected ACT student profile responses for retention prediction. They found that increasing high school GPA increased odds of retention by 65% (Perkhounkova et al.). Furthermore, they found that neither

activities nor accomplishment were predictive (Perkhounkova et al.), just as was found in this project.

The next model was tested using cognitive, high school engagement, and noncognitive variables as potential predictors. Once the noncognitive variables were added, high school GPA was replaced as a significant predictor by Academic Discipline, General Determination, and Social Connection. Though the odds ratios were very small, these represented the best predictors of retention available. Increases in Academic Discipline and Social Connection were shown to slightly increase odds of retention. This supports previous research for both noncognitive factors (Robbins et al., 2006) and engagement research (Eccles & Barber, 1999; Eccles et al., 2003; Marsh & Kleitman, 2002). Students who put in more effort and feel connected are slightly more likely to stay in college beyond the first year. The model also predicted that an increase in General Determination led to decreased odds of retention, which was counter to expected outcomes and past findings (Robbins et al., 2006). Hence, this warranted further exploration.

General Determination had no significant bivariate relationship to retention status. Furthermore, students both retained and not retained reported a full range of General Determination levels. No curvilinear relationships were found. Considering these exploratory results, it seems mostly likely that this finding is directly related to the sample used. Northern Arizona University typically admits students who have all levels of educational achievement and come from a variety of backgrounds, including many first-generation college students. As a less selective institution with an average first-to-second year retention rate of .65 (http://home.nau.edu), NAU's student body mimics that

of a community college where students often face greater barriers in obtaining higher education. It may be that in this population many students exhibit determination, but other unmeasured life characteristics are influencing likelihood of retention.

The final test for retention prediction utilized all the previous variables plus items from the National Survey of Student Engagement. Once these items were entered, the noncognitive predictors ceased to be significant. Instead, talking about career plans with faculty or advisor and total high school accomplishments in music were the only significant predictors. Talking about career plans was a negative predictor. A negative relationship was also found for this item by Gordon and colleagues (2008) when they examined the predictive utility of NSSE items and scales, but to a much smaller degree. The amplified effect of talking about career plans with faculty or an advisor may again be unique to this sample. The other unexpected finding was regarding total accomplishments in music. When only cognitive and high school engagement predictors were entered in the model, this item was not a significant predictor. Yet it was for a smaller sample of students containing all the predictors. This may be a case of range restriction. In the large range of students, total accomplishments in music was not significant, but it was when considering only a restricted subset of that range.

After reviewing the results, it seems likely that the most valid prediction equation for retention may be the model that contains only cognitive, noncognitive, and high school engagement predictors. First, the National Survey of Student Engagement is administered typically in April of students' first year at college. At this late time of year, many students have already decided if they plan to return the following year. It may be that they talk about career plans because they want to explore their other options, or have

determined that pursing a career prior to college represents a better choice. Additionally, students who have already decided to leave may be less likely to complete the NSSE, meaning that using these responses represent selection threat in the sample. A final argument against inclusion of the NSSE is presented by Gordon and colleagues (2008). In their exploration for NSSE items that were predictive of student outcomes, they initially used a 2005 cohort of students. They then replicated the analyses with a 2003 cohort. The replication indicated that the model of prediction was not generalizable for first-to-second year retention. Thus, it seems likely that the best predictors of first-year retention may not be consistently found in NSSE items and may instead be better found through precollege student characteristics, just as Tinto (1993) suggested.

<div align="center">Conclusions</div>

Based on the trend and applied results, several messages are clear for student affairs professionals. First, Millennial first-year students are entering college with lower levels of engagement and accomplishments. Furthermore, though some results (i.e., being involved in community service) are consistent with theorizing about Millennial students, much of the hypothesized nature of Millennial students is inconsistent with the data findings from this study. However, because significant between state variability exists, results will not generalize perfectly to all institutions in all states. When applying this research, it will be important to remember that students' level of engagement is a function of resident state, background characteristics, and generation. Thus, student affairs professionals are encouraged to unique aspects of their own student bodies in order to determine how trends are applying to their institutions.

The practical implications of the results from the trend analysis are demonstrated through the applied elements. High school engagement may or may not be related to college engagement, depending on specific activities measured. Regardless on continuity, it is clear that engagement is important for college outcomes, especially first-year GPA. Therefore, the recommendation to adjust for Millennial students' needs is warranted. Moreover, multiple adjustments seem warranted. First, when planning for college activities, caution is advised given that adjustments do not need to be made for a more engaged and accomplished group of students, but one who is actually losing interest in traditional types of engagement and instead using technology and social networking for connection. Second, given this diminished engagement and the knowledge that engagement relates to outcomes, adjustments to compensate for this lost engagement may be necessary in order to sustain positive college outcomes.

Limitations and Future Directions

This study furthered the area of trend research for incoming college student characteristics and provided student affairs professionals with information about how to apply this information using a very large, representative sample from the United States. Regardless of the many strengths involved in this process, limitations also existed. For trend analysis, this study used archival data, and with this incurred the static nature that previously collected data inherently encompasses. In the applied element testing the continuity of activities, two different measures produced by different entities were used. Again, the use of archival data limited the power of the researcher to create optimal matches, meaning that instead the best available match was chosen. Lastly, for the applied element testing the predictive utility of high school activities, data for the most

complex model utilizing all known categories of predictors were only available from one institution, creating results specific to that sample and possibly limiting the generalizability of the results. Each of these limitations was explored previously in depth in order to place them in the context of the greater strengths of this project.

As with any research, questions remain to be answered and new questions arise. The results reported here explained only some of the variance in trends. What other variables could be added to future studies at both level one individual characteristics and level two state characteristics to account for additional variance? Furthermore, some changing social conditions were addressed in this paper, but what other coinciding social conditions may be interacting with observed trends in activities and accomplishments? Moreover, how do changing social conditions interact with student characteristics to create different trends for specific populations, i.e., students of color, first-generation college students, students with disabilities, students from rural settings, etc.? Lastly, future researchers are advised to further explicate these trends by studying specific types of activities to better understand differential Millennial characteristics.

The implications for college campuses regarding decreasing high school activities is complex, especially when both planning for student activities and promoting student outcomes. Future researchers should explore in more detail how continuation varies depending on type of activity and student characteristics. With this information, researchers might consider several important questions that would further guide student affairs professionals planning for student needs. Are some activities more likely to be continued into the colleges years and why? What barriers do students perceive for continuing activities during the college years; and how are these barriers experienced

differentially for students from varying backgrounds? Does continuity vary based on year in college, essentially evaluating the likelihood that students' participation drops during the first year and rebounds in later years? Second, future researchers may consider how trends in high school activities intersect with students activities in college. Is there also a decreasing trend in college activities, or is this independent of trends in high school activities? This would provide an important addition to the interaction between generational theory and educational environment. Finally, researchers will want to consider the implication of knowing that high school participation is decreasing and that lower participation relates to lower first-year college GPAs. Is this result consistent with other samples? If so, what can college student professionals do to promote ongoing student success when students are becoming less engaged in high school over time? Clearly many future directions and questions exist to expand on the results found in this study.

APPENDIX A

QUESTIONS UTILIZED FROM THE ACT

COLLEGE ENTRANCE EXAM

Questions Utilized from the ACT

Predictive Category	Items Included
Engagement Activities	Sum score of the following items: Instrumental music (band, orchestra) Vocal music Student government Publications (newspaper, yearbook, literary magazine) Debate Departmental clubs (science club, math club, etc.) Dramatics, theater Religious organizations Racial or ethnic organizations Intramural athletics Varsity athletics Political organizations Radio-TV Fraternity, sorority, or other social clubs Special interest groups (ski club, sailing club, judo club, card section, drill teams, etc.) School or community service organizations
Accomplishments: Leadership	Was appointed to a student office Actively campaigned to elect myself or another student to a school office Organized a school political group or campaign Participated in a nonschool political campaign Participated in a student movement to change institutional rules, procedures, or policies Was elected to one or more student offices Received an award or special recognition for leadership (of any kind)
Accomplishments: Music	Composed music Performed with a professional musical group (orchestra, band, choral group) Performed in a school musical group Gave a public recital (individual or group) Played a musical instrument Received a superior rating in a state music contest Participated in a state music contest

Predictive Category (continued)	Items Included
Accomplishments: Speech	Placed first, second, or third in a regional or state speech or debate contest
	Entered a school speech or debate contest
	Had substantial roles in high school or church-sponsored plays
	Gave a speech recital
	Had roles in plays (not high school or church-sponsored)
	Appeared on radio or TV as a performer
	Read for a part in a high school play
Accomplishments: Art	Finished a work of art (painting, ceramics, sculpture, etc.) on my own (not as part of a course)
	Exhibited a work of art at my school
	Exhibited a work of art in a statewide or regional show
	Exhibited a work of art in a city or county art show
	Won a prize or award in an art competition at my high school
	Won a prize or award in a city, county, or state artistic competition
	Had photographs, drawings, or other artwork published in a public newspaper or magazine
Accomplishments: Writing	Worked on the staff of a school paper or yearbook
	Had poems, stories, essays, or articles published in a school publications
	Wrote an original but unpublished piece of creative writing on my own (not as part of a course)
	Had poems, stories, or articles published in a public newspaper or magazine (not school paper) or in a state or national high school anthology
	Won literary award or prize for creative writing
	Had a work of creative writing published in a public magazine or book
	Had a work of creative writing published in a school literary magazine or newspaper

Predictive Category (continued)	Items Included
Accomplishments: Science	Wrote an independent paper on a scientific topic which received the highest possible grade given in my school
	Performed an independent scientific experiment (not as part of a course)
	Participated in a National Science Foundation summer program for high school students
	Won a prize or award (of any kind) for scientific work or study
	Placed first, second, or third in a regional or state science contest
	Placed first, second, or third in a school science contest
	Participated in a scientific contest or talent search
Accomplishments: Athletics	Participated in one or more varsity athletic team events (football, basketball, baseball, etc.) while attending high school
	Earned a varsity letter in one or more sports in high school
	Was appointed or elected cheerleader or captain of a varsity team in high school
	Received all-city, league, county, or state team award (including honorable mention)
	Participated in an organized athletic competition outside high school
	Participated in two or more individual athletic activities (tennis, swimming, bowling, skiing, golf, etc.)
	Attended athletic events regularly
Accomplishments: Community Service	Won recognition or an award for a club or organization activity (FFA, FHA, 4-H, Scouting, Boys' Club, Girls' Club)
	Taught in a church or synagogue, or led a religious service on a regular basis
	Worked as a volunteer aide in a hospital, clinic, or home
	Was active in programs which helped my community or neighborhood develop pride in itself
	Participated in a program to assist children or adults who were handicapped mentally, physically, educationally, or economically
	Worked as a volunteer on a civic improvement project or in a voter education project
	Received an award or recognition for any kind of community service

Predictive Category (continued)	Items Included
Accomplishments: Work Experience	Held a regular part-time job (e.g., waitress, sales clerk, newspaper carrier, etc.)
	Held a full-time paying job during the summer
	Earned money by selling goods or services
	Participated in a work-study, distributive education, cooperative work program while enrolled in high school
	Started my own business or service
	Supervised the work of others
	Managed the financial affairs of some organization
Sociodemographics	Socioeconomic Status:
	To plan financial aid for entering students, colleges need to know the financial background of their students. Please estimate the approximate total combined income of your parents before taxes last year.
	Less than $18,000
	About $18,000 to $24,000
	About $24,000 to $30,000
	About $30,000 to $36,000
	About $36,000 to $42,000
	About $42,000 to $50,000
	About $50,000 to $60,000
	About $60,000 to $80,000
	About $80,000 to $100,000
	More than $100,000
	Community Size:
	Which of the following best described the community in which you live?
	Farm or open country
	Town or city with population of:
	Less than 500
	500-1,999
	2,000-9,999
	10,000-49,999
	50,000-249,999
	250,000-499,999
	500,000-999,999
	More than 1 million

Predictive Category (continued)	Items Included
Sociodemographics (continued)	Racial Background:
	Which of the phrases below best describes your racial/ethnic background? Please select only **one** response.
	African-American/Black
	American Indian, Alaskan Native
	Caucasian-American/White
	Mexican-American/Chicano
	Asian-American, Pacific Islander
	Puerto Rican, Cuban, other Hispanic origin
	Other
	Multiracial
	I prefer not to respond
	Graduating Class Size:
	The number of students in my high school gradating class is/was
	Fewer than 25
	25-99
	100-199
	200-399
	400-599
	600-899
	900 or more

Adapted from "ACT Student Profile Section," by ACT, Inc., 1995, Iowa City, IA.

APPENDIX B

SCALES AND REPRESENTATIVE ITEMS FROM

THE STUDENT READINESS INVENTORY

SRI Scales with Representative Items

Scale	Scale Description	Representative Items
Academic Discipline	The amount of effort a student puts in to his/her schoolwork and the degree to which the student sees him/herself as hardworking and conscientious.	Others consider me a hard-working student.
Academic Self-Confidence	A belief in one's ability to perform well in school.	I'm a fast learner.
Commitment to College	A student's commitment to staying in college and getting a degree.	I would rather be somewhere else than in college. (reverse-scored)
Communication Skills	Attentiveness to others' feelings and flexibility in resolving conflicts with others.	I'm willing to compromise when resolving a conflict.
Emotional Control	How students respond to and manage strong feelings.	I get easily irritated. (reverse-scored)
General Determination	Extent to which one strives to follow through on commitments and obligations.	I am serious about fulfilling my obligations.
Goal Striving	Strength of one's efforts to achieve objectives and end goals.	Once I set a goal, I do my best to achieve it.
Social Activity	One's comfort in meeting and interacting with other people.	I make friends easily.
Social Connection	A student's feelings of connection and involvement with the college/school community.	I have a sense of belonging when I am on campus.
Study Skills	Extent to which students believe they know how to assess an academic problem, organize a solution, and successfully complete academic assignments.	I summarize important information in diagrams, tables, or lists.

Adapted from "SRI user's guide," by ACT, Inc., 2008, Retrieved August 12, 2009, from http://www.act.org/sri/pdf/UserGuide.pdf .

APPENDIX C

REPRESENTATIVE ITEMS FROM THE NATIONAL

SURVEY OF STUDENT ENGAGEMENT

NSSE Items with Beta Coefficients

Items	GPA	Retention
Hours per 7-day week spent preparing for class (studying, reading, writing, doing homework or lab work, analyzing data, rehearsing, and other academic activities)	+ (.009)	
Tutored or taught other students (paid or voluntary	+ (.026)	
Discussed ideas from your readings or classes with faculty members outside of class	− (.008)	
Used an electronic medium (listserv, chat group, Internet, instant messaging, etc.) to discuss or complete an assignment	− (.010)	
Quality: your relationships with faculty members	− (.006)	
Institutional emphasis: providing the support you need to help you succeed academically	+ (.005)	
Institutional emphasis: helping you cope with your non-academic responsibilities (work, family, etc.)	− (.014)	
Come to class without completing readings or assignments	− (.020)	
Mark the box that best represents the extent to which your examinations during the current school year challenged you to do your best work	− (.009)	
Number of problem sets (problem-based homework assignments) that take you MORE than an hour to complete	− (.005)	
Exercised or participated in physical fitness activities	− (.004)	
Hours per 7-day week spent relaxing and socializing (watching TV, partying, etc.)	− (.006)	
Institutional contribution: leaning effectively on your own	+ (.006)	
Talked about career plans with a faculty member or advisor		− (.006)
Practicum, internship, field experience, co-op experience, or clinical assignment		+ (.005)

Items (continued)	GPA	Retention
Quality: your relationships with other students		+ (.013)
Institutional emphasis: attending campus events and activities (special speakers, cultural performances, athletic events, etc.)		+ (.007)
Institutional contribution: acquiring job or work-related knowledge and skills		+ (.004)

Note. Items for first-year GPA listed first, followed by items for first-to-second year retention.

Adapted from "Validating NSSE against student outcomes: Are they related?" by J. Gordon, J. Ludlum, & J. J. Hoey, 2008, *Research in Higher Education, 49,* pp. 33-34.

APPENDIX D

ITEMS UTILIZED FOR CORRELATIONS OF HIGH

SCHOOL AND COLLEGE ENGAGEMENT

Items from ACT and NSSE Used for Correlations

Type of Engagement	Selected Items
Measured High School Activities	Instrumental music (band, orchestra)
	Vocal music
	Student government
	Publications (newspaper, yearbook, literary magazine)
	Debate
	Departmental clubs (science club, math club, etc.)
	Dramatics, theater
	Religious organizations
	Racial or ethnic organizations
	Intramural athletics
	Varsity athletics
	Political organizations
	Radio-TV
	Fraternity, sorority, or other social clubs
	Special interest groups (ski club, sailing club, judo club, card section, drill teams, etc.)
	School or community service organizations
Anticipated College Activities	Instrumental music
	Vocal music
	Student government
	Publications (newspaper, yearbook, literary magazine)
	Debate
	Departmental clubs
	Dramatics, theater
	Religious organizations
	Racial or ethnic organizations
	Intramural athletics
	Varsity athletics
	Political organizations
	Radio-TV
	Fraternity, sorority
	Special interest groups (ski club, sailing club, judo club, card section, drill teams, etc.)
	Campus or community service organizations

Type of Engagement	Selected Items
Measured College Activities	In your experience at your institution during the current school year, about how often have your done each of the following? • Tutored or taught other students (paid or voluntary) • Participated in a community-based project (e.g., service learning) as part of a regular course • Worked with faculty members on activities other than coursework (committees, orientation, student life activities, etc.) During the current school year, about how often have you done each of the following? • Attended an art exhibit, play, dance, music theater, or other performance • Exercised or participated in physical fitness activities • Participated in activities to enhance your spirituality (worship, meditation, prayer, etc.) • Examined the strengths and weaknesses of your own views on a topic or issue • Tried to better understand someone else's views by imagining how an issue looks from high or her perspective • Learned something that changed the way you understand an issue or concept Which of the following have you done or do you plan to do before you graduate from your institution? • Practicum, internship, field experience, co-op experience, or clinical assignment • Community service or volunteer work • Participate in a learning community or some other formal program where groups of students take two or more classes together • Work on a research project with a faculty member outside of course or program requirements • Foreign language coursework • Study abroad • Independent study or self-designed major • Culminating senior experience (capstone course, senior project or thesis, comprehensive exam, etc.)

Type of Engagement	Selected Items
Measured College Activities (continued)	About how many hours do you spend in a typical 7-day week doing each of the following? • Preparing for class (studying, reading, writing, doing homework or lab work, analyzing data, rehearsing, and other academic activities) • Working for pay on campus • Working for pay off campus • Participating in co-curricular activities (organizations, campus publications, student government, fraternity or sorority, intercollegiate or intramural sports, etc.) • Relaxing and socializing (watching TV, partying, etc.) • Providing care for dependents living with your (parents, children, spouse, etc.) • Commuting to class (driving, walking, etc.) To what extent has your experience at this institution contributed to your knowledge, skills, and personal development in the following areas? • Voting in local, state, or national elections • Contributing to the welfare of your community • Developing a deepened sense of spirituality Are you a member of a social fraternity or sorority? Are you a student-athlete on a team sponsored by your institution's athletics department?

Adapted from "ACT Student Profile Section," by ACT, Inc., 1995, Iowa City, IA.; and "National Survey of Student Engagement" by Indiana University Center for Postsecondary Research and Planning, 2008, Bloomington, IN.

APPENDIX E

VARIABLES UTILIZED FOR PREDICTIVE ANALYSIS

Predictive Variables

Cognitive	High School Engagement	Noncognitive	College Engagement	Outcomes
-High school GPA -ACT composite	-Total activities -Total accomplishments Accomplishment types: -Leadership -Music -Speech -Art -Writing -Science -Athletics -Community Service -Work	-Academic discipline -Academic self-confidence -Commitment to college -Communication skills -Emotional control -General determination -Goal striving -Social activity -Social connection -Study skills	GPA items: -Hours class preparation -Tutoring -Discussed ideas w/faculty -Used electronic medium -Relationships w/faculty -Academic support -Help coping -Come to class unprepared -Challenging exams -Number of problem sets -Exercised -Hours relaxing -Learning on own Retention items: -Talked about career plans -Practicum or internship -Relationships w/students -Attending events -Acquiring job skills	-First year GPA -First-to-second year retention

APPENDIX F

DESCRIPTIVE RESULTS FOR TREND ANALYSIS

Table 15

Descriptive Statistics: State Membership

State	Frequency	Percent of Total
Alabama	111058	3.5
Alaska	5454	0.2
Arizona	35850	1.1
Arkansas	81836	2.6
California	67157	2.1
Colorado	75587	2.4
Connecticut	2279	0.1
Delaware	629	0.0
District of Columbia	633	0.0
Florida	97708	3.1
Georgia	22599	0.7
Hawaii	3760	0.1
Idaho	27528	0.9
Illinois	319941	10.1
Indiana	24267	0.8

Table continued

State	Frequency	Percent of Total
Iowa	82075	2.6
Kansas	76891	2.4
Kentucky	105217	3.3
Louisiana	145777	4.6
Maine	887	0.0
Maryland	11475	0.4
Massachusetts	4550	0.1
Michigan	241613	7.7
Minnesota	96206	3.0
Mississippi	95734	3.0
Missouri	146592	4.6
Montana	18921	0.6
Nebraska	63478	2.0
Nevada	14560	0.5
New Hampshire	973	0.0
New Jersey	7895	0.3

Table continued

State	Frequency	Percent of Total
New Mexico	37730	1.2
New York	84727	2.7
North Carolina	12263	0.4
North Dakota	23081	0.7
Ohio	270884	8.6
Oklahoma	95886	3.0
Oregon	7323	0.2
Pennsylvania	22522	0.7
Rhode Island	748	0.0
South Carolina	11994	0.4
South Dakota	23027	0.7
Tennessee	145810	4.6
Texas	171831	5.4
Utah	62961	2.0
Vermont	900	0.0
Virginia	9624	0.3

Table continued

State	Frequency	Percent of Total
Washington	15055	0.5
West Virginia	44161	1.4
Wisconsin	113760	3.6
Wyoming	13488	0.4

Table 16

Descriptive Statistics: Gender

Gender	Frequency	Percent of Total
Female	1,783,522	56.5
Male	1,369,414	43.4
System Missing	3,969	0.1

Table 17

Descriptive Statistics: Racial Background

Racial Background	Frequency	Percent of Total
African-American/Black	310,751	9.8
American Indian, Alaskan Native	35,694	1.1
Caucasian-American/White	2,407,260	76.3
Mexican-American/Chicano	85,838	2.7
Asian-American, Pacific Islander	76,272	2.4
Puerto Rican, Cuban, other Hispanic origin	41,273	1.3
Other	52,185	1.7
Multiracial	63,458	2.0
I prefer not to respond	43,072	1.4
System Missing	41,102	1.3

Table 18

Descriptive Statistics: Socioeconomic Status

Annual Parental Income Before Taxes[1]	Frequency	Percent of Total
Category 0	215,619	6.8
Category 1	204,680	6.5
Category 2	218,704	6.9
Category 3	251,462	8.0
Category 4	294,856	9.3
Category 5	337,229	10.7
Category 6	338,959	10.7
Category 7	528,478	16.7
Category 8	318,516	10.1
Category 9	229,910	7.3
System Missing	218,492	6.9

[1] Actual dollar amounts not reported. These have changed over time to reflect current

cost of living. Categories reported to represent the range of income endorsed by

participants.

Table 19

Descriptive Statistics: Graduating Class Size

Class Size	Frequency	Percent of Total
Fewer than 25	116472	3.7
25-99	594229	18.8
100-199	648310	20.5
200-399	952214	30.2
400-599	508041	16.1
600-899	207858	6.6
900 or more	102068	3.2
System Missing	27713	0.9

Table 20

Descriptive Statistics: Community Size

Community Size	Frequency	Percent of Total
Farm or open country	364,292	11.5
Town or city with population of:		
Less than 500	108,954	3.5
500-1,999	283,553	9.0
2,000-9,999	566,854	18.0
10,000-49,999	770,824	24.4
50,000-249,999	484,938	15.4
250,000-499,999	181,358	5.7
500,000-999,999	140,222	4.4
More than 1 million	167,340	5.3
System Missing	88,570	2.8

Table 21

Descriptive Statistics: High School Grade Point Average

GPA	Frequency	Percent of Total
(D- to D) 0.5-0.9	4858	0.2
(D to C-) 1.0-1.4	22403	0.7
(C- to C) 1.5-1.9	130954	4.1
(C to B-) 2.0-2.4	437783	13.9
(B- to B) 2.5-2.9	606929	19.2
(B to B+) 3.0-3.4	966265	30.6
(A- to A) 3.5-4.0	963783	30.5
System Missing	23930	0.8

APPENDIX G

CORRELATIONS BETWEEN MEASURED

HIGH SCHOOL AND ANTICIPATED

COLLEGE ENGAGEMENT

Table 22

Correlations Between Measured and Anticipated Engagement

College	Instrumental music	Vocal music	Student govt	Publications	Debate	Dept clubs	Dramatics/Theater	Religious orgs	Racial/Ethnic orgs	Intramural athletics	Varsity athletics	Political orgs	Radio-TV	Fraternity/Sorority	Special interest group	Comm service orgs
High school																
Instrumental music	.477*															
Vocal music		.533*														
Student govt			.363*													
Publications				.362*												
Debate					.278*											
Dept clubs						.314*										
Dramatics/Theater							.484*									
Religious orgs								.499*								
Racial/Ethnic orgs									.405*							
Intramural athletics										.428*						
Varsity athletics											.522*					
Political orgs												.296*				
Radio-TV													.213*			
Fraternity/Sorority														.211*		
Special interest group															.354*	
Comm service orgs																.358*
* p < .001																

APPENDIX H

CORRELATIONS BETWEEN MEASURED

HIGH SCHOOL AND MEASURED

COLLEGE ENGAGEMENT

Table 23

Correlations Between High School and College Engagement

College	High School Instrumental music	Vocal music	Student govt	Publications	Debate	Dept clubs
Tutored	.087	.099*	.097*	.000	.043	.158**
Comm-based project	-.028	.053	.027	.030	.061	.037
Worked on activities	.058	.017	.043	.050	.049	.035
Art exhibit, play, etc	.136**	.132**	-.025	.007	.073	.078
Exercised	-.023	.071	.048	-.050	-.035	.044
Spirituality activities	.146**	.178**	.032	-.051	.011	.063
Examined your views	.020	.092	.054	-.040	.045	.129*
Understood others' views	-.011	.123	.057	-.040	.039	.136*
Changed your views	.002	.082	.074	.075	.146*	.120
Practicum, internship	.015	.014	.062	-.016	.035	.041
Community service	-.076*	.024	.142**	.043	.018	.086
Learning community	.021	-.061	.134**	.027	.004	.010
Research proj w/faculty	.063	.010	.069	-.021	.096*	.030
Foreign language	.059	-.017	.068	.053	-.018	.067
Study abroad	-.030	.073	.067	.089	-.068	.108*
Independent study	-.047	.084	.028	.078	.018	.033
Culminating experience	.043	.034	.055	.049	.100*	.064
Preparing for class	.050	-.008	.010	.050	.009	.046
Working on campus	-.015	.015	.031	-.051	.039	-.024
Working off campus	-.124**	.099*	.071	.058	.090	-.068
Co-curricular activities	-.017	-.007	.056	.027	-.051	.043
Relaxing and socializing	-.017	-.046	-.139**	-.041	-.007	-.056
Providing care	-.045	-.001	.047	-.035	-.007	.065
Commuting	.065	-.009	.073	.007	.075	-.026
Voting in elections	-.037	.008	-.032	.139**	-.040	.038
Contribute to community	.043	-.030	.127**	.068	.037	.057
Sense of spirituality	.058	-.016	-.016	.008	-.003	.030
Fraternity or sorority	-.078	.118*	.164**	-.032	.036	-.035
Student athlete	-.086	-.018	.060	-.066	-.012	-.056

* p < .05
** p < .01

Table Continued

College	*High School (continued)* Dramatics/ Theater	Religious orgs	Racial/ Ethnic orgs	Intramural athletics	Varsity athletics
Tutored	.060	.061	.031	.066	.074
Comm-based project	-.014	-.008	.047	.039	.057
Worked on activities	.096*	-.047	.012	.037	.056
Art exhibit, play, etc	.241**	.069	.005	-.058	-.065
Exercised	-.003	.056	-.076	.097	.175**
Spirituality activities	.049	.473**	-.032	.050	-.036
Examined your views	.072	.102	.007	.018	.008
Understood others' views	.118	.116	.000	.096	.007
Changed your views	.092	.095	.071	.026	.027
Practicum, internship	.045	-.014	.053	.055	.068
Community service	.002	.128**	.096*	.091	.083
Learning community	-.024	.062	.049	-.019	.022
Research proj w/faculty	-.080	.051	.065	.016	.040
Foreign language	.087	-.017	.003	-.023	.020
Study abroad	.076	.018	.043	-.052	.032
Independent study	-.022	.049	-.001	.084	.089
Culminating experience	.054	-.022	.023	-.008	.083
Preparing for class	-.006	-.067	.024	-.020	.045
Working on campus	.012	-.047	.014	-.022	-.038
Working off campus	-.019	.108*	.080	.052	-.065
Co-curricular activities	.020	.071	.048	.135**	.187**
Relaxing and socializing	-.013	-.059	-.089	-.006	.070
Providing care	.044	.107*	.074	.010	.015
Commuting	.047	.102*	.116*	.000	.005
Voting in elections	.007	.085	.017	.001	.087
Contribute to community	.017	.072	-.025	-.012	.070
Sense of spirituality	.051	.174**	.010	.051	.080
Fraternity or sorority	.019	.147**	.079	.066	.102*
Student athlete	-.079	.035	-.055	.061	.170**

* $p < .05$
** $p < .01$

Table Continued

College	*High School (continued)* Political orgs	Radio-TV	Fraternity/ Sorority	Special interest group	Comm service orgs
Tutored	.041	.065	.087	.104*	.127**
Comm-based project	.068	.019	.129**	.075	.122**
Worked on activities	.089	.008	-.038	.106*	.071
Art exhibit, play, etc	.143**	.106*	.066	.081	.057
Exercised	.079	.027	.078	.128**	.046
Spirituality activities	.018	.041	.133**	-.022	.135**
Examined your views	.032	-.025	-.001	.058	.055
Understood others' views	.100	.034	.018	-.019	.074
Changed your views	.038	-.035	-.067	-.050	.034
Practicum, internship	.084	-.038	.050	-.015	.116*
Community service	.119*	.035	.169**	.122**	.237**
Learning community	.051	.040	.112*	.092	.111*
Research proj w/faculty	.075	.026	.037	-.004	-.023
Foreign language	.055	-.018	-.008	.057	-.046
Study abroad	.039	.069	.071	.025	.033
Independent study	.040	-.008	-.013	-.042	-.006
Culminating experience	.081	.033	.063	.008	.015
Preparing for class	.069	.056	.088	-.047	.126**
Working on campus	.007	-.013	.032	-.085	.018
Working off campus	-.034	.045	-.041	.029	-.055
Co-curricular activities	.084	.076	.130**	.053	.078
Relaxing and socializing	-.032	-.013	-.062	-.019	-.104*
Providing care	.018	-.049	-.035	-.028	-.075
Commuting	-.003	.074	.070	-.060	-.019
Voting in elections	.034	.115*	.066	.052	.045
Contribute to community	.075	.064	.097*	-.008	.081
Sense of spirituality	-.002	.071	.069	-.096*	.038
Fraternity or sorority	.087	.000	.170**	-.007	.030
Student athlete	-.015	.092	-.039	.034	-.072

* p < .05
** p < .01

APPENDIX I

CORRELATIONS BETWEEN ANTICIPATED AND

MEASURED COLLEGE ENGAGEMENT

Table 24

Correlations between anticipated and measured engagement

Measured College	Anticipated College	Instrumental music	Vocal music	Student govt	Publications	Debate	Dept clubs
Tutored		.064	.082	.082	.058	.100*	.043
Comm-based project		-.054	.020	.040	.027	.042	.000
Worked on activities		-.044	-.006	.038	.007	.158**	-.086
Art exhibit, play, etc		.171**	.186**	.084	-.001	.111*	.098*
Exercised		-.021	.066	.041	-.013	.035	-.037
Spirituality activities		.108*	.145**	.055	-.05	.039	.074
Examined your views		.059	.120	.111	.030	.138*	.077
Understood others' views		.062	.178**	.098	.043	.186**	.074
Changed your views		.050	.061	.110	-.021	.071	.054
Practicum, internship		.009	.040	.056	.057	.030	.108*
Community service		-.078	.035	.060	.079	.047	.029
Learning community		.059	.031	.112*	.028	.075	.085
Research proj w/faculty		.035	.006	.055	-.089	.061	.012
Foreign language		.034	.056	.099*	.178**	.017	.115*
Study abroad		-.025	-.002	.095*	.076	-.011	.062
Independent study		-.037	-.014	.086	.042	-.022	.021
Culminating experience		-.028	-.028	.102*	.025	-.022	.110*
Preparing for class		.045	.002	.009	-.016	.011	.062
Working on campus		.005	.036	.000	-.014	.003	.005
Working off campus		-.101*	.074	.121*	-.051	.040	.017
Co-curricular activities		-.041	-.030	.021	-.028	.007	-.023
Relaxing and socializing		-.022	-.014	-.058	-.046	-.008	-.116*
Providing care		-.020	.086	-.004	-.064	-.041	.036
Commuting		.095*	.046	-.058	-.084	-.013	.015
Voting in elections		-.042	.002	.006	.057	.030	-.003
Contribute to community		-.005	.029	.064	.070	.060	-.007
Sense of spirituality		-.034	.007	-.025	-.024	.047	-.056
Fraternity or sorority		-.088	.048	.044	-.054	-.012	-.019
Student athlete		-.024	-.042	.016	-.004	-.010	-.053

* p < .05
** p < .01

Table Continued

Measured College	Dramatics/ Theater	Religious orgs	Racial/ Ethnic orgs	Intramural athletics	Varsity athletics
Tutored	.041	.040	.014	.094*	.050
Comm-based project	.011	-.090*	.000	.056	-.024
Worked on activities	.021	-.106*	.041	-.044	.022
Art exhibit, play, etc	.150**	.017	-.024	-.102*	-.104*
Exercised	.009	.058	-.035	.158**	.178**
Spirituality activities	-.017	.540**	-.003	-.002	-.028
Examined your views	-.002	.097	.046	.018	-.073
Understood others' views	.053	.077	.014	.048	-.104
Changed your views	.021	.057	.106	-.040	-.008
Practicum, internship	.058	-.007	-.010	.085	.000
Community service	-.033	.112*	.045	.108*	.048
Learning community	.026	-.019	.048	.028	-.046
Research proj w/faculty	-.037	-.053	.034	-.036	.068
Foreign language	.159**	.028	.015	.068	.077
Study abroad	.049	-.060	-.011	.009	.027
Independent study	-.036	.018	.077	.049	.100*
Culminating experience	.068	-.061	.032	.004	.072
Preparing for class	.033	-.047	.052	-.013	-.006
Working on campus	.091	-.027	.049	-.056	-.004
Working off campus	.002	.115*	.044	-.053	-.014
Co-curricular activities	-.051	.048	.013	.132**	.222**
Relaxing and socializing	-.021	-.010	-.069	-.054	.043
Providing care	.033	.091	.046	.036	.056
Commuting	.022	.076	.093*	-.103*	.011
Voting in elections	-.026	.036	.040	.066	.005
Contribute to community	-.012	.093	.033	.026	-.005
Sense of spirituality	.002	.160**	.053	.050	-.013
Fraternity or sorority	-.040	.155**	-.024	.026	.065
Student athlete	-.080	.078	-.033	.115*	.291**

Header (rotated): Anticipated College (continued)

* p < .05
** p < .01

Table Continued

Measured College	*Anticipated college (continued)*	Political orgs	Radio-TV	Fraternity/ Sorority	Special interest group	Comm service orgs
Tutored	.013	.017	.042	.048	.102*
Comm-based project	.024	-.003	.023	.011	.024
Worked on activities	.034	.019	-.015	-.016	.044
Art exhibit, play, etc	.073	-.026	.056	.070	.011
Exercised	.052	-.006	.000	.079	.041
Spirituality activities	.028	-.101*	-.002	.033	.133**
Examined your views	.130*	-.030	.022	.167**	.138*
Understood others' views	.152*	.022	-.013	.165**	.180**
Changed your views	.096	-.050	-.001	.134*	.129*
Practicum, internship	.037	.048	.039	-.002	.116*
Community service	-.036	-.045	.054	.020	.250**
Learning community	.047	-.023	-.069	-.010	.136**
Research proj w/faculty	.048	-.056	-.023	.035	.082
Foreign language	.101*	.101*	-.039	.032	.079
Study abroad	.109*	-.028	.060	.092*	.075
Independent study	.031	-.038	.038	.035	.111*
Culminating experience	.058	.044	.038	.022	.046
Preparing for class	.017	-.015	.026	-.029	.033
Working on campus	-.017	.065	-.021	-.015	.043
Working off campus	.027	.000	.090	.000	-.015
Co-curricular activities	.008	-.025	.115*	.009	.026
Relaxing and socializing	.077	.062	-.076	-.026	-.086
Providing care	-.043	.041	-.034	.012	-.062
Commuting	-.102*	.010	.025	-.090	-.015
Voting in elections	.030	.056	.041	.062	.085
Contribute to community	.098*	.021	.056	-.025	.175**
Sense of spirituality	-.004	-.029	-.021	-.075	.078
Fraternity or sorority	.046	-.033	.204**	.009	.058
Student athlete	-.036	.008	-.091	.015	-.020

* p < .05
** p < .01

APPENDIX J

INTERRELATIONSHIPS OF PREDICTOR CATEGORIES

Table 25

Interrelationships of Cognitive and High School Engagement Predictors

HS Engagement	Cognitive HS GPA	ACT
Activities	.199***	.123***
Accomplishments	.217***	.143***
Leadership	.190***	.063*
Music	.216***	.221***
Speech	.081**	.128***
Art	.136***	.069*
Writing	.115***	.161***
Science	.134***	.133***
Athletics	-.034	-.071*
Comm Service	.114***	.033
Work	.005	-.026

* $p < .05$
** $p < .01$
*** $p < .001$

Table 26

Interrelationships of Cognitive and Noncognitive Predictors

Noncognitive	Cognitive HS GPA	ACT
Commit to College	.193***	.049
Goal Striving	.236***	.013
Acad. Discipline	.436***	.027
Gen. Determination	.294***	-.009
Study Skills	.193***	-.012
Comm Skills	.176***	.020
Social Activity	.000	-.030
Social Connection	.100**	-.044
Acad. Self-Confidence	.369***	.439***
Emotional Control	.172***	.039

* p < .05
** p < .01
*** p < .001

Table 27

Interrelationships of Cognitive and College Engagement (Retention) Predictors

Col. Engagement	Cognitive HS GPA	ACT
Career Plans	-.007	-.088*
Practicum	.022	-.013
Rx w/students	.066	-.038
Attending events	.059	-.007
Acquiring job skills	-.021	-.071
* p < .05		

Table 28

Interrelationships of Cognitive and College Engagement (GPA) Predictors

Col. Engagement	Cognitive HS GPA	ACT
Hours class prep	-.053	.034
Tutoring	.077	.022
Used electronics	-.025	-.090*
Discussed ideas	-.060	-.034
Coming unprepared	.046	-.067
Relation w/faculty	.001	.004
Acad. support	.090	-.042
Help coping	-.017	-.134**
Challenging exams	.067	-.092*
Problem sets	.091*	-.126**
Exercised	.021	-.016
Hours relaxing	-.030	.147***
Learning on own	.021	-.074

* $p < .05$
** $p < .01$
*** $p < .001$

Table 29

Interrelationships of College Engagement (Retention) and High School Engagement

Predictors

HS Engagement	Col. Engagement	Career Plans	Practicum	Rx w/students	Attending events	Acquiring job skills
Activities		.118*	.126**	.107*	.043	.010
Accomplishments		.071	.158**	.090	.006	.074
Leadership		.082	.146**	.055	.048	.080
Music		.109*	.141**	.079	.063	.116
Speech		.088	.143	.037	.010	-.011
Art		.025	.010	.015	-.023	.027
Writing		-.038	.091	.036	.016	-.030
Science		.047	-.006	-.001	.018	-.007
Athletics		.028	.153**	.087	-.003	.028
Comm Service		.084	.092	.125*	-.019	.019
Work		-.032	.041	-.057	-.077	.008

* p < .05
** p < .01

Table 30

Interrelationships of College Engagement (Retention) and Noncognitive Predictors

Noncognitive	Col. Engagement	Career Plans	Practicum	Rx w/students	Attending events	Acquiring job skills
Commit to College		.174***	.133**	.090	.112*	.195***
Goal Striving		.199***	.070	.166***	.180***	.247***
Acad. Discipline		.106*	.112*	.157***	.127**	.165***
Gen. Determination		.209***	.058	.177***	.073	.214***
Study Skills		.212***	-.025	.099*	.116*	.160***
Comm Skills		.190***	-.029	.166***	.077	.147**
Social Activity		.118*	.087	.374***	.081	.221***
Social Connection		.139**	.104*	.351***	.105*	.157***
Acad. Self-Confidence		.095*	-.036	.098*	.132**	.170***
Emotional Control		.108*	-.065	.212***	.132**	.096

* p < .05

** p < .01

*** p < .001

Table 31

Interrelationships of Noncognitive and High School Engagement Predictors

HS Engagement	Noncognitive	Commitment to College	Goal Striving	Academic Discipline	General Determination	Study Skills	Comm Skills	Social Activity	Social Connection	Acad. Self-Confidence	Emotional Control
Activities		.086*	.138***	.087**	.134***	.148***	.175***	.166***	.185***	.084*	.034
Accomplishments		.044	.084	.037	.078	.144***	.159***	.150***	.156***	.104*	.094*
Leadership		.022	.085**	.079*	.100**	.116***	.108**	.101**	.126***	.070	.046
Music		.041	.017	.002	.001	.068	.076	.047	.039	.154***	.090
Speech		.020	.037	-.076	-.021	.017	.134**	.098*	.061	.063	-.018
Art		.057	.018	.054	.008	.038	.087*	-.017	.019	.063	-.082
Writing		.073	.089*	.089*	.098*	.106*	.144***	.003	.021	.090*	.061
Science		.064	.057	.104*	.080	.089*	.058	-.036	.013	.032	.101*
Athletics		-.039	-.010	-.069	-.023	-.023	-.040	.163***	.112**	-.081	.001
Comm Service		.059	.091*	.088*	.111*	.140***	.174***	.130**	.130**	.071	.051
Work		-.046	-.014	-.111*	-.031	.025	-.041	.068	.071	-.047	-.006

* p < .05
** p < .01
*** p < .001

Table 32

Interrelationships of High School Engagement and College Engagement (GPA) Predictors

Col. Engagement	HS Engagement										
	Activities	Accomplishments	Leadership	Music	Speech	Art	Writing	Science	Athletics	Comm Service	Work
Hours class prep	.008	.005	.031	-.063	.034	-.049	-.015	-.040	.025	.047	.021
Tutoring	.207***	.280***	.135**	.097	.133*	.119*	.126*	.233***	.063	.138**	.136**
Used electronics	.097*	.077	.000	.034	.085	-.048	.085	.113*	-.011	.013	.035
Discussed ideas	.137**	.148**	.097*	.036	.118*	-.003	.058	.056	.090	.119*	.061
Coming unprepared	.064	-.010	.024	.090	-.018	-.082	-.034	.023	-.017	.018	-.039
Rx w/faculty	.068	.097	-.015	.132*	.109*	.038	.039	.035	.030	.071	-.105*
Acad. support	.076	.049	.030	.123*	.004	-.013	.061	.092	-.047	-.015	.009
Help coping	-.030	.007	.017	.025	.018	-.007	.024	.015	-.070	-.037	-.031
Challenging exams	.034	-.032	.016	-.053	.001	-.013	-.081	.000	-.041	.043	-.037
# of prob sets	.008	.052	.037	.033	-.064	.020	-.018	.114*	.023	.037	.052
Exercised	.151**	.107*	.063	.034	.077	-.027	.010	-.017	.310***	-.007	-.014
Hours relaxing	-.104*	-.037	-.079	-.013	-.009	-.030	.018	-.032	.084	-.066	-.042
Learning on own	.069	.074	-.019	.072	-.048	.009	-.029	.070	.072	.123*	-.070

* $p < .05$
** $p < .01$
*** $p < .001$

Table 33

Interrelationships of Noncognitive and College Engagement (GPA) Predictors

Col. Engagement	Noncognitive Commitment to College	Goal Striving	Academic Discipline	General Determination	Study Skills	Comm Skills	Social Activity	Social Connection	Acad. Self-Confidence	Emotional Control
Hours class prep	-.080	-.143**	-.277***	-.146**	-.131**	-.039	.027	-.076	-.112*	-.110*
Tutoring	.071	.128**	.098*	.089	.102*	.032	.078	.047	.136**	.081
Used electronics	.071	.127**	.055	.051	.143**	.006	.119*	.086	.114*	.085
Discussed ideas	-.010	.082	-.038	.036	.101*	.022	.130**	.066	.087	.061
Coming unprepared	.190***	.191***	.238***	.196***	.193***	.086	.019	.001	.014	.098*
Rx w/faculty	.118*	.212***	.163***	.149**	.147**	.177***	.172***	.186***	.148**	.219***
Acad. support	.226***	.213***	.194***	.234***	.192***	.193***	.074	.147**	.123*	.166***
Help coping	.080	.102*	.075	.055	.071	.052	.086	.085	.010	.018
Challenging exams	.088	.231***	.160***	.181***	.180***	.146**	.018	.009	-.065	.088
# of prob sets	.010	.114*	.063	.098*	.100*	.058	.019	.038	-.072	.049
Exercised	.060	.213***	.102*	.175***	.093	.108*	.240***	.227***	.127**	.133**
Hours relaxing	-.129**	-.187***	-.163***	-.223***	-.193***	-.132**	-.024	-.052	.053	-.145**
Learning on own	.077	.227***	.096	.126*	.141**	.089	.127**	.144**	.095	-.029

* p < .05

** p < .01

*** p < .001

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