

EFFECTS OF ENGAGEMENT IN HIGH SCHOOL AND  
EXPECTATIONS FOR COLLEGE ENGAGEMENT ON REALIZED  
COLLEGE ENGAGEMENT

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For Maren

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**Abstract**

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**EFFECTS OF ENGAGEMENT IN HIGH SCHOOL AND  
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The positive relationships of college engagement with student persistence, graduation, and satisfaction have been generally accepted by researchers and practitioners for the past thirty years. Much emphasis has therefore been placed on the college's role in fostering college engagement; however, despite considerable college programming intended to increase college engagement, little progress has been seen in improving national retention or graduation trends or the levels of college engagement. This stagnation begs the question of whether or not colleges are as responsible for fostering college engagement as is commonly believed. Are students themselves predisposed to a level of engagement before they reach college and are colleges simply selecting these students via their admissions processes? No prior study has adequately examined high school student engagement and their expectations for college engagement and their relationships with college engagement across a national sample. This study proposes a comprehensive model of engagement and tests the model to contribute a more complete understanding of the student-level factors that contribute to college engagement to the body of extant research.

To evaluate the relationships between college environmental characteristics, high school engagement and expected college engagement with realized engagement behaviors, a series of hierarchical linear models (HLM) models were developed using

data from the 2007-08, 2008-09 and 2009-10 administrations of the Beginning College Survey of Student Engagement (BCSSE) and the National Survey of Student Engagement (NSSE). In general, the variability in the NSSE benchmarks was mostly explained by student characteristics rather than college characteristics. Moreover, the engagement behaviors in high school exhibited the highest and most consistent relationship with each of the benchmarks. Expected college engagement generally demonstrated the second highest levels. In addition to determining the relative effects of student and college characteristics on college engagement, the models also tested whether college characteristics had an indirect effect on college engagement by enhancing the effect a student characteristic may have on college engagement. However, no such relationships were found to be significant, thus indicating that college characteristics had only direct and slight relationships with college engagement when compared to student characteristics.

The findings of this study indicate a need to revisit the discussions surrounding college engagement. Rather than looking towards colleges as the primary source of college engagement, scholars and practitioners should rather look to those behaviors and expectations a student exhibited prior to enrolling in college. This paradigm shift is supported by the retention and engagement models previously proposed by Tinto, Bean and Kuh, but for lack of adequate statistical methods and survey instruments, the importance of prior engagement and expectations were understudied. Given college engagement's relationships with other metrics of student success (e.g., retention, graduation rates), these findings may also have repercussions beyond first-year engagement.

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## Chapter One: Introduction

Engagement in the college experience has received much attention over the past 40 years. Beginning with Pace's concept of "quality of student effort" in the 1970's (Pace, 1979, 1998; Project on the Study of Quality in Undergraduate Education, December 1984) and maturing through other research since that time--most notably that of Astin (as *involvement*) and Kuh (as *engagement*), an increasingly large body of research has explored the types and value of engagement. Respected models of student departure (see Bean (1990) and Tinto (1993), for example) also emphasize the value of the student's experience on the college campus, and increased levels of engagement among students have been shown to have positive relationships with various measures of student success (Astin, 1977, 1993; Bean, 1980; K. A. Feldman & Newcomb, 1969; Gellin, 2003; Kuh, Hu, & Vesper, 2000; Kuh, Kinzie, Buckley, Bridges, & Hayek, 2007; Kuh, Pace, & Vesper, 1997; Pace, 1990; Pascarella & Terenzini, 1991; Pike, 1995, 2006; Pike, Kuh, & Gonyea, 2003; Tinto, 1993). Moreover, the benefits of college engagement continues beyond graduation; for example, alumni who have been involved on campus can be fundamental to increasing participation in alumni activities as well as donations (Miller & Casebeer, 1990; Moore III, 2008). Therefore increasing student college engagement is beneficial to both students and colleges on campus and beyond.

Colleges devote significant resources to encouraging their students' engagement in their undergraduate experience. For example, the number of institutions which have participated in the Your First College Year (YFCY) survey of the Cooperative Institutional Research Program (CIRP) has increased from 13 in 2000 to 61 in 2012 (with 137 participating in its peak year of 2003). Over 400 U.S. institutions have participated in

the YFCY since its launch (Higher Education Research Institute, 2011). In the decade since it was established, the National Survey of Student Engagement (NSSE) has increased its participation from 276 to a high of 751 colleges and expanded the number of students surveyed from 63,000 in 2000 to more than 416,000 students in 2011. Overall, more than 1,500 bachelor's-awarding colleges have administered the NSSE since its launch in 2000 representing a sizeable portion of U.S. and Canadian colleges (National Survey of Student Engagement, 2000, 2002, 2010a, 2011, 2012a). NSSE has since become the most popular survey of student behavior (Porter, 2011, 2013).

However, for all the perceived benefits of engagement, there are skeptics and detractors of the belief in a college's ability to increase it, viewing it as a distraction from other means of improving student success. A recent issue of the *Review of Higher Education* was devoted to articles criticizing instruments measuring engagement—particularly NSSE, but also the Community College Survey of Student Engagement (CCSSE) and CIRP did not go unscathed by their criticisms (A. Nora, Ed., Fall 2011). Others have criticized the methods used to evaluate a college's influence on enhancing engagement. Questions regarding the ability for most studies to control for maturation, self-selection, cross-institutional samples, and a true experimental design often arise. Despite having many advocates, doubts still remain about the legitimacy of whether colleges can foster college engagement. This chapter will broadly discuss engagement in the landscape of higher education and outline the need for more research regarding factors that contribute to engagement beyond the college experience to better legitimate or question the attention devoted to building engagement during college. In short, this chapter asks, “Are colleges over-credited with creating engaged students?”

### **Engagement in the Context of the Larger Issue of “College Success”**

A campus's student body is “shaped” during the college admission and selection process. Though engagement is not a term commonly used by students and parents, students certainly engage in educational purposeful activities prior to college admission, and some indicators of engagement are valued in the college admission process. Indeed, college preparation oftentimes goes beyond performance in the classroom and includes participating in co-curricular activities, community organizations, work-related experiences as well as fostering relationships with teachers and counselors as potential recommenders. Many colleges--especially private or highly selective colleges--use letters of recommendation, essays, or portfolios in admission decisions as a means to become selective, but also, to promote access through “holistic review” in the wake of the Michigan court cases regarding affirmative action (Clinedinst & Hawkins, 2010; "Gratz et al. v. Bollinger et al.," June 23, 2003; "Grutter v. Bollinger," June 23, 2003). The use of such non-academic experiences implicitly incorporates indicators of prior engagement through the college selection process.

Holistic review may also contribute to building a more successful class because academic under-preparation is only one of several sources of student departure. As Adelman (2006) noted, students are more likely indicate non-academic reasons for leaving college: family obligations, finances, employment opportunities. Bean (1980, 1990) and Tinto (1993) include poor institutional commitment as another primary reason to leave college. Like Adelman, Bean (1980, 1990) and Tinto (1993) suggest that students leave due to failure to academically or socially integrate into college. Kuh et al (2008) found that while pre-college characteristics (such as academic preparation, bio-

demographic and socio-economic factors) were “non-trivial” to predicting first-year college grades and persistence, their influence diminishes greatly when measures of college engagement are included. Moreover, they found engagement to have a “compensatory effect” on first-year college grades and persistence, i.e. “the effects of engagement are even greater for lower ability and students of color compared with White students.” (p. 555). By employing holistic review in the admissions process, colleges may be implicitly employing indicators of engagement in the selection of under-represented students who would otherwise not be admissible.

However, despite colleges’ considerable efforts, Kuh, Hu, and Vesper (2000) found that one in five students remain disengaged. If national trends for first-year retention or graduation are considered, little more than half of those who start college successfully completed the degree in six years (National Center for Education Statistics, 2010). A great deal of this failure to graduate is due to the attrition that occurs in the first year alone; almost one in four students entering college in 2010 failed to return to the same institution (National Center for Higher Education Management Systems for Higher Education for Policymaking and Analysis, 2013). Despite the growing interest in promoting engagement as a means to combat this attrition and improve graduation rates, first-year persistence rates have remained relatively flat since they were first tracked by NCES in 2004 (see Figure 1.1) and based on a survey of literature by Bean (1980), these rates are not significantly different from those seen since the early 20<sup>th</sup> Century. These trends cast doubt that efforts of colleges to improve engagement are generating large scale impact on college success.

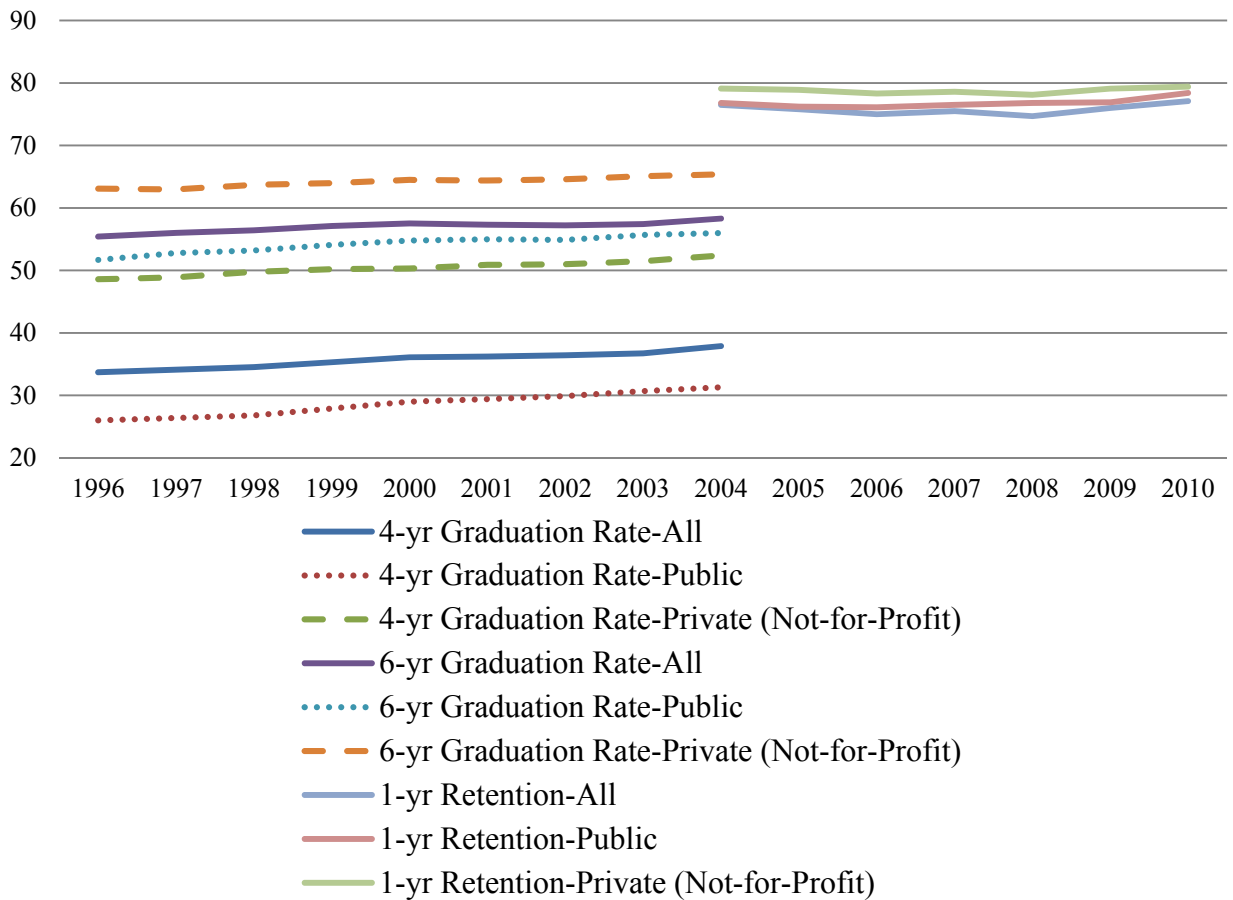


Figure 1.1: 4- and 6- Year Graduation Rates and 1-Year Retention Rates at 4-Year Public and Not-for-Profit Private Colleges (National Center for Education Statistics, April 2012; National Center for Higher Education Management Systems for Higher Education for Policymaking and Analysis, 2013).

Nor have the trends of NSSE’s “Benchmarks of Effective Educational Practices” changed considerably since its founding in 2000 (see Figures 1.2). Most troublesome is the failure of the first-year engagement trends because the largest attrition occurs in the first year. While not a definitive means of assessing engagement efforts, these trends are in line with the findings of Koljatic and Kuh (2001) which indicated that little movement

has occurred in increasing college engagement, particularly in the first year. One must question, given these stagnating indicators in the face of significant investments, whether colleges are, in fact, responsible for increasing engagement in the first year.

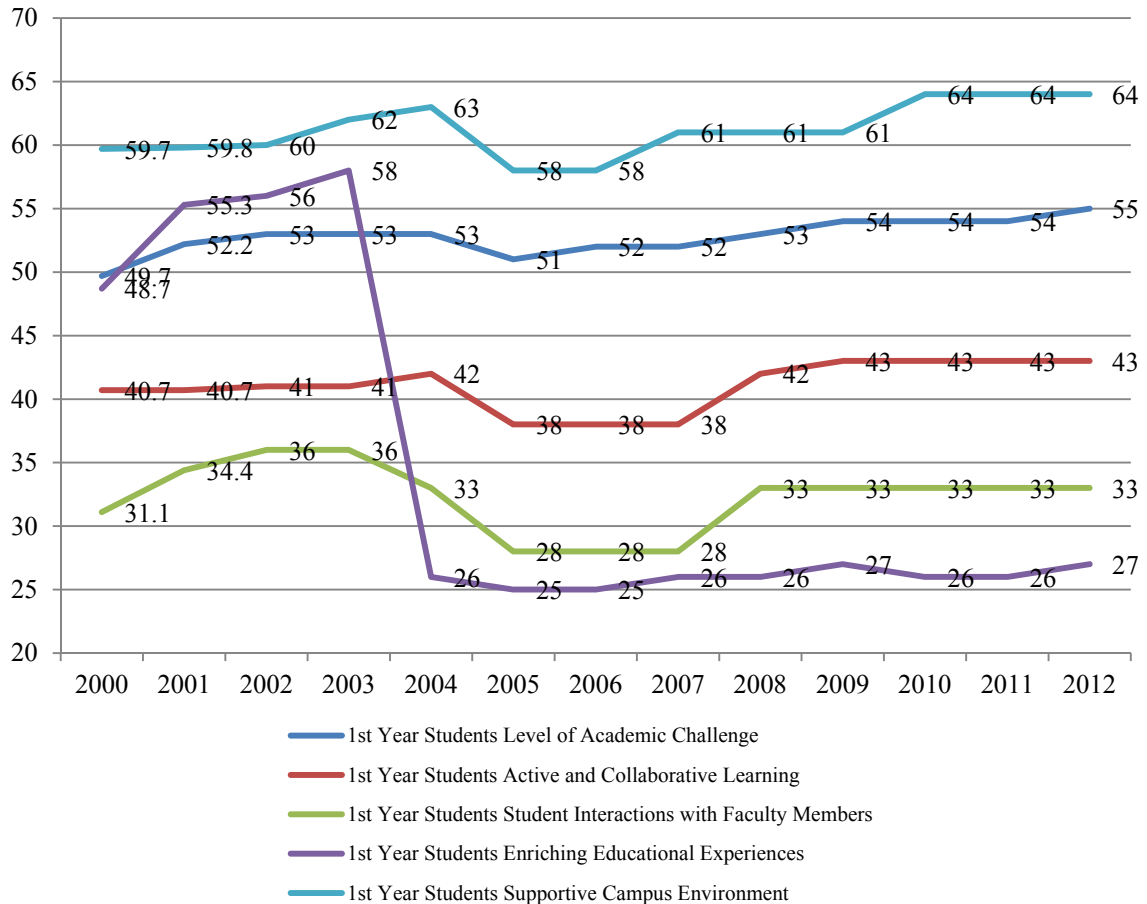


Figure 1.2: 13-year NSSE National Benchmark Trends for First Year Students. Data collected from the National Survey of Student Engagement (2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008b, 2009a, 2009b, 2010a, 2011, 2012a).

### Defining Engagement

A study of engagement requires a discussion of the term itself. Astin (1984) broadly defined *involvement* as “the amount of physical and psychological energy that the student devotes to the academic experience.” (p. 518). Almost two decades later, Kuh

(2003) offered a grander definition for *engagement* which expanded beyond the academic experience:

What students do during college counts more in terms of desired outcomes than who they are or even where they go to college. That is, the voluminous research on college student development shows that the time and energy students devote to educationally purposeful activities is the single best predictor of their learning and personal development. (p. 1)

Though similar, Astin's *involvement* represents a single-sided *academic* interaction, focused upon the student's actions but not those of the institution. On the other hand, Kuh's *engagement* goes beyond merely the energy the student devotes to the collegiate experience; Kuh indicates that the institution remains a contributor. Though the specific "where" remains of lesser importance, a student can only be engaged in opportunities available at a particular college. Moreover, he included activities that are "educationally purposeful" and not simply "academic." Kuh and Associates (2005) later expanded on this relationship by noting:

. . . student engagement has two key components that contribute to student success. The first is the amount of time and effort students put into their studies and other activities that lead to the experiences and outcomes that constitute student success. The second is the ways the institution allocates resources and organizes learning opportunities and services to induce students to participate in and benefit from such activities. (p. 9)

In this definition, Kuh and Associates make explicit what was hinted at previously: colleges influence the engagement of their students. Like a coin, *engagement* has two

sides: on the one side, the student's actions and, on the other, those taken by the college. This evolution of the definition of *engagement* is perhaps also reflective of the general research focus away from student characteristics, perceptions and behaviors to college characteristics and programming: simply, to what the college does. Given the stagnation in the NSSE benchmarks, this research focus may be too narrow.

### **A Theoretical Linkage Between Student Engagement and Student Departure**

A fundamental model of student attrition was proposed by Tinto in 1975 (see Figure 1.3). Tinto's interactionist model was pivotal in that it introduced the college's role in retaining students. Prior to this time, institutional attrition had been viewed as a function of student-level (e.g., psychological) or system-level (e.g., economic, environmental, societal, structural-functional) factors. In the former, student attrition was due to the "personal failure of the individual to measure up to the demands of college life" (Tinto, 1993, p. 85). In the latter, student departure was part of or due to larger social mechanisms beyond the control of either the college or individual. For the most part, colleges escaped responsibility.

Breaking from these traditions, Tinto's model focused on the active interaction between a student's characteristics, behaviors and perceptions and the realities of the specific college experience the student chooses. To Tinto, the choice to stay or leave is linked not only to a student's commitment to pursue a degree, but also the student's commitment to the specific college at which he or she enrolls and the experience he or she has there. Therefore, increasing levels of the latter can increase a student's determination to complete his or her degree. In Tinto's words, "it is the interplay between the individual's commitment to the goal of college completion and his commitment to the

institution that determines whether or not the individual decides to drop out from college and the forms of dropout behavior the individual adopts” (Tinto, 1975, p. 96). Thus, a key to fostering institutional commitment is the interaction between student’s expectations for a college experience and the college experience the student receives.

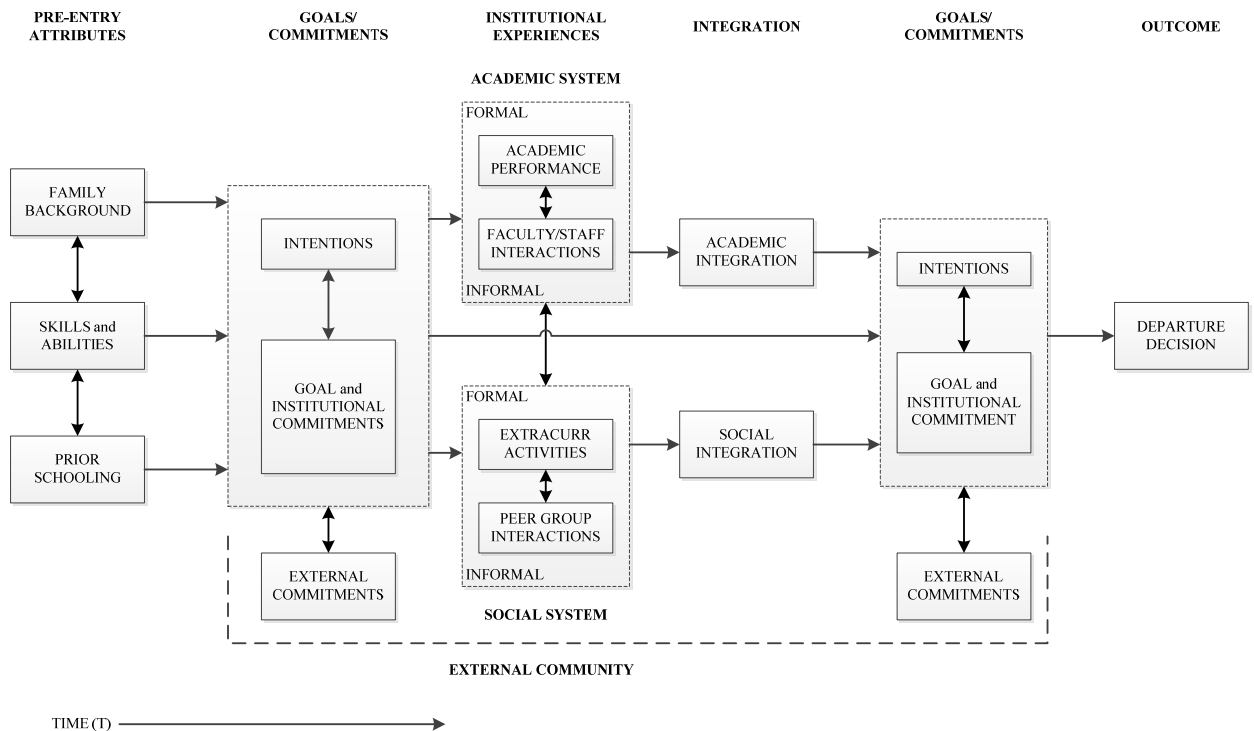


Figure 1.3: Tinto’s Interactionalist Model of Student Departure. Adapted from Tinto (1993).

Despite the model’s incorporation of both student-and college-characteristics, Tinto’s primary focus was on the college’s role in increasing persistence. Tinto’s eventual focus, like that of his successors, is based on what colleges can do to meet the expectations of students or how to foster impactful practices. While his model has sparked much study on college practices to promote engagement, Tinto himself does not lend much focus on the sources of the student’s contributions to the decision to stay or leave. Though Tinto does not use the term *engagement*, his model incorporates

commonly acknowledged indicators of engagement such as Faculty-Staff Interactions, Extracurricular Activities, and Peer Group Interactions—all items which are commonly included in discussions of engagement as well as measured on the NSSE. Engagement, then, is a metric of both Tinto's social and academic integration.

Alongside these measures of engagement, Tinto includes intentions, goals and commitments as inputs to the interaction which are attributes that the student brings with him or herself to the college context. In Tinto's model, these are the product of a student's family background, skills and abilities, and prior schooling. Within these attributes, a student's demographic and socio-economic traits and prior academic performance would be implicitly included; however, there is also room to include the behaviors a student exhibited in high school—including engagement in high school.

Expectations, too, play a significant role in Tinto's model, but his perception of student expectations may be limited. To Tinto, a student's expectations revolve around the commitment to complete their degree in general and to the college in particular. However, if this portion of his model is further expanded, the commitment to the institution would include expectations for that specific experience: for example, expectations for how he or she would interact with peers, levels of academic challenge, and extracurricular activities. In essence, the model should include the expectations for college engagement. Though Tinto emphasizes the college's role and responsibilities to foster this behavior, his model doesn't explicitly indicate the attributes of the college that matter. Astin and Kuh, however, have frameworks that respond to this omission.

### **Engagement Beyond the College Environment**

Like Tinto, Kuh (2006) and Kuh et al (2008) noted that a student does not come to college as a tabula rasa, nor does research relegate engagement to a single environment (Astin & Lee, 2003; Dong & Cole, 2011). Yazzie Mintz (2006) noted that engagement in the secondary school “is also about relationship” with the community, people, and opportunities among other things. (p. 1) The Before College Survey of Student Engagement (BCSSE) measures engagement in high school. While in high school, students are not simply preparing for the academic rigors of college, they are also learning engagement skills; and it is possible that these engagement skills may have more influence on college engagement than either a student’s academic preparation or the actions of the college. This will be discussed further in Chapter 2.

In their work, both Kuh and Astin acknowledge that a student’s background is likely to contribute to engagement in college, but they do not generally include non-academic or non-static pre-college attributes in their studies (e.g., behaviors or perceptions). Given that engagement is a behavior that may occur within *any* context (Astin & Lee, 2003; Dong & Cole, 2011), there is little empirical rationale for this limitation. However, its incorporation in studies of college engagement is limited.

Astin’s (1993) Input-Environment-Output (I-E-O) model (see Figure 1.4) is a common framework for studies of engagement. In this model, the contributing factors of an Output (engagement) must reside in one of two places: either as an Input (the student’s entering characteristics) or from the Environment (the college). Astin’s model presents a closed system and does not account for external factors as inputs that impact the student’s college experience. In looking at reasons for students to leave college, first Bean (1980)

and later Tinto (1993), Adelman (2006), Kuh (2006), and Kuh et al (2007) include externalities in their discussions of failure to persist in college. According to Kuh et al (2007) these externalities might include: economic forces, globalism, state policy, demographics, accountability, and federal policy. However, when considering how to integrate such items into the I-E-O model, such externalities may, indeed, be indirectly included in student-level variables (e.g., parental education, socio-economic status, family income). Therefore, when reviewing potential non-academic reasons for failing to become engaged in college, there are two sources:

- (1) The college environment (including college programming) fails to foster an environment where students become engaged (i.e., the *environment* fails to foster engagement; Kuh's "two-sided" definition is not accomplished); or
- (2) Not all pre-college attributes or externalities that predict a student's propensity to be engaged in college were included (i.e., important *input* characteristics of the students are not being taken into account or they arise from outside the environment).

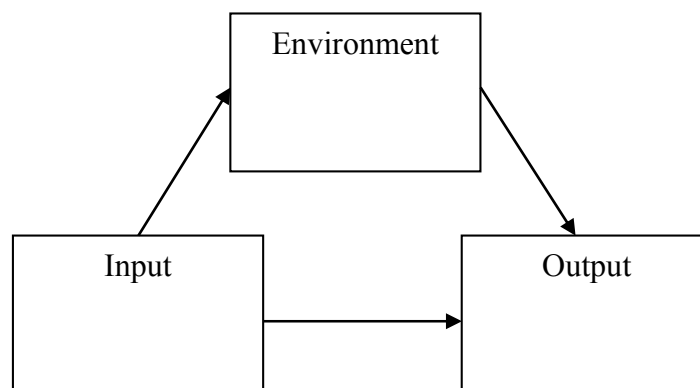


Figure 1.4: Astin's Input-Environment-Output Model. Adapted from Astin (1993).

As noted earlier, the effect of the college environment on student engagement is the common focus of research to date, especially on smaller programs or populations. Thus the first source has been over-studied while the second is understudied. However, reviews of campus-specific programming lack the sample randomization required for a true experimental research design and potential errors due to self-selection are ever-present. Colleges set admission standards according to their mission, enrollment goals, and desired academic profile (Pascarella & Terenzini, 1991); therefore, the collegiate population at any college is, by definition, a non-random and self-selected population. Students select colleges for their own personal reasons, ranging from cost, to location, to prestige; colleges and students therefore introduce significant bias to any single-institution study. Moreover, when colleges develop intervention programs which focus on promoting college engagement, logistical and ethical limitations restrict the design of any research to quasi-experimental designs at best. These limitations make any generalizations based on the studies questionable.

As a result of these limitations, colleges may be claiming success in promoting engagement when, instead, the student population they enroll has been pre-selected with a predisposition to be engaged at that college. Somewhat in support of this assessment, Titus (2004) found that only size and selectivity influenced persistence, and he surmised that differences in student characteristics may be more critical than differences in institutions. Hu and Kuh (2002) identified a “lacuna” in the research in understanding the relationship between institutional and student characteristics. Recently, Pike, Hansen and Lin (2010) used instrumental variables to control for self-selection at one institution’s first-year learning communities. Though far from definitive, they determined that the

effects of the program were not statistically significant when controlling for self-selection. Based on the research to date, the colleges' ability to foster engagement nationally remains questionable. Therefore, additional review of the other contributing factors to engagement to what the students bring with them to campus or—as Astin would phrase it—the inputs—is necessary.

### **Expanding Engagement Beyond the College**

In his framework, Kuh et al (2007) included some “pre-college” characteristics that may prove beneficial to college success, but his focus remained in line with Astin’s I-E-O model: as a product of the actions between the college environment and the student while enrolled there. Kuh offered limited insight into the effects of what the student brings with him or her to college; however, as noted above, a student may develop behaviors and expectations that have, as yet, gone unidentified in the study of engagement. In particular, students may already know how to become educationally engaged or have developed expectations to be engaged before entering college, and these traits may contribute to college engagement behavior, thus shifting the primary source of engagement from the environment (campus) to the input (student characteristics) in the I-E-O model. Institutions may be responsible for student engagement, but not in the manner that Kuh and Astin suggest; whom an institution admits and the expectations they promote in these students may have just as much to do with promoting engagement than how the two interact once the student enrolls.

Though studies on engagement often account for socio-economic, demographic and academic performance in their studies, they rarely account for these non-academic *behaviors* and *expectations* of students. To address this, Astin’s I-E-O model can be

expanded to include previous environments when the output from the first environment (in this case, high school) becomes the input for the next environment (see Figure 1.5). As an example of these limitations, the 2013 NSSE collected limited background information—predominantly demographic, prior academic, and military status. In comparison, CIRP’s 2013 FYCY directly collected less demographic and prior academic information. Though this data may be matched against other institutional or other survey data sets (for example, BCSSE or CIRP’s The Freshman Survey), few, if any, robust studies have done so with more expansive pre-college characteristics across multiple institutions. Studies have generally examined single-institution or small groups of institutional data when looking at the impact of pre-college characteristics on engagement. Researchers should not generalize about all colleges’ ability to promote success based upon institutional-specific research; however, this is precisely what seems to be happening.

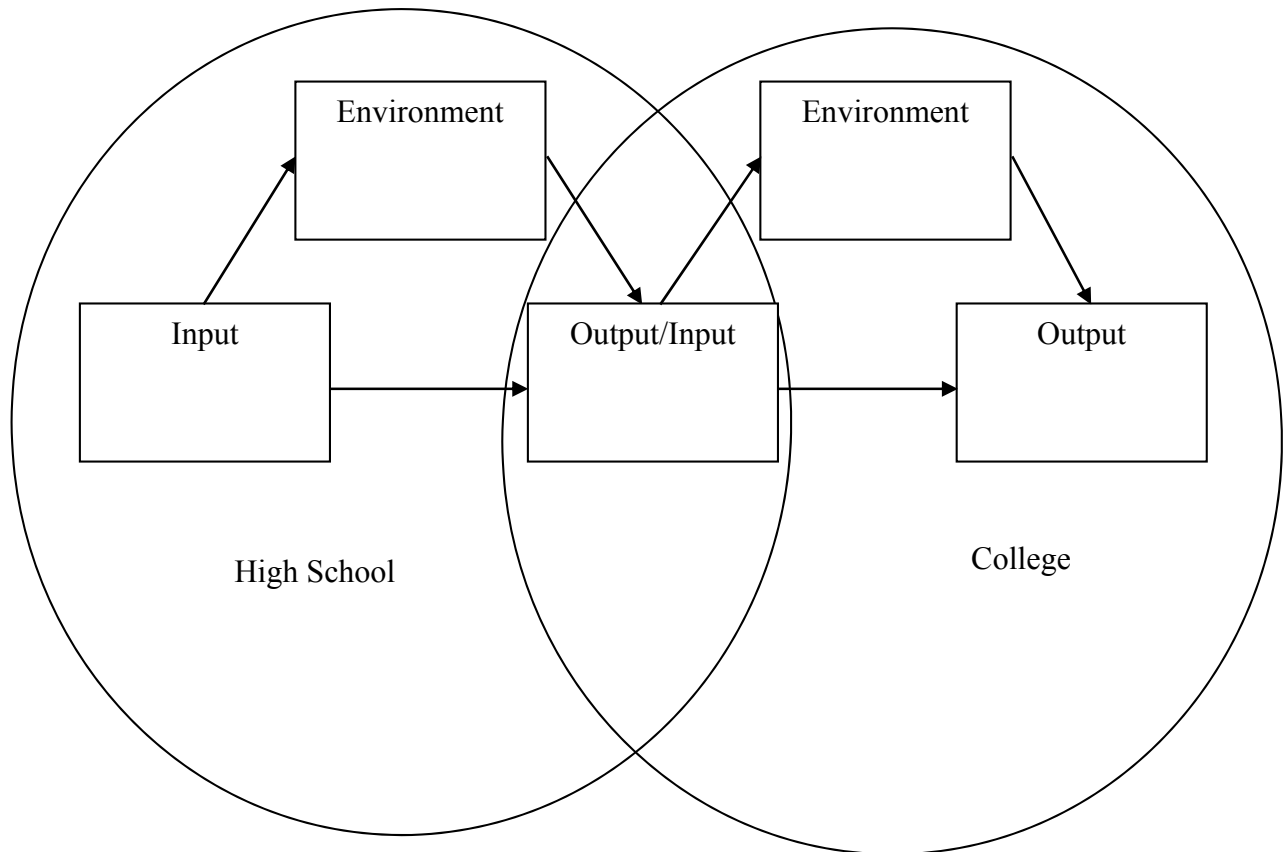


Figure 1.5: Expanded Model of Astin's Input-Environment-Output Model to Span High School and College Contexts

The lack of increased levels of engagement, persistence, and graduation; the admissions practices that may screen out students who have not demonstrated engagement; and the lack of adequate studies that account for self-selection, all support further investigation into the nature and impact of a student's predisposition towards engagement behavior. Hence, the crux of the issue remains: Is college engagement a function of the student's predispositions and pre-college interactions with other educational environments or with those of the college?

### **The Example of Engagement at the Private College**

Despite there being little demonstrated improvement in engagement levels or first year persistence across the U.S. higher educational landscape, some studies have

concluded that certain types of colleges foster higher levels of engagement. This distinction proves a good case study to explore in light of the prior discussion. When looking at engagement, several studies have highlighted the higher levels of engagement found at private colleges (or baccalaureate art & science colleges according to Carnegie classifications--a category that has high representation of private colleges) than those at public institutions (Kuh & Hu, 2001; Kuh, Kinzie, et al., 2005; National Survey of Student Engagement, 2010a).

This advantage is often attributed to smaller campus sizes, lower student-faculty ratios, more personalized advising, higher percentages of students living on-campus and specialized programming; however, when looking at input, the admissions practices at private colleges are more likely than their public counterparts to place greater amounts of “considerable importance” on essays, teacher and counselor recommendations, demonstrated interest and interviews in the admission decisions. Public colleges, in contrast, are more likely to place greater weight on grades in college prep courses, strength of curriculum (in high school), admission test scores, grades in all courses, class rank, and state graduation exam scores (Clinedinst & Hawkins, 2010).

Private colleges, then, are more likely than their public counterparts to select students based on a broader range of pre-college non-academic behaviors, effectively screening applicants for prior engagement behavior. Strong letters of recommendation may indicate higher levels of teacher-student interaction because, presumably, a teacher would have to have more than a casual relationship with a student to write a strong letter. Co-curricular activities listed on an application or highlighted in a statement of purpose would again qualify as exhibiting greater engagement in the high school experience.

Finally, students applying to small privates may also have developed a more realistic expectation for college given that they would presumably be more invested in the application process as well as the beneficiary of a potentially more personalized recruitment process. While deterring some students (thus acting as another filter to the student population), the significant cost of tuition at private colleges may prove an indicator of commitment and expected engagement by students. The greater personal investment may give students more impetus to stay engaged and complete their degree and thus realize the rewards of their investment.

In short, the application requirements and tuition levels of privates may screen for and encourage levels of engagement prior to admission as well as impart a more accurate set of expectations for the college experience. Without controlling for pre-college engagement or a student's expectations for being engaged, studies of engagement in college may be severely flawed and overestimate the contribution of private colleges to the engagement of their students.

### **The Need for a More Comprehensive Model of Student Engagement**

As noted earlier, most models and instruments of college engagement have limited precollege "input" characteristics to include academic (e.g., high school grade point average, SAT or ACT scores) or demographic (e.g., ethnicity, distance from college), or socio-economic (e.g., parental income or education levels) indicators. No significant study has expanded these characteristics to include engagement behaviors and expectations prior to enrolling. Clearly, some colleges are perceived as offering a more "engaging" experience, but students attracted to these colleges may simply be more predisposed to being engaged. This "predisposition" has not been accounted for directly.

Moreover, some admissions practices may select students predisposed to being engaged, and this may explain some elevated engagement behaviors seen on some college campuses. Therefore, this research will focus on developing and testing a model of first-year engagement which incorporates measures of pre-college engagement as well as expectations for college engagement using the national datasets of the NSSE and BCSSE. Such a study has yet to be accomplished across national data sets using appropriate methods. Before discussing the model and the methods to be used, a discussion of definitions on which to base the study is necessary.

### **Definitions**

#### **Student.**

Like Astin (1993) and Tinto (1993), this study limited the discussion to full-time, traditional-aged students who had not previously enrolled in college. As a consequence, the findings of this study are more easily compared with those of prior studies of engagement. Similarly, Astin (1993) restricted his study sample based on the following reasons: (1) non-traditional students confront different issues and problems than their traditional counterparts, and (2) they face different environmental issues which result in differences in engagement. His assumptions were in line with the findings of Bean and Metzner (1985) who concluded that traditional models of attrition are not applicable to non-traditional students. Therefore, Astin (1993) asserted that

By combining the two groups, we run a serious risk of confounding these different effects, thus yielding a clouded picture of the actual environmental effects on student development. In other words, it is far better to obtain clear-cut findings on an important and well-defined population (the full-time undergraduate

of traditional college age) than a watered-down set of conclusions based on a much more heterogeneous sample. (p. xviii).

In a similar fashion, transfer students were also excluded from this study because their previous experience at a college may introduce additional variables not experienced by full-time beginners particularly engagement behaviors (e.g., familiarity with a college environment). Moreover, the services available to these types of students (e.g., transfer orientation, first-year programming, on-campus child care) may also alter the success rates of the college experience. Similar to non-traditional students, a student who transfers from campus to campus may introduce new interactions with additional environments or behaviors that add uncertainties that go beyond the immediate goals of the study at hand.

It is important to acknowledge that part-time, transfer, and non-traditional students are not insignificant portions of the college-going population; however, this study examined the most uniform pipeline to college, and the one that receives, rightly or wrongly, the most attention by policy makers, university administrators, journalists and the general public. Therefore, when this study refers to a *student*, it refers to students who have made the transition from high school to college within the “traditional” timeframe, i.e. initially enrolling full time at a 4-year college in the fall term immediately following high school graduation. Though these other student populations were excluded from the current study, other studies should seek to better understand them.

### **High school.**

According to the NCES (2011, April 2010), 42,518 schools (30,648 public and 11,870 private) educated students at the secondary level. These institutions go by various

names, such as high school, academy, senior high school, and in some cases, colleges or university high schools. This study used the term *high school* to include these various educational experiences that students are typically expected to complete at the secondary level, which typically represents the culmination of twelve years of primary and secondary education and ends with a diploma. High school also included those students who do not attend a physical school but who were instead homeschooled.

### **College.**

With over 4,000 institutions of higher education in the United States, students have a broad spectrum of options for education after high school. These institutions can use a variety of names (e.g., college, school, university, or institute). This study used the generic term of *college* to reference those non-profit public or private institutions which offer a 4-year bachelor's degree program. This study excluded for-profit institutions, not in an attempt to dismiss them as illegitimate institutions, but as an acknowledgement that students who attend for-profits may have goals and needs other than a bachelor's degree. Also, as a relatively new and expanding sector being studied in higher education, the programs of for-profits may not be adequately understood at this point in time to provide meaningful results at this time. Finally, due to the recent inquiries of the federal government, it is possible that the recruiting and financial aid practices of proprietary institutions may differ greatly from those of non-profit colleges, which would obscure conclusions about other students.

### **Engagement.**

This study focused on engagement as defined by NSSE, and particularly those behaviors exhibited during high school (as reported on the BCSSE) as represented by the

five NSSE benchmarks in the first year of college and similar behaviors in high school as measured on the BCSSE. NSSE calculates scores on the following benchmark scales:

- **Level of Academic Challenge:** Index that measures time spent preparing for class, amount of reading and writing, deep learning, and institutional expectations for academic performance.
- **Active and Collaborative Learning:** Index that measures extent of class participation, working collaboratively with other students inside and outside of class, tutoring and involvement with a community-based project.
- **Student-Faculty Interaction:** Index that measures extent of talking with faculty members and advisors, discussing ideas from classes with faculty members outside of class, getting prompt feedback on academic performance, and working with faculty on research projects.
- **Enriching Educational Experiences:** Index that measures extent of interaction with students of different racial or ethnic backgrounds or with different political opinions or values, using electronic technology, and participating in activities such as internships, community service, study abroad, co-curricular activities, and culminating senior experience.
- **Supportive Campus Environment:** Index that measures extent to which students perceive the campus helps them succeed academically and socially, assists them in coping with non-academic responsibilities, and promotes supportive relations among students and their peers, faculty

members, and administrative personnel and offices. (Beginning College Survey of Student Engagement, 2008a, p. 31)

While the BCSSE does not have similar benchmarks for engagement in high school or expectations for college engagement, this study did focus on similar behaviors and expectations to those included in the NSSE benchmark. A more in-depth discussion of these variables is found in Chapter 3.

### **Guiding Research Questions**

Through the use of BCSSE and NSSE data, this study examined the role of a student's high school engagement as well as the expectations he or she has for college engagement on the levels of his or her actual college engagement at the end of the freshman year. Using multi-level modeling, the relationships of these variables on the five NSSE benchmarks were explored while comparing them to other, more traditional indicators of positive engagement. The following questions guided the research:

1. To what extent are student-level characteristics, including high school engagement and expectations for college engagement, related to students' college engagement?
2. To what extent are institutional characteristics related to institutions' college engagement means after controlling for student characteristics and high school engagement and expectations for college engagement?
3. To what extent do institutional characteristics influence the relationship between student-level characteristics, including high school engagement and expectations for college engagement, and college engagement?

By addressing these questions, this study expanded the research surrounding college engagement and provided a better understanding of the development of engagement behavior across both the high school and college contexts. Moreover, these questions will provide clarity as to the source of student engagement: the student or the college.

### *Significance of the Study*

There is increasing interest in generating more college graduates while, at the same time, gaining efficiencies and lowering the costs of doing so. As a result, a significant emphasis has been placed on enhancing student engagement on college campuses and understanding the factors that contribute to increasing college engagement. To date, the emphasis of research and practice has been on environmental/college attributes and actions, while pre-college attributes have predominantly focused on academic, demographic and socioeconomic factors. However, despite current research and practice, national engagement, retention and graduation benchmarks have changed little, if at all, over the past decade, and one should question if all factors that contribute to college engagement have been identified and understood and more concerning still, that the current research is almost exclusively focused on college characteristics and their programs.

By focusing on high school engagement as well as a student's expectations for college engagement, this study fills a gap in the research. This study has meaning for multiple audiences: the student, the high school, the college, and the policy maker. College advisors and faculty can better understand the challenges that students face when entering college and better respond to student needs earlier—even prior to enrollment;

college administrators and faculty can better develop efficient and effective programming to support student engagement and become better stewards of resources by offering more targeted and effective programming; policy makers can have a more holistic understanding of the roots of college success; high school counselors and teachers gain insight into the effect of their non-academic work on a student's behavior in college; college enrollment managers can increase access and return-on-investment by identifying those students who will likely become engaged on their campus as well as provide more targeted and effective alternatives for those who will not; students can better understand what non-academic activities will best compliment their academic preparation and support an engaged college experience as well as see the value in developing realistic expectations to be engaged in the college experience.

In summation, though college engagement is a desirable outcome, accomplishing an increased level of engagement remains elusive. **Determining where the “true levers” to improving engagement is ever more important as we move to incorporate more students into college-going population.** Given that most research on engagement has focused on the college's role in promoting engagement, it behooves researchers to step back and examine the models of college engagement more completely to better understand what contributes to increased levels of engagement. By focusing too narrowly on the college environment, important contributing factors may be missed. After all, as Kuh (2006) noted, students are not blank slates when they enroll on a college campus.

## **Chapter Two: Review of Literature**

This study explores the relationships between prior engagement and expectations on college engagement. Too little is known about the extent to which college engagement is attributable to the college environment or to a predisposition on the student's part. This chapter will review the place of these variables within the framework of Tinto's Interactionalist Model of Student Departure, Bean's Longitudinal Model of the Type of Factors that Affect Retention Decisions, Astin's Theory of Involvement, and his Input-Environment-Outcomes (I-E-O) model. Next, a revised model of engagement that incorporates variables for high school engagement and expected college engagement is proposed. Because of the dearth of research regarding prior engagement and expectations' effect on college engagement, this chapter includes reviews of studies that examined the effects of other variables such as gender or socio-economic status or high school curriculum on high school or college level engagement. These studies provide sufficient warrant for their inclusion in the proposed model to examine the effects of high school experiences on college engagement. Finally, the chapter concludes with a warrant for testing the newly proposed model to better understand the relationships between these variables.

### **Conceptual Frameworks: Tinto, Bean, and Astin**

As was noted in the previous chapter, this study used Tinto's (1993) Interactionalist Model of Student Departure as a primary theoretical framework. Also of note is Bean's (1980, 1990) Longitudinal Model of the Type of Factors that Affect Retention Decisions (see Figure 2.1). Like Tinto, Bean also incorporates student expectations and perceptions of their college experience. Both Bean's and Tinto's models

assert that if students' expectations are not fulfilled, students are likely to depart college. Bean and Tinto also expand pre-college characteristics beyond more academic preparation; of most importance are the students' "goal and institutional commitment," i.e., their perceptions and expectations regarding a college experience. A student's individual pre-college attributes and dispositions "help establish the initial conditions for subsequent interactions between the individual and other members of the institution" (Tinto, 1993, p. 115). Tinto used the terms "adjustment," "difficulty," "incongruence," and "isolation"—terms indicative of a bi-directional relationship (or lack thereof) between student and college—to describe this relationship between perceptions, expectations, and realized experience. A student's decision to leave is rooted in either dispositions prior to college, their interactions with college, or influences external to college. In these models, student actively contribute to, and do not simply receive, the college experience. They bring expectations as well as personal characteristics.

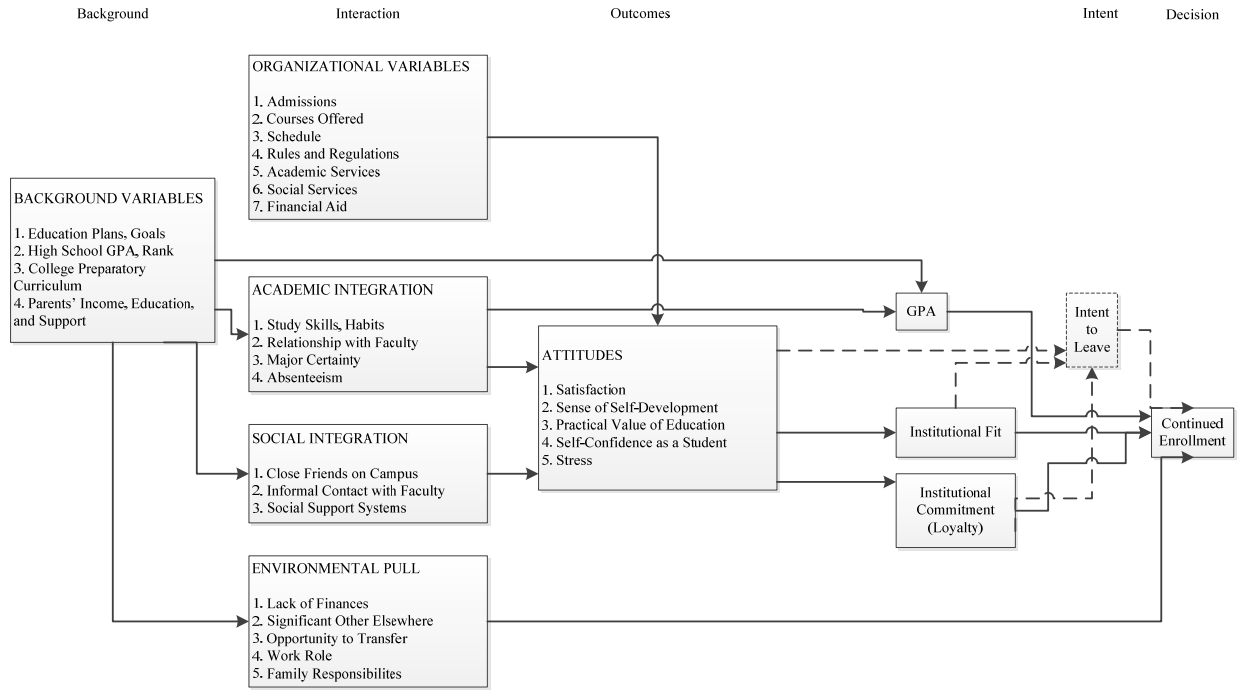


Figure 2.1: Bean’s Longitudinal Model of the Type of Factors That Affect Retention Decisions. Adapted from Bean (1990).

**Astin’s Theory of Involvement and I-E-O model.**

Also noted in the prior chapter, Astin’s (1984) Theory of Involvement focuses on a student’s behavior in college, the college’s behavior towards the student, and their relationship with the student’s success there. Two of its five postulates emphasize the college’s role in fostering desirable actions from the student. First, student learning and personal development are tied to his or her amount of involvement in a college program; second, success of educational policy is related to the ability of this policy to increase student involvement. Though Astin (1975) in his earlier formulation of the theory noted that a student’s “fit” (matching students’ expected experience with those the college will actually deliver) to the institution may be critical to a student’s persistence, his latter research and theory deemphasized this concept.

Flowing out of these postulates was Astin's (1993) "Input-Environment-Outcomes" (I-E-O) model as a framework for assessing a college's effect on student learning and beliefs (see Figure 1.4). Again, the focus is on the effect that the college environment has on the student, with the institution's (not the student's) behavior or characteristics as the environment while the "outcomes" are the behaviors and perceptions of the student: in gains of knowledge, changes in beliefs or values, or in future behavior (e.g., career advancement, persistence rates, levels of engagement, graduation rates). For their part, students contribute static personal background traits (i.e., the "inputs") but in general, neither prior behavioral patterns (such as engagement in high school) nor expectations for behavior are included as inputs.

There are limitations to this model. Perhaps Astin (1993) himself expressed it best when he referred to students as "fully functioning organisms" that are "enhanced" by colleges (p. 17) thus leaving room for their own participation in their development. Moreover, neither Astin's Theory of Involvement nor his I-E-O Model adequately address the natural maturation of students that may happen parallel to the college experience, a problem identified by Feldman and Newcomb (1969). Around the same time, Trent and Medsker's (1968) study of high school graduates also indicated students who did not attend college may have gains equal to those who attended college. However, contrary to these studies, the I-E-O model largely assigns a passive role to the student; the student becomes a test subject on which a treatment is performed.

**Student expectations and perceptions: Tinto's Interactionalist Model of Student Departure and Bean's Longitudinal Model of the Type of Factors that Affect Retention Decisions.**

The models of both Bean and Tinto have been discussed earlier, but it is important to note that, unlike Astin's I-E-O model, these models include student expectations (or in the case of Bean, "education plans, goals") as a factor in becoming engaged on campus. These expectations have a two-fold effect on college engagement. First, they serve as a set of guidelines that students have in determining what kind of college experiences they will or will not get involved in, but secondarily, they become a "contract" of sorts that they expect a college will fulfill once they enroll. In this way, both the students and the colleges play a part in developing and realizing these expectations, and it is the former attribute of expectations that is of most interest to this study since it is these expectations which will impact the first year of engagement.

**Important variations on Astin, Bean, and Tinto.**

Attempts have been made to (1) integrate the models of Bean, Tinto and Astin and (2) expand them to include high school engagement and expected college engagement. In building upon an earlier study (Milem & Berger, 1997), Berger and Milem (1999) tested Astin's theory along with elements of Tinto's model to demonstrate that behavior and perceptions of students shift over the first year. Moreover, they incorporated initial institutional commitment alongside academic preparation, socio-economic status and demographic traits. The voluminous work of George Kuh has also provided significant insights regarding engagement and acknowledges the value of pre-college experiences and expectations. As Kuh (2006) succinctly noted, "Of course,

students do not come to college tabula rasa. Rather, they are shaped by many years of complex interactions with their family of origin and cultural, social, political, and educational environments.” (p. 3) In 2005, he and associates proposed and tested a model that looked at the direct and indirect impacts of expectations on educational gains in college (see Figure 2.2). They found that expectations for performance mostly influenced educational gains indirectly through their relationships with college engagement behaviors, thus demonstrating a relationship between expectations and engagement behaviors.

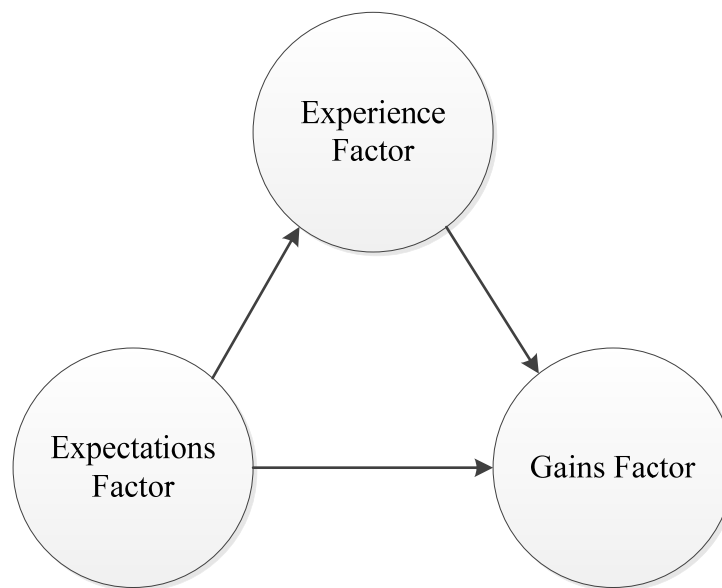


Figure 2.2: Kuh et al’s Conceptual Model for Testing Relationships Among Expectations, Experiences, and Self-Reported Gains in the First Year of College. Adapted from Kuh, Gonyea, and Williams (2005).

In 2007, Kuh et al noted that the variables included in prior studies fell into five categories:

- 1) student background characteristics including demographics and pre-college academic and other experiences, (2) structural characteristics of institutions such

as mission, size, and selectivity, (3) interactions with faculty and staff members and peers, (4) student perceptions of the learning environment, and (5) the quality of effort students devote to educationally purposeful activities. (Kuh et al., 2008, p. 541)

They then proposed a more comprehensive framework of student success (see Figure 2.3) that places college engagement within the broader context of student pre-college characteristics, external forces, student college behaviors, and institutional characteristics. This framework is more comprehensive than those previously proposed, acknowledges a more open system than that of Astin and incorporates elements of social as well as academic integration. Still, this framework does not explicitly include measures for engagement prior to college which may be a critical flaw in the model.

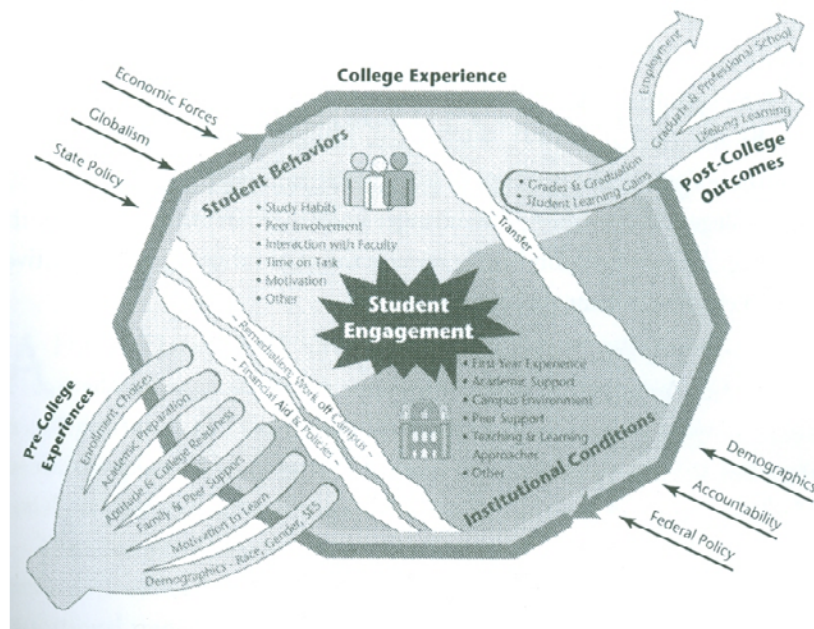


Figure 2.3: Kuh's Framework for Student Success. Adapted from Kuh, Kinzie, Buckley, et al. (2007).

More recently, Cole et al (2009) and Cole and Kinzie (2007) built upon the I-E-O model and incorporated high school engagement into the model as an outcome of the high school environment and the personal characteristics of the student. High school engagement then became an input that then interacted with the college environment to produce college engagement. These explorations and evolutions of the I-E-O model have demonstrated the need for an expanded model of fostering engagement. While they tend to note the value of what a student brings to college, none adequately incorporates engagement behavior and expectations and no comprehensive testing of this been conducted. Therefore, exploring such an expanded model is appropriate.

### **An Expanded Model of First-Year Engagement**

Given the research to date, too little is known about the extent to which college engagement is primarily a function of a student's predisposition to be engaged—which would be evident in high school—and the extent to which college engagement is the result of the college environment. Therefore, a comprehensive model of college engagement should incorporate previous student behavior (high school engagement) and perceptions of their future potential college experience (expected college engagement) while controlling for college environmental factors and personal characteristics. As a result, this study proposes an expanded model of college engagement (see Figure 2.4) which incorporates the following variables:

- (1) Socio-economic and demographic variables (e.g., sex, ethnicity, socio-economic status, parental education) [Tinto's "Family Background"];
- (2) High school academic preparation variables (e.g., high school GPA, SAT or ACT scores, academic intensity) [Tinto's "Skills and Abilities"];

- (3) High school engagement variables (e.g., student-faculty interaction, participation in co-curricular activities) [Tinto's "Prior Schooling"];
- (4) Expected college engagement variables (e.g., expectations for student-faculty interaction, expectations for participation in co-curricular activities) [Tinto's "Goal and Institutional Commitments" and "Intentions"];
- (5) High school characteristics (e.g., control, resource level) [Tinto's "Prior Schooling"];
- (6) College characteristics (e.g., Carnegie classification, control, selectivity, size, residential nature) [Astin's "Environment"].

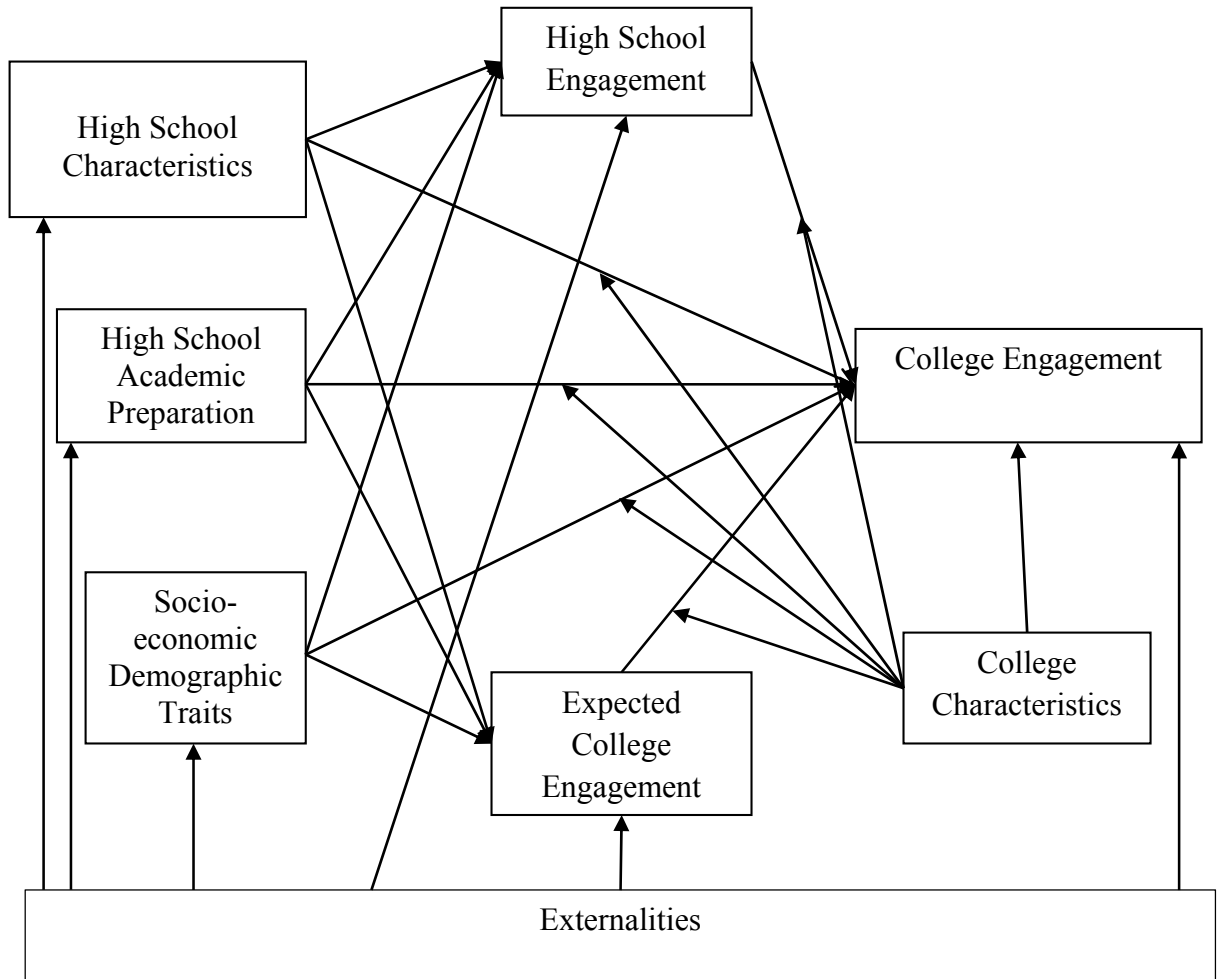


Figure 2.4: Theoretical Model of Postsecondary Engagement Incorporating Secondary Engagement and Expectations for Postsecondary Engagement.

There are several strengths to this model. Derived from Astin's I-E-O concept, it accounts for the outcomes of one environment (the high school) which feed as inputs into the second environment (the college). In this way the I-E-O is tested across multiple contexts as was suggested in Chapter 1. The proposed model also incorporates both the influence of behaviors (levels of high school engagement) as well as perceptions (levels of expected college engagement) on college engagement important to Tinto and Bean. In

agreement with Kuh et al (2005; 2007), it accounts for both the direct and indirect impact these variables have on college engagement, as well as college characteristics and pre-college SES, demographic, academic preparation and expectation variables. It also provides greater clarity regarding the source of college engagement: the college environment or pre-existing predisposition towards engagement as a result of a student's previous environment, thus providing some measure of whether engagement is a function of the student or to the college. Moreover, by using the BCSSE and NSSE datasets, the guiding questions outlined in Chapter 1 can be tested across a national sample which will be covered in more detail in Chapter 3.

### **A Review of Variables**

#### **Engagement as a valued outcome and dependent variable.**

As was noted in Chapter 1, the concept of “engagement” or “involvement” as a desirable outcome of the college experience is not new. Higher levels of involvement/engagement have demonstrated positive effects on student persistence, graduation, and gains in learning outcomes from college (Astin, 1977, 1993; Bean, 1980, 1990; K. A. Feldman & Newcomb, 1969; Kuh et al., 2008; Kuh et al., 2000; Kuh et al., 1997; Pace, 1990; Pascarella & Terenzini, 1991; Pike, 2013; Tinto, 1993). However, as was also noted in Chapter 1, there has yet to be seen a significant increase in the overall levels of college engagement over time (Koljatic & Kuh, 2001; Kuh & Vesper, 1997) and large numbers of college students remain disengaged (Kuh et al., 2000). Therefore, the interest in college engagement as a dependent variable is not unique, nor has research been sufficient in determining its contributors. This study will use the NSSE benchmarks as specific dependent variables. These forms of engagement have been shown to have

positive effects on gains in retention, graduation rates, and learning outcomes (Astin, 1993; Bean & Metzner, 1985; Chickering & Gamson, 1987; Cruce, Wolniak, Seifert, & Pascarella, 2005, November; K. A. Feldman & Newcomb, 1969; Kuh et al., 2008; Kuh & Hu, 2001; Pascarella et al., 2006; Pascarella & Terenzini, 1977, 1991, 2005; Pascarella, Wolniak, Cruce, & Blaich, 2004; Pike, 2013).

### **Independent variables.**

#### ***Tinto's Prior Schooling***

##### *High school control.*

There is a wealth of research that account for the impact of high school attributes on retention and graduation. Previous research on engagement, however, rarely includes these variables directly. High school control matters to these college outcomes. Private high schools are more likely to offer advanced level coursework, offer greater number of co-curricular activities, smaller class sizes, more proactive college counseling, and high college attendance rates (Avery, Fairbanks, & Zeckhauser, 2003; Clinedinst & Hawkins, 2010; Espenshade & Radford, 2009; McDonough, 1997). Students at private schools also demonstrate higher standardized test scores (The College Board, 2011b), possibly gain an advantage in admission to more selective colleges, and participate in a “college-going” culture (Cookson & Persell, 1985; Hernandez, 1997; Mayher, 1998; McDonough, 1997; Toor, 2001). These benefits, while not having a directly demonstrated link to engagement, have sufficient warrant for inclusion based on the benefits they have for other indicators of success.

*High school engagement.*

Though understudied, recent research indicates the value of high school engagement in models of college engagement. Student behaviors like engagement remain relatively consistent across both the high school and college environments (Astin & Lee, 2003; Dong & Cole, 2011). Cole and Qi (2011) found relationships between high school academic engagement on the BCSSE with levels of similar college engagement on the NSSE. Dong and Cole (2011) found that SAT scores have little significance when controlling for high school engagement and college environmental variables. Academic underachievers have lower high school engagement but higher expectations for college engagement (Cole & Gonyea, 2008). Interactions with teachers shape the expectations students have for the college experience not simply about whether or not to attend college, but also what to expect from that experience (Bell, Rowan-Kenyon, & Perna, 2009). Incongruence between these expectations and the experience realized is a reason for departure (Bean, 1980, 1990; Braxton, Vesper, & Hossler, 1995; Smith & Werlieb, 2005; Tinto, 1993). Test scores were found to have a significant but small relationship to college engagement when levels of high school engagement are taken into consideration (Dong & Cole, 2011). While far from conclusive, these studies suggest that the importance of high school engagement to the study of college engagement is far from complete and warrants further examination.

*High school academic engagement*

An important aspect of high school engagement involves relationships with adults (Yazzie-Mintz, 2006). Being the predominant adult with whom most students interact in high school, high school faculty are critical to building expectations for the college experience, even more so than high school counselors (Bell et al., 2009; Venezia, Kirst,

& Antonio, 2003). However, access to teachers as a source of college knowledge is not uniform across all ethnicity or SES levels for many reasons outlined previously (Hossler, Schmidt, & Vesper, 1999; McDonough, 1997, January 2005). Expanding these behaviors to also include interaction with peers around course assignments and class interactions (e.g., working on assignments with peers or asking questions in class) will capture indicators of previous engagement with the behavior that may translate to similar behaviors in college. Also, given that a student's behavior is often consistent across environments (Astin & Lee, 2003; Dong & Cole, 2011), including high school academic engagement as an independent variable in the study's model is reasonable.

*High school co-curricular activities.*

Students who participate in high school co-curricular activities have higher expectations for college grades, persistence, and graduation (National Survey of Student Engagement, 2009b). Participation in co-curricular activities can enhance relationships with high school counselors, teachers and high school peers (Bell et al., 2009; Bowen, Chingos, & McPherson, 2009; Espenshade & Radford, 2009; Hossler et al., 1999). However, studies regarding the impact of high school co-curricular engagement on college engagement have proven inconclusive. Mouw and Khanna (1993) found that when combined with academic measures, extracurricular activities in high school added little to the explanatory value of their model. Their findings were supported by those of Kern, Fagley and Miller (1998) when looking at measures of motivation and HSGPA. In light of this and similar research, Nobel et al (1999) hypothesized that this lack of added value may be because academic preparation acts as a proxy for high school engagement. Kuh et al (2008) found that high school extracurricular activities has a significant, but

small, negative impact on first-year college grades and persistence. However, the results of these studies are not conclusive, and additional research has been called for.

***Tinto's Skills and Ability: High School Academic Preparation***

The relationship between high school academic preparation as measured by high school grade point average, test scores or curricular rigor and subsequent college success, including levels of college engagement, has been well studied (Adelman, 1999, 2006; Astin, 1993; Astin & Oseguera, 2005; Bean, 1980, 1990; Cragg, 2009; DeAngelo, Franke, Hurtado, Pryor, & Tran, 2011; DesJardins, McCall, Ahlburg, & Moye, 2002; Eimers & Pike, 1997; Hu & Kuh, 2002; Ishitani, 2006; Kim & Conrad, 2006; Kuh et al., 2008; A. Nora, Barlow, & Crisp, 2005; Pascarella & Terenzini, 1991; Pike, Hansen, & Childress, 2012; Pike & Saupe, 2002; Tinto, 1993). Most thoroughly studied has been the influence of HSGPA and standardized test scores and college GPA, persistence, graduation and college engagement (ACT, 2011; Hu & Kuh, 2002; Kuh et al., 2008; Murtaugh, Burns, & Schuster, 1999; Pike & Saupe, 2002; The College Board, 2011b). While oftentimes used as the predominant pre-college input variable in studies of college success, studies of engagement have not consistently supported that either HSGPA or test scores specifically promote college engagement. Hu (2010) found that SAT scores were negatively correlated to college engagement. When controlling for institutional commitment, Berger and Milem (1999) found that HSGPA had a negative correlation with faculty interaction and student non-involvement on campus, perhaps indicating that academic preparation is a poor indicator of college success. Other studies have found that the effect of HSGPA has a low effect (Mouw & Khanna, 1993) or non-significant effect

(A. Nora, Cabrera, Hagedorn, & Pascarella, 1996) when controlling for other pre-college variables.

Preliminary studies have also indicated that incorporating high school engagement and expected college engagement further impact the relationships of HSGPA and SAT on college engagement (Cole & Gonyea, 2008; Cole & Kinzie, 2007; Dong & Cole, 2011; Hu & Kuh, 2002). Cole and Gonyea (2008) found that students who overachieved in high school (when comparing their HSGPA to their standardized test scores) were more likely to have been more effectively engaged in both high school and to hold higher expectations for college activities, a finding that was in line with those of Cole and Kinzie (2007). These relationships are discussed later in this chapter.

Higher levels of curricular rigor in high school (e.g., Advanced Placement, International Baccalaureate, dual enrollment or honors courses) have been shown to be an important predictor of college success (Adelman, 1999, 2006; Arbona & Nora, 2007; Cabrera, Burkum, & La Nasa, 2005; DesJardins et al., 2002; Dougherty, Mellor, & Jian, 2006; Ishitani, 2006; Mattern, Shaw, & Xiong, 2009; A. Nora et al., 2005; Pike et al., 2012; Pike & Saupe, 2002). For a variety of reasons, more rigorous courses may foster not only academic preparation, but also greater student-faculty interaction because they tend to involve smaller class-sizes, more highly-trained teachers, academically talented peers.

***Tinto's Family Background: Sex, race/ethnicity, socio-economic status, and parental education.***

Most reviews of student engagement have included variables for sex, ethnicity, race, socioeconomic status (SES), and parental education (Astin, 1993; Bean, 1980, 1990;

Bowen et al., 2009; Espenshade & Radford, 2009; Kuh, Kinzie, Buckley, et al., 2007; Pascarella & Terenzini, 1991; Tinto, 1993). A student's family and larger social context can act as enablers or inhibitors to college involvement (e.g., through advice, developing expectations, supporting participation in co-curricular activities, demanding "work"--e.g., childcare or contribution to household income--, modeling interactions with high school teachers and staff) (Hossler et al., 1999; McDonough, 1997). In addition, the lack of availability of financial resources of first-generation and low-SES students may force them to substitute work in place of college engagement (Dungy, Rissmeyer, & Roberts, 2003).

Several studies have demonstrated that high school engagement, expected college engagement, and college engagement vary depending upon a student's sex (Cole & Gonyea, 2008; Cole & Kinzie, 2007; Hu, 2010; Hu & Kuh, 2002; The College Board, 2011b). The relationship between ethnicity and college engagement has also been much studied, and great attention has been given to the "achievement gap" that exists for Hispanic/Latino and African American students across standardized test scores, dropout rates, AP/honors high school course enrollment levels, college admission and attendance trends, as well as college performance and engagement (ACT, 2011; Astin & Oseguera, 2005; Berger & Braxton, 1998; Berger & Milem, 1999; Cabrera et al., 2005; Carey, 2005, January; Clinedinst & Hawkins, 2010; DeAngelo et al., 2011; Dougherty et al., 2006; Hu & Kuh, 2002; Ishitani, 2006; Kuh, Kinzie, Buckley, et al., 2007; Ladson-Billings, 2006; The College Board, 2011a, 2011b). Moreover, Hispanic/Latino and African American students are also more highly concentrated in low-resource schools, which as was noted previously, has a negative relationship with academic preparation, college attendance and

performance (Ladson-Billings, 2007; McDonough, January 2005). However, non-white students are more likely to be engaged in college (Kuh, Kinzie, Buckley, et al., 2007) and college engagement appears to have a compensatory effect to first-year college grades and persistence, i.e. countering the negative effects of low-income and non-white characteristics (Kuh et al., 2008).

Several studies have noted that students from higher SES levels have higher levels of high school academic preparation, private school attendance, “enhanced programming” opportunities, college participation, and college engagement (Adelman, 2006; Astin & Oseguera, 2005; Cabrera, Nora, & Castaneda, 1992; DesJardins et al., 2002; Dougherty et al., 2006; Espenshade & Radford, 2009; Hu & St. John, 2001; Ishitani, 2006; The College Board, 2011a, 2011b). Students from low SES families often shoulder a greater proportion of college costs, forcing them to devote greater time to working—often at the cost of engaging college behaviors. This may be exacerbated by their tendency to be averse to taking out loans to support their college costs as well as being an indication that they are at a disadvantage to tapping other financial sources because of the lack of social capital and knowledge on how to do so. Since the high costs and loans typically associated with private colleges may be more of a deterrent to low-income students, financial resources may also play into what type of college is attended, (Bell et al., 2009; Espenshade & Radford, 2009; Hossler et al., 1999). Parental education has also been shown to be related to high school academic performance, college attendance, high school engagement, expected college engagement, and college engagement as well as receiving better college counseling (Arbona & Nora, 2007; Astin & Oseguera, 2005; Braxton, Hirschy, & McClendon, 2004; Cole et al., 2009; DeAngelo

et al., 2011; Gonyea, Kuh, Kinzie, Cruce, & Nelson Laird, 2006; Hu & Kuh, 2002; Ishitani, 2006; Johnson, Rochkind, Ott, & DuPont, 2010; Kim & Conrad, 2006; Kuh, Gonyea, et al., 2005; Pike et al., 2012; Stratton, O'Toole, & Wetzel, 2007; The College Board, 2011b). Also, family income and parental education may mitigate the effects of ethnicity as well as influence college engagement (Murtaugh et al., 1999; Pike et al., 2012). Being a first generation student also decreases the likelihood of student-faculty interaction in the first year of college (Pike, Kuh, McCormick, Ethington, & Smart, 2011).

***Tinto's intentions and goal and institutional commitments: Expected college engagement.***

The models of Bean (1980, 1990) and Tinto (1993), along with the variation of Braxton et al (1995), emphasize the importance of a student's perceptions of a college in establishing institutional commitment and the benefit of its matching the reality that is experienced. Astin (1993) found that those students who expected to participate in some activities while in college were more likely than others to have participated in those actions.

In agreement with Tinto and Bean, several studies indicate that accurate expectations for college engagement lead to better indicators of student success (Braxton et al., 1995; Hu & Kuh, 2002; Kuh, Gonyea, et al., 2005; Smith & Werlieb, 2005), but until recently, research regarding the effects of expected college engagement was limited (Kuh, 1999), yet Feldman (1981) noted early on that expectations often shape future activities. The benefits of expectations are two-fold (Kuh, Gonyea, et al., 2005; Olsen et al., November, 1998). First, expectations serve as a filter to activities; if one doesn't

expect to participate in an activity, these activities are likely to be overlooked or dismissed. Second, expectations may act as an inhibitor or catalyst to other behavior. If a student expects to participate in an activity, they are more likely to do it or even be aware it exists; and if he or she is not expecting to participate in an activity, he or she is less likely to do it. Therefore, fostering the expectations for beneficial activities is critical to positive engagement.

In a study using CSXQ and the College Student Experiences Questionnaire (CSEQ) data, Kuh, Gonyea and Williams (2005) found that ability, aspirations, motivation and orientation towards college “have more influence on college expectations than other student background characteristics” included in the study (p. 58), giving solid reason to incorporate expectations as an independent variable. The authors found strong relationships between a student’s expectations and the experiences those students pursued in college which in turn had a strong relationship to gains made in learning during the first year of college. It is less clear as to how these expectations are developed (Kuh, Gonyea, et al., 2005), but it is likely that some elements of engagement in high school through interaction with teachers and peers or participation in co-curricular activities play a part in crafting a student’s expectations for college.

A relationship between high school engagement and college expectations also exists, though the nature of this relationship is disputed. Cole and Kinzie (2007) found a relationship between high school engagement and these expectations, with lower achieving students expecting to be more engaged in college. Though underachievers have lower levels of high school engagement, their expectations for academic difficulty is not different than those who overachieve in high school—an indication that high school

engagement may be necessary in developing reasonable expectations for college (Cole & Gonyea, 2008). Though not conclusive, the evidence so far has led some researchers to call for more thorough consideration of expectations of college engagement when working with new students to improve college success (Cole & Gonyea, 2008; Cole et al., 2009).

*The Environment: College characteristics.*

As was seen in Chapter 1, college engagement levels vary depending upon college classification (see Figures 1.2 and 1.3). This is not surprising, given that the primary research concerning college success has examined the college environment's impact on students and classification is a predominant means to differentiate colleges (Astin, 1993; Bean, 1980, 1990; K. A. Feldman & Newcomb, 1969; Pascarella & Terenzini, 1991; Tinto, 1993). There are many studies on institutional type, size and residential nature and their relationships with engagement (Kinzie, Schuh, & Kuh, November 2004; Kuh, Kinzie, Cruce, Shoup, & Gonyea, 2007; Kuh, Kinzie, et al., 2005; McCormick, Pike, Kuh, & Chen, 2009; Pike, Smart, Kuh, & Hayek, 2006; Titus, 2004). When examining engagement using multilevel modeling, Pike et al (2011) found that institutional characteristics accounted for 3% to 5% of the overall variance on the NSSE first-year benchmarks, thus indicating that the majority of variance is due to student-level characteristics. However, of the variance explained at the college level, the college characteristics included in this study accounted for only 4% to 23% of the variance. Therefore, not only is the college's relationship with college engagement low, the understanding of how college characteristics impact engagement is extremely low, likely less than 1.5 percent.

Despite these findings, significant attention and credit has been given to college characteristics in fostering college engagement. For example, four-year bachelor's degree-institutions typically exhibited higher levels of engagement than those at other institutional types (Kuh & Hu, 2001; National Survey of Student Engagement, 2010a). Liberal arts colleges, in particular, are frequently seen as having practices and programs that promote engagement and are considered "built to engage." (Kuh, 2005, p. 122) Finally, college characteristics also form a student's expectations through the college search and selection process (Ethington, 2000). Because of this interest in college characteristics as well as their inclusion in the models outlined, it was important to include a broad spectrum of college characteristics in this study.

*Carnegie classification and control.*

Control and Carnegie classification most likely exhibit indirect effects on engagement (Astin, 1993; Pascarella & Terenzini, 1991). This effect may be influenced by admissions and recruitment practices; private and highly selective colleges are more likely to incorporate letters of recommendation, essays, portfolios, co-curricular activities, and interviews than high school grades, rank or standardized tests thus screening for previous engagement-type behavior (Clinedinst & Hawkins, 2010; Pascarella & Terenzini, 1991). Both college engagement and expected college engagement differ between public and private colleges (Henry, Wills, & Nixon, 2003; Hu & Kuh, 2002; Kuh & Hu, 2001). Not only are private and liberal arts colleges built to engage, so are the students enrolling there. While some initial studies have found that liberal arts colleges foster engagement when controlling for expectations and high school engagement (Gonyea et al., 2006; Kuh, 2005; Kuh, Kinzie, et al., 2005), other studies

also indicate that institutional type is far less relevant when controlling for these same variables (Cole & Kinzie, 2007; Cole & Qi, 2011; Hu & Kuh, 2002; Kuh & Hu, 2001; Pike, 2013; Pike & Kuh, 2005; Pike et al., 2003) or not as integral as the high school environment (Dong & Cole, 2011).

Though admission standards intentionally select the populations that a college educates, institutional differences between classifications are significant. Resources allocated to student services clearly differ across college types. In 2010, the private bachelor's sector outspent all other sectors on student services, and all private sectors (bachelor's master's and research) outspent public sectors (master's and research) by double and, in some cases, almost triple; moreover, the private sectors outpaced publics in increasing funding for student services—despite the economic difficulties of 2008 (Desrochers & Wellman, 2011). While institutional spending is no guarantee of effective student support, it is a strong indicator of how much value an institution places on a particular initiative. Though limited in effect, institutional expenditures can positively impact college engagement—especially student-faculty interaction (Pike et al., 2011; Pike et al., 2006)

However, this support comes at a high sticker price. Despite the financial aid available at private colleges, the high tuition of privates may prove a deterrent to some populations from attending a private college, further exacerbating the selection bias potentially present in previous research of engagement based on institutional characteristics. While some colleges seem to foster high levels of engagement, they also select and attract students with previous engagement behaviors and fewer risk factors for non-engagement.

*Selectivity.*

Institutional selectivity is the most commonly cited measure of institutional quality (Bowen & Bok, 1998; Pascarella & Terenzini, 1991; Rumberger & Thomas, 1993; Thomas, 2003). *U.S. News & World Report* rankings of the top 50 colleges can be mostly explained by the average SAT scores of their freshman class (Kuh & Pascarella, September/October 2004; Pascarella et al., 2006), yet the links between selectivity, the implementation of good undergraduate practices, and student engagement are tenuous at best (Kuh & Hu, 2001). Though the effects of selectivity on learning activities and persistence have proven significant, they are small (Hu & Kuh, 2002; Kuh & Pascarella, September/October 2004; Pascarella et al., 2006; Titus, 2004, 2006); however, in a recent study, Pike (2013) found that of all the college traits included in his study, Barron's selectivity index had the strongest relationship with retention and graduation. In public discourse, institutional selectivity forms the foundation in the discussion of over- or under-matching, the concept that students often select colleges whose academic profiles are below their individual academic profile; under-matching has been proposed as a risk factor for students, particularly those from under-represented populations (Bowen et al., 2009). Because of the significance of the variable to previous studies as well as popular opinion, the study included Barron's selectivity index as an independent variable.

*Campus size, residence and demographics.*

In addition to institutional control, classification, and selectivity, several models and studies have included size and composition of enrollment and residential nature. Kuh and associates (2007) found that institutional size was inversely related to academic and social involvement, persistence, graduation rates and student-faculty interaction, a finding

that was in line with that of Kuh and Hu (2001). However, Titus (2004, 2006) found that the effects of size were insignificant or unrelated to outcomes when student-level variables and institutional expenditures are accounted for. College expectations are influenced by institutional size, with smaller institutions fostering higher expectations (Henry et al., 2003). Enrollment size may be more important in the formulation of expectations by students (Kuh, Kinzie, Buckley, et al., 2007); for example, a student going to a smaller campus may expect greater engagement with both faculty and peers. College student-faculty interaction, too, can be related to institutional size as well as living on campus (Pike et al., 2011). Living on campus may also increase persistence (Titus, 2006). To further explore the effects of enrollment on campus, the composition of the student body (e.g., the percentage of African Americans or the percentage of females enrolled) were also explored.

### **Conclusion: Filling the Research Gap**

In this chapter, the traditional models of college engagement were expanded to include measures of high school engagement and expected college engagement as inputs. Previous studies primarily focused on academic preparation, bio-demographic data, parental education, or some measure of socio-economic status as pre-college inputs. Recent research has begun to indicate that college engagement has relationships with a student's high school behaviors and perceptions of college, thus supporting additional research beyond academic performance and college programming. To date, no study has incorporated both high school engagement and expectations for college engagement as well as college characteristics and pre-college characteristics across a national sample. More problematic, the studies that have examined expected college engagement and high

school engagement have one or more of the following limitations: inadequate sample sizes, compromised methods, institutional singularity, or adaptation of instruments that were not necessarily meant to measure these specific elements.

Though Tinto, Bean, Astin and Kuh acknowledged that a student enters college with a mix of pre-college characteristics which either directly or indirectly influences their college engagement, most engagement studies have focused on the college's role in promoting engagement, and therefore they have not fully accounted for the student's previous engagement patterns and expectations. Without directly testing engagement in high school as well as expected college engagement, the relationship between the college environment and college engagement cannot be completely understood and worse still, may be overestimated. Based upon this review, a more in-depth look at high school engagement and the expected college engagement is warranted, and testing the proposed model is a means to extend the research to date. The following chapter will outline the methodology and data that was used to do so.

### **Chapter Three: Research Methods**

While the literature to date provides some insight into the research questions posed in Chapter 1, a more comprehensive and definitive study of these relationships is necessary. This chapter outlines the data, variables and methods used to test the research questions proposed in Chapter 1 and the model outlined in Chapter 2. Given the nested nature of national student engagement datasets and multilevel modeling's current prevalence in studies of engagement, this study used hierarchical linear modeling (HLM). This chapter will therefore begin with a discussion of multilevel models, the challenges they pose for researchers, and the use of HLM to analyze clustered datasets.

#### **Multilevel Models**

Student data is inherently multilevel in nature, meaning that student data resides within clusters, such as classes, majors, campuses and even states (Burstein, 1980; Cronbach, Deken, & Webb, July 1976; Luke, 2004; Raudenbush & Bryk, 2002). Clustering creates more complex relationships between independent and dependent variables at each level of data. Dependencies and effects within and across clusters of individual records commonly exist in clustered data, and studies involving student data therefore require statistical techniques that are designed to accommodate and explore these complex relationships. Current research underscores the need to treat both the student and college as units of analysis for studies of institutional effects (Enders & Tofghi, 2007; Ethington, 1997; Luke, 2004; Raudenbush & Bryk, 2002). Therefore, multilevel modeling has become the preferred technique when reviewing intercollegiate datasets because this modeling can examine student-level variables while controlling for college-level characteristics (Ethington, 1997; Luke, 2004; Raudenbush & Bryk, 2002).

With the advent of robust software in the 1980s, multilevel modeling has been replacing general linear modeling within social sciences and particularly higher education, including studies of college engagement. Ethington (2000) used HLM to examine the impact of a student's peer group on his or her perceptions of growth and development using data from the Community College Student Experiences Questionnaire. Hu and Kuh (2002) used HLM with CSEQ data to assess the relationship between individual and institutional characteristics with student engagement in educationally purposeful activities in college. Using NSSE data, Nelson Laird and Cruce (2009) used HLM to examine the effects of part-time enrollment on student-faculty interaction and self-reported gains. Pike et al (2011) used HLM and NSSE data to review the impact of college educational expenditures on student engagement when controlling for individual and institutional characteristics. These studies and others like them enable researchers to differentiate between individual and contextual variables when looking at college engagement.

The limitations of general linear models in analyzing clustered data are multifaceted. Cronbach et al (July 1976) first identified the weaknesses of earlier educational research that aggregated student data and analyzed group-level effects using statistical techniques not suited to multilevel data. Cronbach's criticism of general linear models in these scenarios focused on the issues of aggregation "that conceal more than they reveal" and result in "false conclusions in many studies" (p.1). Later, Burstein (1980) summarized the overall thinking about multilevel data in education as:

- (1) Attempts at cross-level inference (e.g., using school-level data to infer about individual behavior) generally cause problems. Analyses of educational

effects at different levels reveal substantial differences across levels for specific models. Also, different variables enter models at different levels [i.e., cross-level (ecological) inference or aggregation bias].

- (2) Phenomena of importance occur at all levels of the educational system, and they need to be described and investigated [i.e., choosing the appropriate unit of analysis].
- (3) Analyses involving both individual-level and group-level effects are important. They should be based on theories in which the source and form of group effects are stated specifically. Moreover, purported group effects should be measured directly [i.e., contextual analysis].
- (4) The focus of an investigation of educational effects should be on the proper specification of the substantive analytical model(s) rather than on making a choice among competing units of analysis [i.e., specification of appropriate analytical models for multilevel data]. (p. 161)

Raudenbush and Bryk (2002) further highlighted three common difficulties researchers encounter when using analyzing clustered datasets with earlier, non-hierarchical statistical methods: aggregation bias, misestimated standard errors, and heterogeneity of regression. Multilevel models have been used to minimize these difficulties and leverage multilevel datasets to produce more meaningful understanding of relationships between characteristics at both student- and college-level.

Aggregation bias is present when a variable can have different meanings at multiple levels. For example, SES levels can be an attribute of both the student (e.g., indicating the family's resource levels to support extracurricular activities, provide

tutoring, require financial or child-care contribution for the family, and enable a broader choice of colleges) and the high school (e.g., levels of resources available to students and teachers, teacher compensation, reduced student-teacher ratios, etc.). Thus, in general linear models where data is aggregated, everyone within the group is treated as having the same value (something that is not always true—e.g., low-SES students may attend schools with high average SES levels), leading to erroneous conclusions regarding the effects of variables on the studied outcome. Multilevel models enable the researcher to decompose the individual- and group-level effects into separate components, thus enabling a more complete understanding of the effects at both levels. In the example above, the researcher would understand the distinct influence that SES had on the individual as separate from that seen by the average SES of the school (Raudenbush & Bryk, 2002).

General linear models also fail to account for the effect that level 1 variables may have on other level 1 variables within the same cluster due to, for example, shared experiences, institutional policies, or grade inflation. This results in misestimating standard errors. This “dependence among individual responses within the same organization” may arise due to “shared experiences” or due to the mechanism that draws an individual to join a group. For example, students who attend the same college campus are likely to have common experiences that would lead them to more likely respond more similarly on questionnaires. On the other hand, as was noted in Chapter 2, there is an element of self-selection in the college enrollment process that may lead students to respond similarly to experiences because they chose (or were chosen to be offered admission to) the same college and may then seek a similar experience. Therefore, when

compared to OLS analysis, standard errors “are underestimated, resulting in increased Type 1 errors” (Luke, 2004; Pedhazur, 1997, p. 692). Multilevel modeling addresses this problem by calculating a random effect for each group, and accounts for these random effects when estimating standard errors as well as accounts for intraclass correlation (Raudenbush & Bryk, 2002).

The third difficulty of multi-level data involves heterogeneity of regression which “occurs when the relationships between individual characteristics and outcomes vary across organizations” (Raudenbush & Bryk, 2002, p. 100). While this phenomenon is at times seen as a problem, in educational research, this heterogeneity can be interpreted as a means to explain differences in outcomes due to college-level factors. Since multilevel models calculate a separate set of regression coefficients for each college, researchers can then model this variance in college-level variables “as multivariate outcomes to be explained by organization factors,” an important method that has been called “slopes-as-outcomes” by Bernstein (1980) and others (Raudenbush & Bryk, 2002, p. 100). In this study, this aspect of multilevel data was explored to better understand the relationships college-level variables have directly on student-level variables to influence college engagement.

### **Research Questions**

As was stated in Chapter 1, the purpose of this study is to explore the relationships between high school engagement, expected college engagement and other variables commonly linked with college engagement on college engagement. To this end, this study will use the research questions posed in Chapter 1 to guide our research. They are as follows:

1. To what extent are student-level characteristics, including high school engagement and expectations for college engagement, related to students' college engagement?
2. To what extent are institutional characteristics related to institutions' college engagement means after controlling for student characteristics and high school engagement and expectations for college engagement?
3. To what extent do institutional characteristics influence the relationship between student-level characteristics, including high school engagement and expectations for college engagement, and college engagement?

To assist in conceptualizing the relationships investigated by these questions, the model proposed in prior chapters was refined (see Figure 3.1). This model incorporated the influence of student-level and college-level characteristics into a 2-level HLM model.

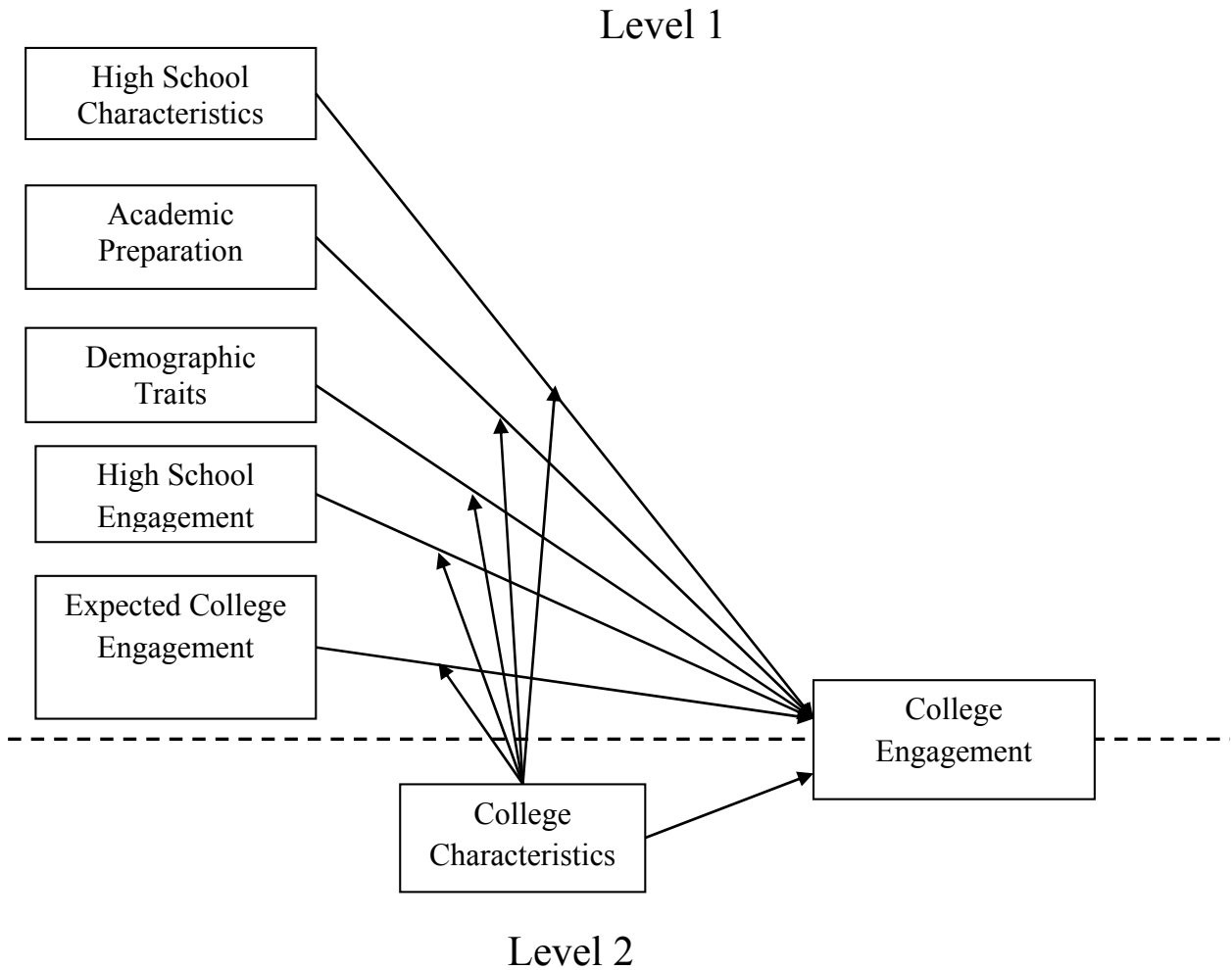


Figure 3.1: The 2-level HLM Model.

### Data

Student-level data for this study came from two instruments of the National Survey of Student Engagement (NSSE): The Beginning College Survey of Student Engagement (BCSSE) and National Survey of Student Engagement (NSSE). College-level data came from *Barron's Profiles of American Colleges* and the Integrated Postsecondary Education Data System (IPEDS). Data was requested and obtained via the

policies set forth by NSSE. The dataset provided was a de-identified combined dataset of BCSSE, NSSE, IPEDS and *Barron's* data. NSSE policy allows researchers access to data no earlier than three years from the data of administration. Therefore, the most recent administrations available for study are the 2007, 2008 and 2009 administrations of the BCSSE and the 2008, 2009, and 2010 administrations of the NSSE.

### **The National Survey of Student Engagement (NSSE).**

The NSSE is a nationally administered survey of collegiate first-year students and seniors and has been administered annually since 2000. More than 1,500 colleges have used the NSSE since its inception in 2000, making it one of the most widely used measures of student engagement (National Survey of Student Engagement, 2012a). Colleges conduct the survey electronically or via paper to a random sample of first-year and senior students, during the spring semester. In 2010, more than 165,998 students completed the NSSE at 561 colleges (98 or 17% of which also completed the BCSSE) (National Survey of Student Engagement, 2010a). Annual participation in NSSE for the three years is provided in Table 3.1.

Table 3.1

*Student and College Participation Rates in BCSSE and NSSE for the 2007-08, 2008-09, and 2009-10 Administrations*

	<b>2007-08</b>	<b>2008-09</b>	<b>2009-10</b>
<b>NSSE Participation</b>			
1 <sup>st</sup> year student responses	184,457	159,949	165,998
# of college participants	722	614	561
Response Rate, Overall	37%	36%	37%
Response Rate, Web-only	39%	37%	38%
Response Rate, Paper & Web	32%	31%	33%
<b>BCSSE Participation</b>			
# of student responses	62,941	70,386	73,274
# of college participants	122	119	129
<b>BCSSE-NSSE Participation</b>			
# of student responses	15,675	14,307	17,623
% of total BCSSE respondent participation	25%	20%	25%
# of colleges with combined BCSSE-NSSE administration	94	91	98
% of BCSSE college participation	75%	76%	76%

Source: (Beginning College Survey of Student Engagement, 2007, 2008b, 2009,

November 2008, October 2009, October 2010; National Survey of Student Engagement, 2008b, 2009b, 2010a)

For the 2008, 2009 and 2010 administrations, the survey included 28 core items which collected 105 data points that can then be grouped into the five benchmarks outlined in Chapter 1. Responses are self-reported, and though individual colleges can link their individual NSSE data with institutional data, institutional data for the national datasets are not available. The instrument has been tested for validity and reliability (Kuh, 2001; National Survey of Student Engagement, 2008a, 2009c, 2010b).

A complicating characteristic of the NSSE is that, while random sampling is employed to select students from within colleges, the colleges select themselves for inclusion in the survey. This “cluster sampling” rather than simple random sampling leads to standard errors calculated in traditional significance tests being too small, and therefore, Type I errors are likely in analyses of Level 1 data. As a result, in line with the recommendations of other researchers, a conservative probability value of  $p < 0.001$  at the student level was set. At level 2, this issue is of less concern, and the conventional level of  $p < 0.05$  was used (Pike, 2007; Pike, Kuh, & McCormick, November 2008).

### **The Beginning College Survey of Student Engagement (BCSSE).**

Initially launched in 2007, the BCSSE was designed as a counterpart to the NSSE to assess the levels of high school engagement and expectations for college engagement prior to college enrollment. Given to entering first-year students either prior to enrollment, during orientation or shortly after enrollment, the BCSSE is designed to provide colleges with an overall baseline snapshot of the engagement behaviors and expectations of their entering students. Not simply a research tool, the BCSSE is also intended to be used as an advising tool during the students’ transitions to the college campus (National Survey of Student Engagement, 2013). In 2009, 73,274 first-year

students at 129 institutions completed the BCSSE. Ninety-eight of these colleges (76% of all BCSSE college participants) also participated in the NSSE 2010, allowing for 17,623 (25% of the total number of BCSSE participants) student responses to be matched between the two surveys (Beginning College Survey of Student Engagement, October 2010; National Survey of Student Engagement, 2010a). These trends are similar to those for 2007 and 2008 and can be seen in Table 3.1.

Like the NSSE, the BCSSE can be administered either in a paper or electronic format, and can be given in coordination with the NSSE or alone. If given in coordination with the NSSE, the BCSSE is given prior or during the fall semester preceding the spring administration of the NSSE to first-year students. In most cases, it is administered during or after orientation for the fall semester. When a joint BCSSE-NSSE administration is given, student responses can be matched between the BCSSE and NSSE; however, unlike the NSSE, BCSSE does not employ random sampling. Since the BCSSE is intended to assist in advising, institutions generally administer it to entire populations of incoming students or those subsets that the institution is interested in conducting population-specific programming based on the results.

There are 32 core items that collect 114 data points on the BCSSE, and the items are designed to dovetail with those included on the NSSE. Overall, 23 items on the 2007, 2008 and 2009 BCSSE surveys have corresponding items on the 2008, 2009, and 2010 NSSE surveys (Beginning College Survey of Student Engagement, November 2008, October 2009, October 2010). In addition to questions regarding engagement and expectations, the BCSSE collects self-reported information regarding high school academic preparation, socio-economic status, and bio-demographic data. Though the

instrument has not undergone the same level of validity and reliability testing as the NSSE, the instrument is constructed with similar questions and theoretical frameworks and an initial review of validity indicates that some similar items on the two surveys are significantly related (National Survey of Student Engagement, 2012b).

#### **College-level data.**

Institutional data was obtained from IPEDS and *Barron's Profiles of American Colleges*. NSSE appends college characteristics data from both IPEDS and Barron's when researchers request datasets. In particular, Barron's provides a selectivity index that has proven useful in predicting student success (Pike, 2013). Several studies, for example, Kuh, Gonyea & Williams (2005), Pike (2013) and Koljatic and Kuh (2001), have therefore used data from Barron's when reviewing engagement.

#### **Self-reported data.**

Both the BCSSE and NSSE utilize self-report data. Much analysis has been conducted on the reliability and validity of data (Baird, 1976; Berdie, 1971; Pace, 1985; Pike, 1995, 2013; Pohlmann & Beggs, 1974) and has shown that they are reliable given five conditions:

1. The information is known to respondents;
  2. The questions are phrased clearly and unambiguously;
  3. The questions refer to recent activities;
  4. The respondents think the questions merit a serious and thoughtful response; and
  5. Answering the question does not threaten, embarrass, or violate the privacy of the respondent or encourage the respondent to respond in socially desirable ways
- (Kuh, 2001, p. 4)

Research has indicated that the NSSE is reliable according to the above criteria (Kuh, 2001; Kuh et al., 2001; Ouimet, Bunnage, Carini, Kuh, & Kennedy, 2004), and though similar studies have yet to be conducted for the BCSSE, it also meets these same criteria.

As noted earlier, student surveys of engagement which utilize self-reported data, and particularly NSSE, are not accepted by all researchers as valid. A primary example among these critics is Porter (2011, 2013) who has voiced concerns that the validity of the testing techniques employed have not been rigorous enough and the questions are not properly constructed, nor is a student's memory reliable. In his critique, a student's self-reported scores rarely match the actual behavior. Moreover, items, like major, can greatly influence the responses. Of primary concern to Porter is the validity of NSSE when the individual is the unit of analysis.

These concerns have also been addressed in responses from Ewell et al. (2011) and McCormick and McClenney (2012), and further exploration of the survey's validity was conducted by Pike (2013). These supporters of self-reported data re-emphasized that the NSSE's validity is questionable when looking at the individual student, but that the instrument remained valid when looking at broader trends across institutions. They also underscored that focus groups had confirmed that students understood and interpreted the survey's questions in similar ways. As Pike (2013) concluded, "The NSSE benchmarks are appropriate for assessment and evaluation, but not for evaluating or predicting the academic success of individual students." (p. 164) Given that this study analyzed a multi-year sample of data across a broad sample of colleges and students, the concerns raised by critics of the use of self-reported data should be minimized. As a means to further

minimize errors, the study's conclusions will refrain from making definite assertions regarding the impact individual characteristics on the benchmarks, but instead comment on general trends that the analyses uncover.

### **Sample**

This study used data from the 2007, 2008, and 2009 administrations of the BCSSE and the 2008, 2009, and 2010 administrations of the NSSE. Table 3.1 shows the overall participation rates in both surveys for these years. Only those students who completed both the BCSSE and the NSSE in the following spring term were included, thus the 2007 BCSSE data was matched with the spring 2008 NSSE data, the 2008 BCSSE data was matched with the 2009 NSSE data, and the 2009 BCSSE data was matched with the 2010 NSSE data. In accordance with the definitions of student and college outlined in Chapter 1, the sample included only students who graduated from high school the spring prior to enrollment at a U.S. college the following fall. The staff of the Center for Postsecondary Research provided a sample of 15,000 student records from 195 colleges representing 20% of the available surveyed population. Students who delayed entry to college after high school, transferred from another college or who did not attend a public or not-for-profit private 4-year college and invalid responses were excluded. When responses were left blank, a listwise deletion method was employed based on the recommendations of Allison (2002) who considered listwise deletion superior to imputational methods as long as listwise deletion did not compromise the size and value of the sample. These filters reduced the initial sample received from NSSE to 8,621 records clustered within 179 colleges.

When using HLM, the group-level sample size is most critical. Individual-level sample size is usually not as critical, nor is the number of individuals in each group. However, Mass and Hox (2005) noted that standard errors are substantially underestimated when the number of groups is substantially less than 100. Given that the sample for this study includes individuals from 179 colleges, the sample size is appropriate to provide a trustworthy analysis.

### **Variables**

Based on the literature reviewed in Chapter 2, independent variables were selected at both the individual and college level (see Table 3.2). In cases where a value for a particular variable existed in both the BCSSE and NSSE, the value provided on the BCSSE was used. Ethnicity, which is a categorical field on both the BCSSE and NSSE, was translated into five dummy-coded ethnic variables (African American, Hispanic/Latino, Asian, and Other Ethnicity). The parental education level of the BCSSE and NSSE, which includes a separate categorical variable for each parent, was combined into a single dichotomous variable representing the completion of a bachelor's degree by either parent.

Data for college-level characteristics were provided by NSSE based on institutional responses to the IPEDS questionnaire, save for institutional selectivity, which was provided by the Barron's selectivity index. In compliance with NSSE policy, some data elements were grouped into larger bands to ensure the confidentiality of student and college identities. These bands were developed based upon the distribution of the data within the initial sample. The following are the fields that were banded: size, percent female, percent full-time, percent African American, percent Asian, and percent

Hispanic/Latino. Two other items were derived from elements provided from IPEDS.

Both residential nature and graduate coexistence were based on the college's Carnegie advanced classification. The values used for the college variables are shown in Table 3.2.

Table 3.2

*Student- and College-Level Independent Variables and Values*

Variable Name	Values
<b>Student-Level Variables</b>	
Female	Yes=1, No=0
African American	Yes=1, No=0
Hispanic/Latino	Yes=1, No=0
Asian	Yes=1, No=0
Other Ethnicity	Yes=1, No=0
First Generation	Yes=1, No=0
Pell Recipient	Yes=1, No=0
Private High School	Yes=1, No=0
High School GPA	C- or lower = 1, C = 2, C+ = 3, B- = 4, B = 5, B+ = 6, A- = 7, A = 8
AP Course Completed	Yes=1, No=0
Standardized Test Score	Continuous variable
High School Student-Faculty Interaction	Continuous variable
High School Co-Curricular Activities	Continuous variable
Expected College Student-Faculty Interaction	Continuous variable
Expected College Co-Curricular Activities	Continuous variable
<b>College-Level Variables</b>	
Private	Yes=1, No=0
Research	Yes=1, No=0
Bachelor's Selectivity	Yes=1, No=0
Size	Noncompetitive = 1, Noncompetitive Plus = 1.5, Less Competitive = 2, Less Competitive Plus = 2.5, Competitive = 3, Competitive Plus = 3.5, Very Competitive = 4.0, Very Competitive Plus = 4.5, Highly Competitive = 5, Highly Competitive Plus = 5.5, Most Competitive = 7
Residential Nature	Fewer than 1,500 = 1, 1,500 to 2,499 = 2, 2,500 to 4,999 = 3, 5,000 to 9,999 = 4, 10,000 or more = 5
Graduate Coexistence	Primarily Commuter = 1, Commuter & Residential = 2, Primarily Residential = 3, Highly Residential = 4
	No graduate Coexistence = 1, Some Graduate Coexistence = 2, High Graduate Coexistence = 3
% Female	Less than 50% = 1, 50%-55% = 2, 55%-60% = 3, 60%-75% = 4, 75% or more = 5
% Full-time	60% or less = 1, 61%-75% = 2, 75%-80% = 3, 80%-90% = 4, 90% or more = 5
% African American	Less than 5% = 1, 5%-10% = 2, 10%-25% = 3, 25%-80% = 4, 80% or more = 5
% Asian	Less than 1% = 1, 1% = 2, 2% = 3, 3%-5% = 4, 5%-20% = 5, 20% or more = 6
% Hispanic/Latino	Less than 2% = 1, 2%-3% = 2, 3%-5%=3, 5%-10% = 4, 10%-30% = 5, 30% or more = 6

**NSSE benchmarks and continuous variables of engagement.**

The validity and reliability of the items and benchmarks on the NSSE have been thoroughly tested (Kuh, 2001). All five benchmark scores were used in this study. Three of these benchmarks had Cronbach's alpha scores of  $> .70$ . Eleven items made up the benchmark of level of academic challenge had alpha scores of  $.74$ ,  $.73$ , and  $.73$  for 2008, 2009, and 2010 respectively. The benchmark for student-faculty interaction, which was comprised of six items, had alpha scores of  $.72$ ,  $.71$ , and  $.71$ , and supportive campus environment had alpha scores of  $.79$  for each of these three years for its six items. The fourth benchmark, active and collaborative learning, was of lesser but still acceptable reliability across its seven items with alpha scores of  $.68$ ,  $.66$ , and  $.67$ . The final benchmark, enriching educational experiences, had a marginal level of reliability ( $\alpha = .62$ ,  $.59$ , and  $.60$  for 2008, 2009 and 2010) (National Survey of Student Engagement, 2008a, 2009c, 2010b). All benchmarks have been included as both independent and dependent variables in prior studies of college engagement.

Unlike the NSSE, the BCSSE does not report its results via benchmarks. Therefore, four scales were constructed and tested for reliability for this study using items from the BCSSE. The first, high school academic engagement ( $\alpha = .73$ ), incorporated eight items concerning interaction with high school faculty and colleagues surrounding the classroom or the college experience. The second scale, expected student-faculty engagement ( $\alpha = .79$ ), incorporated six items which tested the students' expectations to be engaged with faculty and colleagues in the college classroom experience. The third scale, expected co-curricular activities ( $\alpha = .78$ ), included three items which involved a student's expectations for being involved in campus events, student organizations or

religious groups. All three of these scales were constructed as composite scores of multiple items and then rescaled on a 100-point scale, similar to the NSSE benchmarks, and all had a reliability sufficient to be included in the study ( $\alpha > .70$ ). A correlation matrix was also developed for each scale to identify potential correlation between the items. Because the format of the items surrounding high school co-curricular activities were more focused on distinct activities rather than a broader construct, the fourth scale, high school co-curricular engagement, was simply a count of the number of the eight high school co-curricular activities the student could have reported as participating in on the BCSSE survey. The result was an 8 point scale. The BCSSE items included in each scale are found in Table 3.3.

Table 3.3

*Continuous Variables and Reliability Coefficients*

Independent Variable	NSSE- BCSSE Item	Item Description	$\alpha$
<b>High School Academic Engagement</b>	hfacad	During your last year of high school, about how often did you do each of the following? Discussed grades or assignments with a teacher	.732
	hclassgr	During your last year of high school, about how often did you do each of the following? Worked with other students on projects during class	
	hfacadplan	During your last year of high school, about how often did you do each of the following? Talked with a counselor, teacher, or other staff member about college or career plans	
	hfacidea	During your last year of high school, about how often did you do each of the following? Discussed ideas from your readings or classes with teachers outside of class	
	hclquest	During your last year of high school, about how often did you do each of the following? Asked questions in class or contributed to class discussions	
	hclprese	During your last year of high school, about how often did you do each of the following? Made a class presentation	
	hoccgrp	During your last year of high school, about how often did you do each of the following? Worked with classmates outside of class to prepare class assignments	
	hrewropa	During your last year of high school, about how often did you do each of the following? Prepared two or more drafts of a paper or assignment before turning it in	

**Expected College  
Student-Faculty  
Engagement**

.786

cfacgrad	During the coming school year, about how often do you expect to do each of the following? Discuss grades or assignments with an instructor
cfacothe	During the coming school year, about how often do you expect to do each of the following? Work with faculty members on activities other than coursework (committees, orientation, student life activities, etc.)
cfacidea	During the coming school year, about how often do you expect to do each of the following? Discuss ideas from your readings or classes with faculty members outside of class
cclquest	During the coming school year, about how often do you expect to do each of the following? Ask questions in class or contribute to class discussions
cclprese	During the coming school year, about how often do you expect to do each of the following? Make a class presentation
cfacfeed	During the coming school year, about how often do you expect to do each of the following? Receive prompt feedback from faculty on your academic performance (written or oral)

**High School Co-Curricular Engagement**

N/A

hinvars	During your high school years, how involved were you in the following activities at your school or elsewhere? Performing or visual arts programs (band, chorus, theater, art, etc.)
hinvathl	During your high school years, how involved were you in the following activities at your school or elsewhere? Athletic teams (varsity, junior varsity, club sport, etc.)
hstugov	During your high school years, how involved were you in the following activities at your school or elsewhere? Student government
hinvpubs	During your high school years, how involved were you in the following activities at your school or elsewhere? Publications (student newspaper, yearbook, etc.)
hinvhono	During your high school years, how involved were you in the following activities at your school or elsewhere? Academic honor societies
hinvaccl	During your high school years, how involved were you in the following activities at your school or elsewhere? Academic clubs (debate, mathematics, science, etc.)
hinvvcl	During your high school years, how involved were you in the following activities at your school or elsewhere? Vocational clubs (business, health, technology, etc.)
hrelgrp	During your high school years, how involved were you in the following activities at your school or elsewhere? Religious youth groups

**Expected College Co-Curricular Activities**

.780

cenveven	How important is it to you that your college or university provides each of the following? Opportunities to attend campus events and activities
cenvnaca	During your high school years, how involved were you in the following activities at your school or elsewhere? Assistance coping with your non-academic responsibilities (work, family, etc.)
cenvsoca	During your high school years, how involved were you in the following activities at your school or elsewhere? Support to help you thrive socially

### Statistical Model and Data Analysis

For each dependent variable, seven potential models were developed using HLM7. First, an “intercepts only” or “null” model was developed which included no predictor variables at either level. The equation for this model was

$$Y = \gamma_{00} + u_{0j} + r_{ij} \quad (1)$$

Where  $Y$  is the dependent variable and  $\gamma_{00}$  is intercept for the model representing the fixed effect for colleges. There are two residuals in this case:  $u_{0j}$  is the random effect attributed at the college level and  $r_{ij}$  is the random effect attributed to the student level. Variances are then calculated for each of the student-level ( $\sigma^2$ ) and college-level ( $\tau^2$ ) random effects. The percent of the total variance of the model that is explained at the college-level ( $\rho$ ) can be derived using the equation

$$\rho = \frac{\tau^2}{\tau^2 + \sigma^2} \quad (2)$$

and the percentage of the total variance attributable to the student-level is therefore  $1 - \rho$ . The result of this equation established an estimation of the amount of variance attributable to both the student- and college-levels and provides a baseline estimate to which future models to be compared. In addition, it provides a partial answer to the second research question.

The second model was a single-level HLM model with the equation

$$Y_{ij} = \beta_{0j} + \beta_{1j}X_{1ij} + \beta_{2j}X_{2ij} + \dots + \beta_{qj}X_{qij} + r_{ij} \quad (3)$$

where  $i$  was an individual student at a particular college ( $j$ ).  $Y_{ij}$  was the college engagement benchmark score for an individual student given the unique effect ( $\beta_{0j}$ ) for the college, the result of the coefficients ( $\beta_{qj}$ ) for individual student variables ( $X_{qij}$ ) and the random effect ( $r_{ij}$ ) for the given student attending the particular college. The second

model incorporated the traditional student-level variables, and again the variance components were again generated. The second model's variance component for level 1 was compared to the student-level variance of the first model. The following equation was used to determine the amount of the level 1 variation that was explained using these variables:

$$\rho = \frac{\sigma_0^2 - \sigma_1^2}{\sigma_0^2} \quad (4)$$

where  $\rho$  is the percentage of the of the student-level variance ( $\sigma^2$ ) explained by the traditional student-level characteristics included in the second model.

The third model built upon the second model, but incorporated the high school engagement and expectation variables. Again the variance components were generated, and the variance component for level 1 were compared to those level 1 variance components of the first model using Equation 4. The result provided an estimation of the percent of the level 1 variance explained by this model, and by subtracting the variance explained by the second model, an estimation of the contribution of high school engagement and expectation variables was obtained. This result addressed the first research question.

The fourth model was a level 2 "intercept as outcomes" model. The level 2 independent variables were added to determine their influence on the intercept, but not on the level-1 independent variables. For this model, the intercept from Equation 3 ( $\beta_{0j}$ ) was replaced with the equation

$$\beta_{0j} = \gamma_{00} + \gamma_{01}W_{1j} + \gamma_{02}W_{2j} + \dots + \gamma_{0s}W_{sj} + u_{0j} \quad (5)$$

where  $\beta_{0j}$  was now the unique effect for the college, the result of the level-2 coefficients ( $\gamma_{0s}$ ) and individual college values ( $W_{sj}$ ) and the level-2 random effect ( $u_{0j}$ ). Thus  $\beta_{0j}$  or

the intercept becomes the extent to which the student's college engagement ( $Y_{ij}$ ) can be explained by the college characteristics. A variance component for the level-2 random effect ( $\tau^2$ ) can then be calculated, and the percentage of the level two variance explained by this model can then be calculated using the equation

$$\rho = \frac{\tau_0^2 - \tau_1^2}{\tau_0^2} \quad (6)$$

where  $\tau_0^2$  is the level-2 variance from the first or baseline model and  $\tau_1^2$  is the level-2 variance from the fourth model. This model provided an answer to the second research question.

To provide additional insight into the relative effect sizes of the individual variables in answer to both the first and second research questions, a fifth model was developed using Equations 3 and 5. The values for dependent and independent variables were standardized into z-scores so that comparisons of the relative effects of a change in one standard deviation could be made. It is important to note that the standardized coefficients could only be compared within each level and not across the levels.

The sixth model was an exploration of the variances of the level-1 variables from Equation 5 to determine whether a "slopes as outcomes" level-2 model would be warranted. In this model, random effects were calculated for each of the level-1 variables and variances calculated. Chi-square statistics were then evaluated for each of the variance for significance. A conservative p-value of less than .001 was used to simulate an overall significance of less than .05 across the entire model.

If sufficient significant variance in the level-1 variables was discovered in the sixth model, a seventh "slopes as outcomes" level-2 model was developed. In a "slopes as outcomes" model, a series of level-2 equations are developed to determine the

relationship of these same college characteristics ( $W_{sj}$ ) influence the other student-level variables ( $X_{qij}$ ) in Equation 3. Just as the level-1 intercept in Equation 3 was replaced by Equation 5 in the “intercept as outcome” model, the individual student-level variables were replaced by the equation

$$\beta_{1j} = \gamma_{10} + \gamma_{11}W_{1j} + \gamma_{12}W_{2j} + \dots + \gamma_{1s}W_{sj} + u_{1j} \quad (7)$$

Obviously, given the number of student-level variables included in the study as well as the number of college-level variables, the number of possible relationships between college- and student-level variables was daunting. Consequently, “slopes as outcome” models would only be developed for those student-level variables where the variance was discovered to be significant at the .001 level when reviewing the results of the model 6 outlined above. Because of the complexities of multi-level modeling, discovering significance at level 2 is generally more difficult, and therefore the study required a more liberal value of .05 for the college-level variables.

### **Centering of Variables**

Of primary consideration when developing an HLM model is the centering of level 1 variables (Enders & Tofighi, 2007; Raudenbush & Bryk, 2002). In the case of level 1 variables, the intercept ( $\beta_{0j}$ ) is the value for all students at college  $j$  when all student-level variables ( $X_{qij}$ ) have values of zero.  $\beta_{0j}$  then is the covariate-adjusted engagement mean for the college. Thus centering the variables appropriately so that  $\beta_{0j}$  is meaningful to the researcher becomes critical to making sense of the model; therefore, ensuring that the values of  $X_{qij}$  are meaningful at zero is essential to interpreting the results of the model. Centering on the group mean and centering on the grand mean are

two common methods to consider when centering on the natural X metric is not appropriate (Raudenbush & Bryk, 2002).

The decision regarding how to center variables is best based on the research interests at hand, particularly on whether the variables of interest are at the level 1 or level 2 (Enders & Tofighi, 2007). When the primary interest is in the level-1 variables or on the interactions between level 1 and level 2 variables, centering non-binary level-1 variables on the group mean is preferred (Enders & Tofighi, 2007; Raudenbush & Bryk, 2002). Enders and Tofighi (2007) recommend that the same considerations for centering level-1 variable apply to both continuous as well as dichotomous variables, and given this study's interest in student-level characteristics, all level-1 variables were centered on their group means. This means that the intercept ( $\beta_{0j}$ ) is the expected outcome ( $Y_{ij}$ ) for a student whose values on the independent variables ( $X_{qij}$ ) are equivalent to the group average for each variable.

Centering variables at level 2 is of lesser concern and the considerations at this level are similar to those involved with simple OLS regression (Enders & Tofighi, 2007; Raudenbush & Bryk, 2002). Because all level 2 variables are identical within a cluster, centering along group means is not an option, and therefore the most common options are to center level-2 variables on the grand mean or to use the raw scores. In this case, the primary issue for centering at level 2 is ensuring that the intercept has a meaningful value for interpretation. In reviewing the college-level variables, uncentered values would be easily interpreted and have meaning to the analyst. Because centering on the grand mean of level-2 variables would generate less useful results for the level-2 variables (i.e.,

organizational size and selectivity), these variables have been left uncentered. The level-2 dichotomous variables were also left uncentered.

### **Limitations**

This study has several limitations, and care should be given not to overemphasize or overgeneralize the findings. Instead, its findings should be viewed as a start to a broader conversation regarding college engagement and the role of both students and colleges in fostering this valued college outcome.

First, as has been noted previously, both the NSSE and BCSSE rely solely on self-reported data. While many of the concerns regarding the use of self-reported data have been addressed by Pike (2013), Ewell et al. (2011), and McCormick and McClenney (2012), the ability to use the findings of this study to directly take action for individual students is not recommended. As a result, this study's findings should guide further research in more fruitful directions and not as a means to develop plans of action for individual students based on their responses to student surveys.

Second, the BCSSE itself has several limitations which require caution when analyzing its data. Of primary concern is the lack of robust validity testing of the instrument, and while its design is based on that of the NSSE, the validity of which has been tested and discussed above, conclusions based on the BCSSE should be considered exploratory in nature. Also, the BCSSE is not administered through random sampling nor is the survey's timing similar across all campuses. Because the instrument is administered at the discretion of the institution, it may be administered to a random sample, an entire population, or a sub-population. It may also be sent to students at a variety of times: prior to orientation, during orientation, after orientation but before classes start, or after classes

start. These differences in administrations raise concerns regarding the validity and reliability of the responses depending on the sample and timing of its administration. In some ways, this study compensates for this limitation by incorporating only those BCSSE respondents who have also completed the NSSE which is randomly sampled.

Third, due to the structures of the surveys, the study cannot incorporate the externalities that Tinto and Kuh incorporate into their models and may have significant influence on college engagement. Externalities are, by definition, outside the educational systems which are the focus of this study and are therefore difficult to capture. However, as an exploratory study, its purpose is to identify to what extent the variances of NSSE benchmarks can be explained by the characteristics of secondary and higher educational systems. When viewed as an opportunity, these externalities can later be explored in future studies to build upon the findings of this study.

Fourth, the study purposefully ignores a large portion of the college-going U.S. population. Though the reasons for this restriction were previously outlined and follow the practices of prior studies, this study's narrow focus on high school graduates who enter college directly after graduation hampers the generalizability of its findings to other populations. However, this limitation should provide another opportunity for other researchers who will build upon the findings presented here by conducting similar research on these other populations.

Fifth, the use of ordinal rather than continuous variables for both student- and college-level characteristics (e.g., high school GPA, institutional selectivity, institutional size, etc.) may have attenuated some relationships, particularly at the college level. Of course, the use of continuous variables would have been preferable; however, the use of

ordinal variables could not be avoided given the policies of the Center for Postsecondary Research to ensure the confidentiality of participants—both of students and of colleges. As a result, the interpretation of these variables should take this limitation into account.

A final factor that may be of issue is the fact that students are not only clustered within colleges, but could also be clustered within high schools. This could lead to misestimation of student-level effects, since in the current design, these high school characteristics are tied to the student directly (for example, the fact that the student attended a private high school is a student-level characteristic that is actually a characteristic of the high school). It is possible that the use of a statistical technique such as cross-clustered hierarchical linear modeling may provide clearer insight into the effects of high school characteristics on student engagement. However, neither the NSSE nor BCSSE samples provided information that would allow students to be grouped by high school thus making this more refined analysis impossible with the current instruments.

Despite these limitations, this study provided initial insight into the student and college characteristics which contribute to college engagement. As an investigative study, this research will provide a basis on which additional studies can be conducted that will account for the limitations above.

## **Chapter 4: Results**

This chapter presents and discusses the results of the analysis outlined in Chapter 3. This study used hierarchical linear modeling (HLM) to determine the relationships of high school engagement and expected college engagement with college engagement, and how these variables were related to those characteristics traditionally included in research of college engagement. The discussion begins with an overview of the descriptive statistics of the sample to compare it to general attributes of the national population of students. The discussion then provides an overview of the results of the models developed. The first set of models determined the variance attributable to the student and college levels as well defining how much of the variance was explained by traditional student variables, high school engagement and expected college engagement, and college characteristics. The second set of models explored the significance of the relationships of the individual independent variables with each of the NSSE benchmarks, and a third set of models used standardized independent variables to gain an understanding of the relative effect sizes of those relationships that were statistically significant. A final set of models tested each of the student-level variables to see if they might have relationships with the college-level variables and have additional indirect effects on the NSSE benchmarks. The chapter concludes by revisiting each of the research questions posed earlier and addresses them in light of these findings.

### **Descriptive Statistics of the Sample**

To begin, where possible the study's sample was compared to national trends to contextualize the results and ensure that the results would not be compromised by a sample which was unduly skewed from national norms. Table 4.1 presents the descriptive

statistics of the final sample (N=8,621) used for the analysis. At the student level, the sample's academic profile was generally well academically prepared. The average HS GPA was a B+/A-; 70% reported having completed an AP course; the average SAT was 1164. The sample was more female (69%) than the national standards. The mean of the responses to the NSSE benchmarks were similar to the averages of the national averages presented in Chapter 1. Academic challenge, active and collaborative learning, and student-faculty interaction were nearly identical to the national averages for 2008, 2009 and 2010. The average of the enriching educational experiences of 29 was slightly higher than the averages of 26 or 27 for those years. The largest gap was between supportive campus environment of 65 compared to 61 and 64 of the total population surveyed.

At level 2, the sample included 179 institutions, 64% of which were private, similar to the national landscape according to the Carnegie Foundation (2009). Research institutions constituted 21% of the sample, slightly more than the 18% of the national population, and the sample included 34% of bachelor's institutions, lower than the national average of 42%. The average for selectivity was "competitive plus" according to Barron's Index, and the average for graduate coexistence was "some graduate coexistence." The sample was "primarily residential" with a size set between 2,500 and 4,999 students. Most of the campuses had 80% or more of their students enrolling full-time which is not unexpected since part-time students were not included in the analysis and this would presumably eliminated institutions who serve high numbers of part-time students. The colleges also averaged 5% to 10% African American, 2% Asian, and 2% to 5% Latino populations with 60% to 75% of their population being female. Compared to the student-level means, the college's exhibited a similar average percent female, African

American and Latino. Only Asian students were more highly represented in the general student population (4%) when compared to the average percent of the population of Asians on the campuses, which was between 1% and 2%, which would indicate that either Asians were more likely to respond to the survey overall or that some of the included colleges had disproportionately high number of Asian respondents.

Table 4.1

*Descriptive Statistics of Variables*

Variable	N	Mean	SD	Min	Max
<b>Student-Level Variables</b>					
Private High School	8621	0.18	0.38	0	1
HS GPA	8621	6.79	1.25	1	8
AP Courses	8621	0.70	0.46	0	1
High School Academic Engagement	8621	56.37	15.39	0	100
Standardized Test Scores	8621	1164.32	166.00	450	1600
High School Co-curricular Engagement	8621	3.81	1.77	0	8
Expected Student-Faculty Interaction	8621	59.16	17.14	0	100
Expected College Co-Curricular Engagement	8621	70.73	19.93	0	100
Pell-eligible	8621	0.16	0.37	0	1
Female	8621	0.69	0.46	0	1
African American	8621	0.05	0.22	0	1
Hispanic/Latino	8621	0.04	0.19	0	1
Asian	8621	0.03	0.18	0	1
Other Ethnicity	8621	0.06	0.24	0	1
First Generation	8621	0.33	0.47	0	1
Academic Challenge	8621	55.48	12.59	0	100
Active and Collaborative Learning	8621	43.28	15.23	0	100
Student-Faculty Interaction	8621	34.51	16.96	0	100
Enriching Educational Experiences	8621	29.27	12.33	0	94.44
Supportive Campus Environment	8621	64.67	17.70	0	100
<b>College-Level Variables</b>					
Private	179	0.64	0.48	0	1
Selectivity	179	3.53	1.03	1	6
Research	179	0.21	0.41	0	1
Bachelor	179	0.34	0.48	0	1
Graduate Coexistence	179	1.95	0.66	1	3
Residential Nature	179	3.01	1.12	1	4
Size	179	2.91	1.36	1	5
% Female	179	3.05	1.08	1	5
% Full-time	179	4.32	0.94	1	5
% African American	179	1.93	1.01	1	5
% Asian	179	3.01	1.44	1	6
% Hispanic/Latino	179	2.69	1.48	1	6

**Overall Variance Explained**

Next, the study developed a series of models to determine the amount of variance which could be explained by traditional student-level characteristics, levels of high school engagement and expected college engagement, and college characteristics. The baseline models for all five first-year engagement benchmarks proved statistically significant at the between-college variance components. Table 4.2 provides the results of these analyses. For academic challenge ( $\chi^2 = 919.22105$ ;  $df = 178$ ;  $p < .001$ ), the between-college variance accounted for 8.6% of the variance of academic challenge. Adding standard student-level characteristics accounted for 1.7% of the within-college variance while adding the student-level high school engagement and expectations characteristics accounted for another 10.7% of the within-college variance. Finally, the addition of college characteristics accounted for 60.8% of the between-college variance. In total, the models for academic challenge accounted a total of 16.6% of the benchmark's variance.

Table 4.2

*Variance Components for HLM Models*

		Model 1 Intercepts Only	Model 2 Level 1 Standard Characteristics	Model 3 Level 1 Engagement Characteristics	Model 4 Level 2 Intercepts as Outcomes
AC	INTRCPT1, $u_0$	13.7359	13.8127	14.3009	5.3823
	level-1, r	145.849	143.31	127.693	127.736
	Variance at Level 1	0.914			
	Variance at Level 2	0.086			
	Level Variance Explained		0.017	0.107	0.608
	Total Level Variance Explained		0.017	0.124	0.608
	Total Variance Explained		0.016	0.114	0.166
ACL	INTRCPT1, $u_0$	19.7563	19.8162	21.2815	11.1997
	level-1, r	214.923	213.32	175.929	175.867
	Variance at Level 1	0.916			
	Variance at Level 2	0.084			
	Level Variance Explained		0.007	0.174	0.433
	Total Level Variance Explained		0.007	0.181	0.433
	Total Variance Explained		0.007	0.166	0.203
SFI	INTRCPT1, $u_0$	21.114	21.1643	22.8228	11.2201
	level-1, r	269.599	268.131	221.842	221.974
	Variance at Level 1	0.927			
	Variance at Level 2	0.073			
	Level Variance Explained		0.005	0.172	0.469
	Total Level Variance Explained		0.005	0.177	0.469
	Total Variance Explained		0.005	0.164	0.198
EEE	INTRCPT1, $u_0$	12.6988	12.7867	13.2471	6.17333
	level-1, r	140.756	138.196	125.171	125.096
	Variance at Level 1	0.917			
	Variance at Level 2	0.083			
	Level Variance Explained		0.018	0.093	0.514
	Total Level Variance Explained		0.018	0.111	0.514
	Total Variance Explained		0.017	0.102	0.144
SCE	INTRCPT1, $u_0$	16.6768	16.7352	17.1486	9.32555
	level-1, r	297.852	295.76	281.162	281.137
	Variance at Level 1	0.947			
	Variance at Level 2	0.053			
	Level Variance Explained		0.007	0.049	0.441
	Total Level Variance Explained		0.007	0.056	0.441
	Total Variance Explained		0.007	0.053	0.076

The baseline model for active and collaborative learning ( $\chi^2 = 877.36180$ ;  $df = 178$ ;  $p < .001$ ) produced a between-college variance component that accounted for 8.4% of the benchmark's total variance. The standard student-level model accounted for .7% of the within-college variance while another 17.4% was explained by adding the high school engagement and expectations characteristics. The addition of college characteristics accounted for 43.3% of the between-college variance. In total, the models for active and collaborative learning accounted for a total of 20.3% of the benchmark's variance.

The baseline model for student-faculty interaction ( $\chi^2 = 775.23403$ ;  $df = 178$ ;  $p < .001$ ) produced a between-college variance component that accounted for 7.3% of the total variance of the benchmark. The standard student-level model accounted for .5% of the within-college variance, and the addition of high school engagement provided an explanation of an additional 17.2% of the benchmark's variance. Addition of college characteristics accounted for 46.9% of the between-college variance. In total, the models for student-faculty interaction explained 19.8% of the benchmark's variance.

The baseline model for enriching educational experience ( $\chi^2 = 871.52503$ ;  $df = 178$ ;  $p < .001$ ) produced a between-college variance component that accounted for 8.3% of the benchmark's total variance. The standard student-level model accounted for 1.8% of the within-college variance while another 9.3% was explained by adding high school engagement and expectations characteristics. College characteristics accounted for 51.4% of the between-college variance. In total, the models for enriching educational experiences accounted for a total of 14.4% of the benchmark's variance.

The baseline model for supportive campus environment ( $\chi^2 = 618.23380$ ;  $df = 179$ ;  $p < .001$ ) accounted for 5.3% of the benchmark's total variance. The standard

student-level model accounted for .7% of the within-college variance, and the addition of high school engagement and expectations characteristics further explained 4.9% of the within-college variance. College characteristics accounted for 44.1% of the between-college variance. In total, the models for supportive campus environment explained 7.6% of the benchmark's variance.

Based on this analysis, it is clear that while college characteristics account for some portion of the variance, the vast majority of the variance for each of the benchmarks (90% or more in each case) is attributable to student-level characteristics. Moreover, the majority of the variance explained by student-level characteristics was due to the high school engagement and expected college engagement variables. Though large amounts of the variance remained unexplained by the models, prior engagement behaviors and expectations for college engagement were found to be the most influential on college engagement.

### **Analysis of Individual Variables**

The study then developed a series of models to determine the significance of each independent variable at both the student- and college-levels with the NSSE benchmarks. Table 4.3 presents the unstandardized regression coefficients for the Level 2 intercepts models for each of the NSSE benchmarks. As was noted in Chapter 3, coefficients at the student level were considered significant at a p-value of less than .001 while less than .05 was used for college-level characteristics. At level 2, discovering significance can be difficult given the complexities of multilevel modeling. Therefore, the less conservative p-value of .05 for significance was used to allow for more potential relationships to be

seen. Some student-level variables were also significant at a .05 level. While they are not discussed here, they are noted appropriately on Table 4.3.

Table 4.3

*Fixed Effects for “Intercepts-as-Outcomes” Level 2 Model with Robust Standard Errors*

Fixed Effect	AC		ACL	
	Coef	SE	Coef	SE
Intercept	46.495171**	2.583085	42.914118**	3.439526
Private	3.444422**	0.648085	3.993026**	0.895698
Selectivity	1.512885**	0.325416	-0.044844	0.460352
Research	0.665931	0.670792	1.160202	1.015832
Bachelor	0.502210	0.927462	-1.110751	1.133805
Graduate Coexistence	-1.167218*	0.484695	-0.812947	0.686644
Residential Nature	0.127579	0.250829	0.745080	0.395993
Size	0.080268	0.320999	-0.883945*	0.437422
% Female	0.202741	0.296099	-0.092953	0.351833
% Full-time	-0.054470	0.295347	-0.349973	0.469328
% African American	0.509419	0.278596	1.315290*	0.420840
% Asian	0.284850	0.236548	-0.309588	0.342609
% Hispanic/Latino	0.189701	0.196161	0.455869	0.268728
Private High School	1.033067*	0.360294	0.258723	0.495304
HS GPA	0.672585**	0.108904	0.086608	0.130358
AP Courses	0.665350*	0.312149	1.030858*	0.368202
Standardized Test Scores	-0.001313	0.000956	0.003305*	0.001204
High School Academic Engagement	0.136777**	0.010878	0.241043**	0.012852
High School Co-curricular Engagement	0.534960**	0.076885	0.968900**	0.084439
Expected Student-Faculty Interaction	0.106880**	0.009147	0.163914**	0.011155
Expected College Co-curricular Engagement	0.045728**	0.007309	0.007266	0.008590
Pell-eligible	0.592548	0.368297	0.029734	0.367360
Female	1.141212**	0.263180	-1.833322**	0.309944
African American	-0.734408	0.743349	-1.283276	0.692817
Hispanic/Latino	-0.770198	0.644516	0.682644	0.837693
Asian	-1.575030*	0.644985	-1.825026*	0.912647
Other Ethnicity	-0.028707	0.461978	0.063312	0.589729
First Generation	-0.274428	0.330156	-0.213414	0.335464

Fixed Effect	SFI		EEE	
	Coef	SE	Coef	SE
Intercept	35.324921**	3.807627	23.624619**	2.997645
Private	2.512891*	0.925370	1.914382*	0.668330
Selectivity	-0.201795	0.422732	1.042991*	0.339467
Research	1.127942	1.104861	1.472354*	0.709829
Bachelor	0.111268	1.277181	-1.244993	0.874643
Graduate Coexistence	-0.564995	0.729582	-1.348524*	0.500730
Residential Nature	0.236620	0.459015	0.441773	0.274916
Size	-1.309814*	0.498056	-0.621866	0.333359
% Female	0.209434	0.396022	-0.143278	0.274882
% Full-time	-0.174874	0.528346	-0.074011	0.360392
% African American	2.027728**	0.434187	1.375824**	0.249046
% Asian	-0.445338	0.330039	0.494325*	0.209143
% Hispanic/Latino	0.419704	0.283709	0.284080	0.165093
Private High School	0.142310	0.476887	0.115222	0.351854
HS GPA	-0.205547	0.160273	-0.130625	0.141693
AP Courses	0.110682	0.412739	1.057263**	0.306580
Standardized Test Scores	-0.003832*	0.001382	0.008762**	0.001068
High School Academic Engagement	0.219237**	0.015535	0.117678**	0.011068
High School Co-curricular Engagement	1.070232**	0.095260	0.920257**	0.076088
Expected Student-Faculty Interaction	0.217986**	0.013299	0.079900**	0.009176
Expected College Co-curricular Engagement	0.033002**	0.009586	0.035131**	0.008147
Pell-eligible	0.548578	0.470638	0.788854*	0.359089
Female	-1.808561**	0.334860	-0.088714	0.264112
African American	-0.716146	0.707911	1.418597	0.858785
Hispanic/Latino	0.111688	0.924908	1.410385*	0.705664
Asian	-1.878670*	0.838384	0.308775	0.795353
Other Ethnicity	-0.307582	0.749592	1.694384*	0.644835
First Generation	-0.824868*	0.419777	-0.314677	0.301356

Fixed Effect	SCE	
	Coef	SE
Intercept	65.047060**	3.212018
Private	3.251970*	1.143050
Selectivity	1.528720**	0.407360
Research	-0.540633	0.850894
Bachelor	0.108471	1.012046
Graduate Coexistence	-1.135206	0.694853
Residential Nature	0.247816	0.511662
Size	-0.282153	0.463532
% Female	-0.703931*	0.353834
% Full-time	-0.767446	0.555021
% African American	0.486287	0.401142
% Asian	-0.415225	0.298290
% Hispanic/Latino	0.177629	0.253191
Private High School	0.633113	0.509048
HS GPA	0.733953**	0.170917
AP Courses	0.634583	0.382172
Standardized Test Scores	-0.006541**	0.001393
High School Academic Engagement	0.091983**	0.016313
High School Co-curricular Engagement	0.022144	0.099405
Expected Student-Faculty Interaction	0.113114**	0.012428
Expected College Co-curricular Engagement	0.098299**	0.011048
Pell-eligible	0.084320	0.564856
Female	-0.334776	0.403968
African American	-1.853008	1.000574
Hispanic/Latino	-2.361107*	1.045672
Asian	-2.523360*	1.068116
Other Ethnicity	-2.359257*	0.810726
First Generation	0.288469	0.490205

\*  $p < .05$

\*\*  $p < .001$

In reviewing the coefficients for the academic challenge model at the student level, HS GPA and being female were positively related to the benchmark as were high school academic engagement, high school co-curricular activities, expected student-

faculty engagement and expected co-curricular engagement. At the college level, being private and more selective were positively related to the benchmark while having higher levels of graduate student co-existence on the campus had a negative relationship to the academic challenge intercept.

For active and collaborative learning, being female and having higher levels of high school engagement, high school co-curricular engagement, and expected student-faculty engagement were positively related to the benchmark. Expected co-curricular engagement was not found to be significantly related to this benchmark. At the college level, being more highly residential and having larger percentages of African American students were positively related to the benchmark. Having larger student enrollments was negatively related to active and collaborative learning means.

Student-faculty interaction demonstrated a positive student-level relationship with school academic engagement, high school co-curricular activities, expected student-faculty engagement, and expected co-curricular engagement while being negatively related to being female. At the college level, being private and having increasing percentages of African American students were positively related to the benchmark while the size of enrollment was negatively related to the benchmark's intercept.

Student characteristics that were found to have significant relationships with enriching educational experiences were having taken AP courses, standardized test scores, high school academic engagement, high school co-curricular engagement, expected student-faculty engagement, and expected co-curricular activities. The college-level characteristics related to the benchmark were being private, being more selective,

being classified as a research institution, and the percentage of African American and Asian students enrolled on campus.

For supportive campus environment, high school academic engagement, expected student-faculty engagement, and expected co-curricular engagement were positively related to the benchmark. Standardized test scores were negatively related to the benchmark. Variables at the college level that were positively related to supportive campus environment were being private and more selective while the percentage of female students was negatively related to the means of supportive campus environment. This latter relationship may be counter-intuitive, but it may reflect the level of expectations female students have for support services while on campus (e.g., female students expect more support services than are actually delivered).

Looking across the benchmarks, high school academic engagement and expected student-faculty engagement were the only student-level variables to be significantly related to all the benchmarks whereas only one college-level variable was significant across all: being a private college. There were no other college-level characteristics which proved significant for more than three of the benchmarks; high school co-curricular activities and expected co-curricular engagement were the only other student-level characteristics which were found to be significant at four of the five benchmarks. Table 4.4 provides a summary of the variables and their significance for each benchmark.

Therefore, measures of high school engagement and expected college engagement not only explained the most variance, but they also exhibited the most consistent relationship with the NSSE benchmarks. However, what is not clear is the relationship that colleges may have on influencing the expected engagement variables. As was noted

earlier, colleges themselves may shape a student's expectations for the college experience through admissions and recruitment practices. Therefore, the consistency of expected engagement may reflect either self-selection on the student's part or efforts on the college's part. Both are possible.

Table 4.4

*Significant Variables by NSSE Benchmarks*

	AC	ACL	EEE	SFI	SCE
<b>College Level Variables</b>					
Private	P	P	P	P	P
Selectivity	P		P		P
Research Bachelor			P		
Graduate Coexistence	N				
Residential Nature Size		N		N	
% Female					N
% Full-time					
% African American		P	P	P	
% Asian			P		
% Hispanic/Latino					
<b>Student-Level Variables</b>					
Private High School					
HS GPA	P				P
AP Courses			P		
Standardized Test Scores			P		N
High School Academic Engagement	P	P	P	P	P
High School Co-curricular Engagement	P	P	P	P	
Expected Student-Faculty Interaction	P	P	P	P	P
Expected College Co-curricular Engagement	P		P	P	P
Pell-eligible					
Female	P	P		N	
African American					
Hispanic/Latino					
Asian					
Other Ethnicity					
First Generation					

P positive significant relationship at .001 for student-level variables and .05 for college-level variables

N negative significant relationship at .001 for student-level variables and .05 for college-level variables

**Standardized variables and effect sizes**

Next, the study again developed a series of “intercepts as outcomes” 2-level models, but this time the variables were standardized which allowed an approximation of

the relative value of each variable's relationship with the dependent variables. Though not definitive, this analysis provided an approximation of the relative effect sizes of the significant variables. Due to the complexity of multilevel analyses, determining the exact proportion of an individual variable's effect on the dependent variable compared to that of another individual variable is extremely difficult. However, a general understanding can be gained by comparing the coefficients of the independent variables when the variables are standardized, giving the variables a mean of zero and a standard deviation change in the variable a value of 1. When standardized, dichotomous variables retain a null value of 0 and a positive value of 1. Table 4.5 provides the outcomes of these analyses once the variables were standardized. This analysis allows for a general understanding of the individual effect sizes of the college- and student-level characteristics on the NSSE benchmarks; however, because the level-1 and level-2 variables do not impact the dependent variables in the same way (level-2 variables directly affect the intercept while level-1 variables have direct effects on the dependent variable), such comparisons of variables must remain between those variables of the same level.

Table 4.5

*Standardized Fixed Effects for “Intercepts-as-Outcomes” Level 2 Model with Robust**Standard Errors*

Fixed Effect	AC		ACL	
	Coef	SE	Coef	SE
Intercept	-0.007384	0.017919	0.060251*	0.020444
Private	.132001**	0.024837	0.126117**	0.028290
Selectivity	0.136872**	0.029441	-0.003344	0.034325
Research	0.021211	0.021366	0.030457	0.026667
Bachelor	0.018993	0.035076	-0.034622	0.035340
Graduate Coexistence	-0.061666*	0.025607	-0.035397	0.029898
Residential Nature	0.011318	0.022252	0.054477	0.028953
Size	0.008613	0.034445	-0.078174*	0.038684
% Female	0.017336	0.025318	-0.006551	0.024794
% Full-time	-0.004194	0.022739	-0.022207	0.029780
% African American	0.040519	0.022159	0.086222*	0.027587
% Asian	0.032422	0.026924	-0.029042	0.032139
% Hispanic/Latino	0.022189	0.022944	0.043945	0.025905
Private High School	0.031145*	0.010862	0.006429	0.012307
HS GPA	0.067573**	0.010941	0.007171	0.010794
AP Courses	0.024319*	0.011409	0.031053*	0.011092
Standardized Test Scores	-0.017546	0.012783	0.036403*	0.013262
High School Academic Engagement	0.167368**	0.013311	0.243090**	0.012961
High School Co-curricular Engagement	0.076017**	0.010925	0.113470**	0.009889
Expected Student-Faculty Interaction	0.146222**	0.012514	0.184819**	0.012578
Expected College Co-curricular Engagement	0.072248**	0.011548	0.009461	0.011186
Pell-eligible	0.017698	0.011000	0.000732	0.009043
Female	0.041976**	0.009680	-0.055575**	0.009396
African American	-0.014071	0.014242	-0.020264	0.010940
Hispanic/Latino	-0.012055	0.010088	0.008806	0.010806
Asian	-0.023149*	0.009480	-0.022107*	0.011055
Other Ethnicity	-0.000550	0.008851	0.001000	0.009312
First Generation	-0.010194	0.012264	-0.006534	0.010270

Fixed Effect	SFI		EEE	
	Coef	SE	Coef	SE
Intercept	0.063874**	0.019033	0.014377	0.019021
Private	0.071042*	0.026161	0.074369*	0.025963
Selectivity	-0.013468	0.028213	0.095651*	0.031132
Research	0.026503	0.025961	0.047539*	0.022919
Bachelor	0.003104	0.035633	-0.047730	0.033531
Graduate Coexistence	-0.022020	0.028435	-0.072220*	0.026816
Residential Nature	0.015485	0.030040	0.039728	0.024723
Size	-0.103684*	0.039426	-0.067643	0.036261
% Female	0.013211	0.024980	-0.012419	0.023826
% Full-time	-0.009932	0.030008	-0.005776	0.028126
% African American	0.118979**	0.025476	0.110929**	0.020080
% Asian	-0.037393	0.027712	0.057035*	0.024131
% Hispanic/Latino	0.036214	0.024480	0.033682	0.019575
Private High School	0.003165	0.010606	0.003521	0.010753
HS GPA	-0.015234	0.011879	-0.013303	0.014430
AP Courses	0.002984	0.011129	0.039172**	0.011359
Standardized Test Scores	-0.037790*	0.013625	0.118725**	0.014466
High School Academic Engagement	0.197903**	0.014024	0.145968**	0.013728
High School Co-curricular Engagement	0.112189**	0.009986	0.132557**	0.010960
Expected Student-Faculty Interaction	0.220002**	0.013422	0.110807**	0.012725
Expected College Co-curricular Engagement	0.038464**	0.011173	0.056265**	0.013048
Pell-eligible	0.012087	0.010369	0.023883*	0.010872
Female	-0.049073**	0.009086	-0.003308	0.009847
African American	-0.010122	0.010006	0.027552	0.016679
Hispanic/Latino	0.001290	0.010680	0.022378*	0.011196
Asian	-0.020369*	0.009090	0.004600	0.011850
Other Ethnicity	-0.004347	0.010595	0.032908*	0.012524
First Generation	-0.022604*	0.011503	-0.011849	0.011348

Fixed Effect	SCE	
	Coef	SE
Intercept	0.012581	0.017899
Private	0.089039*	0.031297
Selectivity	0.098812**	0.026331
Research	-0.012303	0.019364
Bachelor	0.002931	0.027346
Graduate Coexistence	-0.042849	0.026228
Residential Nature	0.015707	0.032430
Size	-0.021631	0.035537
% Female	-0.043004*	0.021616
% Full-time	-0.042214	0.030530
% African American	0.027634	0.022796
% Asian	-0.033766	0.024257
% Hispanic/Latino	0.014844	0.021158
Private High School	0.013637	0.010965
HS GPA	0.052683**	0.012268
AP Courses	0.016571	0.009980
Standardized Test Scores	-0.062467**	0.013303
High School Academic Engagement	0.080416**	0.014261
High School Co-curricular Engagement	0.002248	0.010092
Expected Student-Faculty Interaction	0.110563**	0.012148
Expected College Co-curricular Engagement	0.110960**	0.012471
Pell-eligible	0.001799	0.012053
Female	-0.008798	0.010616
African American	-0.025365	0.013697
Hispanic/Latino	-0.026404*	0.011694
Asian	-0.026497*	0.011216
Other Ethnicity	-0.032295*	0.011098
First Generation	0.007656	0.013010

For academic challenge, being private (.132) and selectivity (.137) had standardized coefficients which were twice as large as graduate coexistence (-.062), making it clear that while the latter was significant, the former variables contribute the most from the college-level. At the student level, high school academic engagement

(.167) and expected student-faculty interaction (.146) had the largest coefficients amongst all the significant variables, being nearly twice those of others. This is, in part, expected given the prior findings concerning the contributions of the high school engagement and expected college engagement variables to NSSE benchmarks, but this finding would indicate that the contributions of high school co-curricular activities (.076) and expected college co-curricular engagement (.072) are only slightly higher than those of HS GPA (.068) and being female (.042).

In the case of active and collaborative learning, being private (.126) again proved to be the largest of the college-level standardized coefficients being more than 50% larger than the other significant college-level variables of enrollment size (-.078) and percent African American (.086). At the student level, high school academic engagement (.243) again exhibited the largest standardized coefficient, nearly a third higher than expected student-faculty interaction which is still relatively large at .185. Despite being the third largest of the student-level variables, high school co-curricular engagement (.113) is still double to size of the only other significant student-level characteristic, being female (-.056).

At the college level, student-faculty interaction is predominantly influenced by the size of the student body (-.104) and the percentage of African Americans (.119) enrolled on the campus. In this case, the coefficient of being a private institution (.071), while still significant, is about a third smaller than the other significant college attributes. Here again, high school academic engagement (.198) and expected student-faculty interaction (.220) contribute the most to this benchmark, with high school co-curricular engagement (.112) providing a strong third contributor. In comparison, the coefficients

for expected college co-curricular engagement (.038) and being female (-.049) are relatively minimal.

For enriching educational experiences, the percentage of African Americans on campus (.111) provided the largest increase in the benchmark, though it was still relatively close to the effect of being private (.074), institutional selectivity (.096) and graduate coexistence (-.072). Being a research campus (.048) provided the least amount of influence for the significant college variables. At the student level, high school academic engagement provided the largest coefficient (.146), followed by high school co-curricular activities (.133). This benchmark was unique in that standardized test scores had the third highest coefficient (.119) which was slightly larger than that of expected student-faculty interaction (.111). The coefficient for expected college co-curricular engagement was small (.056) with AP courses also having a minimal coefficient of .039.

For supportive campus environment, being selective provided the largest effect on the intercept (.099), while being private (.089) was a close second. The percentage of females on campus (-.043) exhibited a smaller and negative relationship. At the student level, both measures of expected college engagement had the largest coefficients (both at .111) and high school academic engagement was third (.080). Two high school academic performance measurements, standardized test scores (-.062) and HS GPA (.053), had smaller coefficients.

In summation, the results of using standardized coefficients in the models were in line with those found significant in the unstandardized models. In addition, the coefficients of the variables for high school engagement and expected college engagement were generally larger than the standard student-level characteristics,

reinforcing the prior finding that engagement and expectations for engagement provide the largest known influence on the NSSE benchmarks. In particular, high school engagement and expected student-faculty engagement had the largest coefficients across all the benchmarks, making them not only consistently influential but making them the consistently *most* influential variables on college engagement behaviors, and generally far exceeding traditional student-level characteristics. At the college-level, the variables are less consistent across the benchmarks with being privately controlled being the exception. The percentage of African American students, while consistently significant, did not prove to have a large impact on benchmarks.

### **The relationship between college- and student-level characteristics**

The final models for the study involved testing each benchmark's level-2 model to determine whether there was interaction between the level-2 variables and level-1 variables in such a way that would warrant the creation of a "slopes as outcomes" model outlined in Chapter 3. To make this determination, the intercepts level-2 model for each benchmark was adjusted to make each level-1 variable random. HLM7 then produced a variance component matrix for each of the level-1 variables which was then reviewed for significance. Given the number of variables included in the study, a p-value of .001 was established as necessary for the individual variables in an attempt to simulate an overall p-value of .05.

The results of this analysis are reported in Table 4.6. None of the variables demonstrated a significant variance which would warrant further investigation through a "slopes as outcomes" model. This indicated that there were no significant relationships

between the level-1 and level-2 variables that impact the dependent variables, and no “slopes as outcomes” models were warranted.

Table 4.6

*Analysis of Level-1 Variables with Random Coefficients*

Fixed Effect	AC		ACL	
	SD	Variance	SD	Variance
Intercept	2.36520	5.59416	3.40056	11.56379
Private High School	1.63256	2.66526	2.87780*	8.28171
HS GPA	0.34282	0.11753	0.39770	0.15816
AP Courses	1.20254	1.44610	1.33841	1.79134
Standardized Test Scores	0.00267	0.00001	0.00506	0.00003
High School Academic Engagement	0.05463	0.00298	0.06929	0.00480
High School Co-curricular Engagement	0.32417	0.10509	0.46366	0.21498
Expected Student-Faculty Interaction	0.03987	0.00159	0.07007	0.00491
Expected College Co-curricular Engagement	0.03730*	0.00139	0.04455	0.00198
Pell Recipient	1.52382	2.32202	0.95708	0.91600
Female	1.20449	1.45080	1.40058	1.96162
African American	3.14326	9.88007	1.61775	2.61710
Hispanic/Latino	1.85020	3.42323	3.39537*	11.52857
Asian	1.71910	2.95531	3.41823	11.68427
Other Ethnicity	1.02525	1.05113	3.30629	10.93156
First Generation	1.81766	3.30387	1.30711	1.70853

Fixed Effect	SFI		EEE	
	SD	Variance	SD	Variance
Intercept	3.41161	11.63910	2.51140	6.30712
Private High School	1.84273	3.39566	1.58681	2.51795
HS GPA	0.75199	0.56549	0.72240	0.52186
AP Courses	2.16630	4.69288	1.19288	1.42296
Standardized Test Scores	0.00600	0.00004	0.00498	0.00002
High School Academic Engagement	0.09850	0.00970	0.06016	0.00362
High School Co-curricular Engagement	0.33899	0.11492	0.29670	0.08803
Expected Student-Faculty Interaction	0.08267*	0.00683	0.03943	0.00155
Expected College Co-curricular Engagement	0.04163*	0.00173	0.04331	0.00188
Pell Recipient	1.81805	3.30532	1.80197	3.24711
Female	1.17254	1.37484	0.84755	0.71834
African American	1.60564	2.57807	4.56629	20.85100
Hispanic/Latino	3.17988	10.11162	3.02729	9.16446
Asian	2.48369	6.16869	2.68292	7.19806
Other Ethnicity	3.95960	15.67843	3.63272*	13.19669
First Generation	2.26907*	5.14868	1.74602*	3.04858

Fixed Effect	SCE	
	SD	Variance
Intercept	3.15273	9.93974
Private High School	1.35297	1.83054
HS GPA	0.65440	0.42824
AP Courses	1.36258	1.85661
Standardized Test Scores	0.00399	0.00002
High School Academic Engagement	0.08959*	0.00803
High School Co-curricular Engagement	0.27609	0.07623
Expected Student-Faculty Interaction	0.04896*	0.00240
Expected College Co-curricular Engagement	0.06472*	0.00419
Pell Recipient	3.20598	10.27833
Female	1.80444	3.25599
African American	2.61620	6.84451
Hispanic/Latino	4.44901	19.79371
Asian	4.27101	18.24154
Other Ethnicity	3.47052	12.04452
First Generation	2.63386*	6.93724

**Research Question 1 Revisited: To what extent are student-level characteristics, including high school engagement and expectations for college engagement, related to students' college engagement?**

Based upon the results of the first three models for each NSSE benchmark, student-level characteristics explain more than 90% of the variance in all five first-year benchmarks. Of this variance, the student characteristics which have traditionally been included in models of engagement (i.e., bio-demographic and academic performance) explain relatively little of the level-1 variance (less than 2%) while the addition of high school engagement and expected college engagement variables greatly increased the percent of level-1 variance explained by 5 and 17 percentage points. Clearly, in answer to the research question, the majority of variance for college engagement in the first year is explained by student characteristics and not those of the college, and while a great deal of

level-1 variance remains unexplained (the maximum explained for any of the benchmarks was 18.1% for active and collaborative learning), it is clear that the contribution of engagement behaviors in high school and the expectations developed for college engagement play the largest identified role in developing engagement in the first year of college. Moreover, the high school engagement and expectations for college characteristics were the most consistently significant variables across all the benchmarks, making them both strong and reliable predictors of college engagement in the first year.

**Research Question 2 Revisited: To what extent are institutional characteristics related to institutions' college engagement means after controlling for student characteristics and high school engagement and expectations for college engagement?**

As was noted earlier, the results of the first model for each benchmark indicated a relatively small amount of the variance (5.3% to 8.6%) was attributable to college-level characteristics. Though the percent of the overall variance explained was relatively low, the variables included in the fourth models were able to account for high levels of the level-2 variance (43.3% to 60.8%). It is important to remember that the college-level variables were held to a more liberal p-value of .05 to determine a significant relationship compared to the .001 value used for student-level variables. Though this follows methods used in other multilevel studies, it does warrant some caution when viewing the significance of these level-2 relationships. When compared to the traditional student-level characteristics (e.g., sex, ethnicity, Pell-eligibility, parental education, high school control, high school curricular rigor, high school GPA, and standardized test scores), the amount of overall variance explained by the college characteristics (e.g., control,

classification, selectivity, size, residential nature, graduate coexistence, percent female, percent full-time, percent African American, percent Asian, and percent Hispanic/Latino) (2% to 5%) was roughly comparable to the traditional student-level characteristics' contributions (less than 2%). However, the high school engagement and expectations student-level characteristics still provided greater explanative value than that of the college-level variables.

**Research Question 3 Revisited: To what extent do institutional characteristics influence the relationship between student-level characteristics, including high school engagement and expectations for college engagement, and college engagement?**

In reviewing the preliminary analysis for developing a fifth “slopes as outcomes” model for each benchmark, no significant levels of variance were seen across the level-1 variables that could then be explained by level-2 variables. As a result, this study could not identify any significant relationship between a college-level and student-level characteristics.

### **Summary**

College engagement in the first year, as defined by the NSSE benchmarks, is predominantly a product of the student-level characteristics. The contributions of college characteristics are low, generally explaining less than 10% of any variance discovered. However, the characteristics traditionally used to determine a student's contribution to college engagement are also poor at explaining college engagement at the first year. Of the variables explored in this study, those for high school engagement and expected college engagement explained the largest amounts of variance. No significant

relationships were found between student and college variables that would have led to the development of a “slopes as outcomes” model. This latter finding further emphasizes that the influence of college-level characteristics on college engagement during the first year is rather limited.

The contributors to each benchmark were not the same across all the benchmarks, but there were some which were commonly significant across four or five benchmarks. When looking at the variables individually, the most consistent college characteristics were being private, being more selective, and the percentage of African American students enrolled on campus. The first had a positive relationship with all forms of engagement while the other two showed positive relationships with three of the five benchmarks. At the student level, high school academic engagement, high school co-curricular activities, expected student-faculty engagement and expected co-curricular engagement were the most consistently significant. Each of these had significant positive relationships with at least four of the engagement benchmarks. None of the traditional bio-demographic or academic performance variables were consistently significant across all the benchmarks, and only being female exhibited a positive relationship with two of the benchmarks and a negative relationship with a third. When looking at their standardized coefficients, the variables for high school engagement and expected college engagement also demonstrated the largest effects of all student-level characteristics on the benchmarks. As a result, not only were the variables for high school engagement and expected college engagement the largest identified contributors to college engagement, they were also the most consistent across all the benchmarks.

## **Chapter 5: Conclusions and Implications**

This chapter begins with a summary of the purpose of this study followed by a discussion of the study's methods and results. Next, it presents conclusions based on the findings about the relationships between student-level and college-level characteristics and college engagement. Finally, the chapter will close with a discussion of the study's implications for both research and practice.

### **Summary of the Study**

College engagement has taken a prominent place in the study of college success—particularly as a positive influence on retention and graduation. Interest in increasing college engagement has grown as improving college retention and graduation has become a national priority for higher education (Adelman, 2006; Bok, 2006; Bowen & Bok, 1998; Obama, August 9, 2010). Despite this national attention, more than 40% students fail to graduate from college within six years, a number that has remained fairly stable since the early 20<sup>th</sup> Century (Bean, 1980; IES: National Center for Educational Statistics, 2010; National Center for Education Statistics, April 2012; National Center for Higher Education Management Systems for Higher Education for Policymaking and Analysis, 2013). Given the prevalence of high impact practices that target first-year engagement, one would expect to see increases in first-year engagement over the past decade. However, like retention and graduate rates, national increases in engagement have not been realized. Since most attrition occurs in the first year of college, fostering engagement in the first year is a national priority.

While scholars agree that both students and colleges contribute to increasing engagement, most studies to date focus on the college's role in promoting student

engagement (Astin, 1977, 1993; Bean, 1980; K. A. Feldman & Newcomb, 1969; Gellin, 2003; Kuh et al., 2000; Kuh, Kinzie, Buckley, et al., 2007; Kuh et al., 1997; Pace, 1990; Pascarella & Terenzini, 1991; Pike, 1995; Pike et al., 2003; Tinto, 1993). As a result, colleges devote significant institutional resources to provide programming targeted at promoting engagement. While studies have shown that specific programs can improve engagement, as was noted, overall gains in national measures of engagement have not greatly increased despite more than a decade of intensive attention by colleges to promote increased engagement (Koljatic & Kuh, 2001). Moreover, at least one recent study has found that the majority of variance in first-year engagement is not explained by college characteristics (Pike et al., 2011). The major factors contributing to college engagement, then, must reside with the student more than the college.

The student's role in promoting their engagement is understudied to date. While they do not make it a focus of their research, Bean (1980), Tinto (1993) and Kuh (2006; 2008) agree that a student's experiences prior to college and their expectations for the college experience play key roles in their college success. Because engagement behaviors cross from one environment to another (Astin & Lee, 2003; Dong & Cole, 2011), students may have learned engagement behaviors in high school that will make them more likely to be engaged in college. In addition, the high school environment may also influence students' the expectations for the college experience that will also prove critical to their engagement in college.

On their side, colleges pre-select students both actively (via the admission process) and passively (via recruitment and marketing); therefore, much of the research regarding engagement may overemphasize the role of the college in fostering

engagement—particularly in the critical first year—and be subject to selection bias. In short, despite the efforts of colleges to improve engagement, students may be “built and selected to engage” prior to ever enrolling on a college campus, an aspect of college engagement that has been relatively ignored prior to this study.

### **Purpose and Value of the Study**

The purpose of this study was to determine the relationships between high school engagement and expected college engagement on first-year college engagement net of the effects of other student-level and college-level variables. College engagement was defined according to the Benchmarks of Effective Educational Practice utilized by NSSE, and variables for high school engagement and expected college engagement were constructed based on similar activities and expectations from the BCSSE. Additional student-level and college-level variables were included based upon a review of the literature. Three research questions guided this study:

1. To what extent are student-level characteristics, including high school engagement and expectations for college engagement, related to students’ college engagement?
2. To what extent are institutional characteristics related to institutions’ college engagement means after controlling for student characteristics and high school engagement and expectations for college engagement?
3. To what extent do institutional characteristics influence the relationship between student-level characteristics, including high school engagement and expectations for college engagement, and college engagement?

This study is of value because it expands the current knowledge regarding the student-level and college-level characteristics that influence first-year college engagement. Up to this point, no studies have adequately integrated variables for high school engagement and expected college engagement into models reviewing college engagement across national samples of data and using appropriate multilevel modeling techniques.

The findings of this study can be used by multiple audiences. College administrators can improve admissions practices in the selection of students who are an appropriate fit for their institution and develop academic and student life programming to better support those students they do enroll. Policy makers can take high school engagement and expected college engagement into consideration when developing policy to promote college success. High school teachers and administrators can improve the programming they deliver to students while in high school to foster behaviors and expectations that will foster college engagement. Students and families will better understand that a successful college experience depends upon more than academic success but also upon high school engagement and expected college involvement.

### **Data and Methods**

This study used data from the 2007, 2008 and 2009 administrations of the BCSSE and the 2008, 2009 and 2010 administrations of the NSSE. Across these three years, 47,605 students completed both the BCSSE at the beginning of their first year of college and the NSSE at the end of their first year. A random sample of 15,000 student records from 195 colleges was selected, and of these records, 8,621 from 179 colleges remained

in the sample after eliminating missing data and institutions which were beyond the scope of this study.

To answer the research questions posed by this study, a series of 2-level multilevel models were developed using the HLM7 statistical software package. To answer the first and second questions required five models for each NSSE benchmark. The first was an “intercepts only” model which provided an estimate of the variance for each benchmark attributable to student-level and college-level characteristics. The second model introduced standard student-level variables, and the level-1 variance of the second model was compared to the first “intercepts only” model to determine the amount of variance explained by the standard student-level variables. The third model built upon the second by adding high school engagement and expected college engagement variables to the model, and again the variance was compared to the first “intercepts only” model to determine the amount of variance explained by these new variables. The fourth model was an “intercepts as outcomes” level-2 model that built upon the third model by introducing college-level variables as influencers on the intercept. The college-level variance of the fourth model was then compared to that of the first “intercepts only” model to determine the amount of variance explained by the college-level variables. To determine an estimated effect size for individual variables, a fifth “intercepts as outcomes” model was developed for each benchmark using standardized values for the variables. In this way, a rough estimation of each variable’s contribution to the equation could be ascertained.

To answer the third question required an exploration of the variance of each student-level variable to determine whether a “slopes as outcome” model would be

warranted for each benchmark. To do this, the fourth model from above was revisited and the residual term for each student-level variable was set as being random rather than fixed, and standard deviations and variances were computed for each variable which could then be evaluated for significance using a chi-square statistic. A p-value of less than .001 was determined necessary for a variable to warrant the further development of a “slopes as outcomes” model.

## **Results**

Engagement in the first year is predominantly a product of the characteristics that the student brings with them to campus. While college characteristics explain a small amount (less than 10%) of the variance seen for each of the benchmarks, the overwhelming majority of the variance still resides with student characteristics. The largest amount of the student-level variance was explained by the introduction of variables for high school engagement and expected college engagement, accounting for up to 16% of all the student-level variation seen in the benchmarks. However, the amount of variance explained by the models varies depending upon the benchmark. The models explained 20% of the variance for both active and collaborative learning and student-faculty interaction, 17% of academic challenge, 15% of enriching educational experiences, and only 8% of supportive campus environment. Therefore, the effects of the variables included vary depending upon the type of college engagement of interest.

At the student level, traditional bio-demographic and academic performance student characteristics explained relatively little (less than 2%) of the overall variance. Moreover, the results of the level-2 “intercepts as outcomes” model indicated that the significance of these variables varied from one benchmark to the next. None of these

characteristics included in the study proved significant for more than three of the benchmarks, and only one, being female, exhibited a significant relationship with three of the benchmarks (academic challenge, active and collaborative learning, and student-faculty interaction). In contrast, all of the variables included for high school engagement and expected college engagement proved to have significant positive relationships with at least four of the benchmarks, making them a more reliable contributor to all types of first-year college engagement. Moreover, these variables explained far larger amounts (5% to 16%) of the variance of the benchmarks. Despite the ability for these variables to prove significant, there still remains a great deal of the student-level variance that remains to be explained.

While the college-level variables proved limited in their value to explain the variance, a great deal of the college-level variance (40% to 60%) was explained by the variables included in the study. Private institutions were routinely more likely to be linked with all forms of college engagement in the first year, and having larger percentages of African American students enrolled on campus was seen as being positively related to all of the benchmarks except for supportive campus environment. Selectivity—exhibiting positive relationships with academic challenge, enriching educational experiences and supportive campus environment—was the only other characteristic which proved to have a significant relationship with more than two of the benchmarks.

The results of the models using standardized values provided an estimate of the effect sizes of the individual variables. Levels of significance were consistent with those of the non-standardized models. The coefficients for high school academic engagement

and expected student-faculty engagement were generally the largest significant variables across all the benchmarks. High school co-curricular activities and expected co-curricular engagement were only slightly less consistently significant with smaller coefficients. At the college-level, even though being private was consistently significant across all the benchmarks, the size of its coefficient in relation to other college-level characteristics did not indicate that it was consistently the largest contributor. These results further underscore the value of including high school engagement and expected college engagement into studies of college engagement as a consistent and strong contributor to college engagement.

The investigative analysis of the variance of the student-level variables to address the third research question did not indicate significant variance that could be explained through additional modeling. As a result, no additional “slopes as outcomes” modeling would have proven useful, and no significant relationships were determined to exist between the college-level variables and the student-level variables. Therefore, the influences of college-level characteristics were limited to the intercept only, and no indirect effects, mediated through student characteristics, were observed.

### **Conclusions**

Three conclusions can be drawn from the result of this study:

*1) Student-level characteristics are responsible for the majority of first-year college engagement.* Many colleges devote significant amounts of resources to promote college engagement in the first year. Intensive freshman seminars, themed-learning communities, first year experiences, and similar programming command much attention as tools to foster increased engagement. However, reviews of such programs rarely

control for self-selection and certainly, being campus-specific, are unlikely to consider the pre-selection that occurs through the admissions process. All of this is predicated on the assumption that colleges have significant control over the levels of engagement in the first-year of college.

Based on the results of this study, this assumption is unfounded. Colleges have relatively little influence on the overall levels of engagement during the first year of college. Over 90% of all variance in college engagement benchmarks resides with student characteristics, and while the college's contributions are not inconsequential, students themselves appear to be "built" to engage or not engage prior to enroll. Students are far from being "tabula rasa" upon entering college; instead, they appear to be nearly fully drafted texts. While campuses may vary in the types of engagement available to students, the ability to gain from those programs and services still depends upon student characteristics. An exception to this may be the college's role in developing the expectations a student has for college engagement, which was shown to be highly influential on first-year college engagement; however, for the purposes of this study, these expectations were treated as a student-level characteristic. Given that students generally consider multiple colleges during the selection process, it is unclear how much a single college will influence the expectations for its own campus.

This conclusion should come as little surprise, yet it is contrary to much research. Prior to arriving on campus, students have had 18 years to develop knowledge, behaviors, perceptions and expectations that will impact their college experience. To assume that colleges would be able to discard these characteristics in nine months is unrealistic.

2) *High school engagement and expected college engagement have larger relationships with college engagement benchmarks than traditional bio-demographic or academic student-level variables or college-level characteristics.* Traditionally, emphasis on college success has focused on a student's high school academic performance—their test scores, grades or curricular rigor. The use of other characteristics is generally used to differentiate between students with similar academic measures. While the students in this study were all admitted to colleges, it can be noted that once admission had been gained, the value of academic performance as well as bio-demographic and financial characteristics on levels of engagement are negligible, generally accounting for less than 2% of any variance observed. Put more simply, once a student has gained admission to college, traditional pre-college factors fail to influence, in a significant way, college engagement.

This is not to say that academic preparation has no relationship with college success. Viewed in a different way, this may mean that academic measures, while used to determine academic ability to succeed, are of limited value after that threshold has been met. Failure to persist, however, has little to do with academic ability (Adelman, 2006; Bean, 1980, 1990; Tinto, 1993). It may be appropriate to determine admission on their academic performance, and this may in fact be happening quite well if students are academically succeeding on the campuses to which they enroll. However, the current research indicates that, after this threshold has been met, their overall engagement depends almost entirely upon other pre-college factors.

Instead, the characteristics that matter most to college engagement are those measuring similar types of engagement in high school and expected engagement in

college. Students who enter college with a great deal of experience and expectations on how to engage in educational settings engage more than those who do not. While a great deal of variance remained unexplained (80% or more) for the benchmarks, this exploratory study was able to attribute the most powerful indicators of college engagement was an engaged high school expectations and an expectation for an engaged college experience.

*3) The relationships between the college-level characteristics and the student-level characteristics are limited in their effect on college engagement.* Contrary to expectations, this study found no evidence of secondary relationships between student-level and college-level characteristics which influenced college engagement. In short, a college does not “enhance” the effect a student’s individual characteristics may have on his or her college engagement. As a result, a college’s role in promoting engagement is uninfluenced by student characteristics. For example, all students, once admitted to a campus, will benefit from that college’s characteristics in the same way; an African American student or female student or high achiever will all receive the same college-level effects once they enroll at that college. However, students must, of course, gain admission before enrolling, and this admission process may “pre-select” the students enrolling on its campus and therefore ensure that the students enrolling are most likely to equally gain from the college environment regardless of their own individual characteristics.

### **Implications for Research**

These conclusions support future areas of research to increase the understanding of college engagement and its relationships to high school engagement and expected college engagement.

*1) There is value in developing and refining instruments to assess engagement in high school and expected college engagement.* The significant levels of variance of college engagement which is attributable to student-level characteristics support further research in students' engagement in high school and their expectations for college engagement. There is a lacuna in definitive research surrounding these attributes. A key limitation to the study of these attributes is the availability of data. Beyond the BCSSE and the CSXQ, there are no nationally administered instruments for high school engagement or expected college engagement. However, even these instruments have limitations. For example, the BCSSE has not been robustly tested for psychometric properties, nor is its administration as consistent as that of the NSSE. As for the CSXQ, it only measures expectations for college, and is therefore of limited value. Both rely on self-reported data, which may be valid, but the research would be greatly enhanced with more accurate measures of actual high school behavior.

Therefore, more robust instruments for assessing high school engagement and expected college engagement should be developed. Benchmarks should be developed that will consistently and reliably provide meaningful indicators of high school student behaviors and expectations. These instruments should also incorporate bio-demographic, SES, and academic performance characteristics. This would allow future research to understand the levels of high school engagement and expected college engagement

students exhibit as well as review the relationships between high school engagement and expected college engagement with other student-level and high school characteristics. These instruments should also include the high school identifiers, so that students can be clustered within high schools and within colleges for the purposes of cross-cluster hierarchical modeling.

*2) The study of engagement should span both the high school and college environments using multilevel modeling to fully understand the contributors to college engagement.* The current research on college engagement is predominantly limited to the impact of college characteristics; however, it is clear that students exhibit significant levels of engagement in high school which in turn influence their engagement in college. This cross-environment existence of engagement is not a new concept and was incorporated into Tinto's (1993) model, yet most research has overlooked pre-college engagement and expectations. This broader scope could expand engagement from being a concept fragmented by systemic breaks in the educational system (i.e., college engagement vs high school engagement) to a broader concept of educational engagement which incorporates similar behaviors which are desired and fostered by *any* educational environment.

Multilevel modeling is also fundamental to the understanding of engagement across national datasets. As was noted in Chapter 3, standard OLS analysis is prone to generating flawed results when reviewing students who are clustered in groups, in this case, in colleges. The benefits of multilevel modeling allows for a robust estimation of the amount of variance attributable to student- or college-level variables, as well as more accurate estimates of the fixed effects of individual characteristics. In addition, should the

data allow, cross-classified multilevel modeling techniques should be explored to control for the clustering of students within high schools as well as in colleges.

*3) Studies of persistence and graduation should incorporate measures of high school engagement and expected college engagement to understand their role in fostering persistence particularly in the first year.* Prior research has indicated that increased levels of college engagement have relationships with increased persistence and graduation (Astin, 1977, 1993; Bean, 1980; K. A. Feldman & Newcomb, 1969; Gellin, 2003; Kuh et al., 2000; Kuh, Kinzie, Buckley, et al., 2007; Kuh et al., 1997; Pace, 1990; Pascarella & Terenzini, 1991; Pike, 1995; Pike et al., 2003; Tinto, 1993). Moreover, a majority of all failure to return (and consequently to graduate) occurs in the first year. As such, expanding these studies may discover direct relationships between persistence and graduation with pre-college engagement and expectations without being mediated by college engagement benchmarks.

Particular attention should be given to expectations in light of Tinto's concept of "fit." While high school engagement provides students the tools to take advantage of the college experience, expectations may prove more vital to student retention. As both Kuh et al (2005) and Tinto (Tinto, 1993) note, students' expectations better enable them to capitalize on the opportunities a campus provides. Moreover, inaccurate expectations for the college experience can lead to disenchantment with the college experience (both with the individual college or with higher education as a whole) and developing an intention not to return, a prime indicator of attrition (Bean, 1980). If engagement behaviors are the tools to college success, expectations may provide the creative vision necessary to use them.

*4) Research on high school outcomes should be expanded to include measures of high school engagement and expected college engagement in addition to academic preparation.* High school outcomes have increasingly focused on student performance on standardized tests, levels of students participating in advanced curricula, and graduation rates. While academic preparation and graduation may be beneficial to gain entrance to college and prepare students for academic success in college, these measures appear to have little to do with whether or not a student is engaged in college. Educators insist that high school students are more than transcripts, but for the purposes of most research and educational assessment, that is precisely what they are. This blind spot in the research creates a mismatch between the efforts of high schools to measure the success of students and the traits that are truly necessary to be successful in college. Research of high school preparation should therefore seek to incorporate measures of high school engagement and the expectations their students have for college alongside measures of academic preparation. These measures of engagement and expectations should be viewed as just as desirable as those for academic preparation, and further, researchers should look into the predictors of higher levels of high school engagement and expected college engagement. In this way, high school educators can then expand their definitions of successful student outcomes and the factors that contribute to them.

### **Implications for Practice**

While an exploratory study which will require further research to validate and refine its findings, this study does point towards four major recommendations for practitioners:

*1) High schools should place greater emphasis on fostering an engaged experience for all students' just as much as academic preparation.* In the current environment, high schools are under pressure to reduce costs and increase student academic performance, most commonly through standardized examinations (oftentimes state examinations). The emphasis on reducing costs oftentimes leads to greater student-faculty ratios or to the elimination of co-curricular programming, while the emphasis on increasing academic performance drives the remaining resources and time into focusing on curricular performance. The result is a diminishment of teaching, programming and counseling resources and time which would help foster high school engagement and expected college engagement. Based upon the findings of this study, this shifting of resources towards curricular efficiency and performance will produce little benefit to college engagement and, by taking resources away from co-curricular activities and reducing the time available for teachers, counselors and administrators to interact with students on an informal basis, may even undermine college engagement.

High school teachers and administrators should look to ways to increase the participation of students in co-curricular activities as well as ensure that students and teachers can interact in more than curricular endeavors. Students should be encouraged to participate in the classroom through discussions and group work. Teachers should be given the time to give critical and thoughtful feedback to their students and model the types of interactions that the students will eventually need to have with college faculty. Moreover, teachers and administrators should be encouraged and rewarded to participate in co-curricular activities in an effort to both expand the number of such activities

available to students but also further expand the opportunity for students to interact with them.

Meaningful education about the college experience should also become a larger role of high school teachers and administrators. Teachers should actively discuss with students the differences between the high school and college experiences to develop accurate expectations for college engagement. Schools should devote adequate resources to college counseling offices which would conduct workshops and school visits to colleges as well as meet individually with students to monitor and increase the accuracy of their expectations for college engagement.

This recommendation should not be seen as a condemnation of high school teachers and administrators, who oftentimes understand the importance of these efforts. It is, however, a call for school administration to return these efforts into the mainstream of their mission rather than marginalizing them for the sake solely focusing on academic preparation.

*2) High schools and colleges should partner to increase levels of expected college engagement.* A primary finding of this study is that college engagement is a product of both the high school and college environments. Colleges who wish to increase college engagement within the first year have a vested interest as well as a role in expanding the numbers of students who have high and accurate expectations for college engagement. Indeed, colleges should see themselves as partners with high schools and embrace their role in developing meaningful and appropriate expectations for college engagement. In short, colleges must realize that the foundation for a student's successful engagement on their campus begins while he or she is in high school, and as such, colleges have a vested

interest in developing partnerships with high schools to engender high levels of expected college engagement within future college students.

With this in mind, colleges should collaborate with high schools to help them develop accurate expectations for students regarding their college experience. This could take the form of on-campus programming for younger students, an increase in the numbers of pre-college and summer programming offered to high school students of all ability types, and regular communication between high school teachers and college faculty regarding the successful student-faculty interaction practices.

*3) Colleges should incorporate levels of high school engagement and expected college engagement in their enrollment planning and student support programming.*

While some campuses may incorporate some indicators of high school engagement and expected college engagement into their admissions practices, most colleges, particularly public campuses, may overly emphasize HS GPA, standardized test scores, and curricular rigor in their admissions practices (Clinedinst & Hawkins, 2010). Particularly in areas where a student's academic indicators may in be "on the cusp," a student's prior engagement and expectations may prove useful in determining a student's likelihood for success on the campus.

Even more important would be incorporating these characteristics into academic advising and support programming. This is in accord with one of the stated purposes of BCSSE (National Survey of Student Engagement, 2014). Incorporating BCSSE or similar data into advising sessions at the point of new student orientation could provide colleges with timely and meaningful data to determine which students may need additional support to take advantage of engagement opportunities during their first year. Such

information could be a powerful element of a college's "program of care" for its incoming students. In developing such programming, colleges should conduct their own research to determine the beneficial engagement and expectation factors important to their campus.

Please note that it is not the intent of this recommendation for colleges to exclude students based on this information, but instead to use it as a means to be more inclusive and to make better decisions regarding which students might be successful on their campus as well as how to support those students once they enroll.

*4) Policy makers should incorporate high school engagement and expected college engagement as desired outcomes of high school and as necessary prerequisites for college success when determining public policy and allocating educational resources.*

Current discussions regarding preparation for college revolve around the academic performance a student achieved in high school, in part due to Adelman's (2006) work. In an effort to foster this success, policy makers have undermined the role that informal interaction with teachers and high school administrators through both the classroom as well as in co-curricular programs play in college success.

Policy makers should pause and reassess their strict focus on academic preparation and integrate research regarding high school engagement and expected college engagement. Both of these factors should be added as desirable outcomes of high school alongside other measures of academic preparation. The findings of this study demonstrate that focusing solely on academic preparation will have limited benefits regarding college engagement.

**Final Word**

Student engagement in college has gained significant attention from scholars and practitioners because of its relationship with desirable college outcomes, particularly persistence and graduation. With growing national attention on increasing college graduation, it is essential that students, parents, high school teachers and administrators, college administrators, and policy makers fully understand the contributing factors behind college engagement, a strong indicator of college persistence and graduation. This study has demonstrated that high school engagement and expected college engagement have key relationships with multiple forms of college engagement. Not only do they prove to have consistent relationships with college engagement, they also proved to be the largest identifiable relationship with college engagement, making them more important than bio-demographic traits, high school academic measures, or college characteristics. As a result of this study, discussions of college engagement, and perhaps of all college success measures, should be expanded to further look at the contributions of high school engagement and expected college engagement to college success.

In a broader sense, this study revisits a question raised by earlier studies of college gains: Are the gains exhibited by college graduates due to the college experience itself or due to simple maturation? Recent studies of college engagement have emphasized the role of the college experience and the actions and programs of the colleges themselves, but the older studies of Feldman and Newcomb (1969) and Trent and Medsker (1968) supposed maturation as a significant factor in student gains beyond graduation. While the current study did not include non-enrollees and therefore could not measure their success out of college, it did indicate that the role of the college in fostering

engagement was far less than that contributed by the student's own characteristics. Since the student contributes the most to first-year college engagement, it may be plausible that students continue to contribute to their success throughout the college experience.

Moreover, it is also possible that these same students could leverage other environments to see similar gains—a topic that, while beyond the scope of this study, still deserves investigation.

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