STUDENT-FACULTY INTERACTION AND ITS RELATION TO SATISFACTION, ASPIRATION, AND COLLEGE GPA FOR FIRST-GENERATION COLLEGE STUDENTS

by

KELLY W. TALBERT

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Student: Kelly W. Talbert

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This dissertation has been accepted and approved in partial fulfillment of the requirements for the Doctor of Education degree in the Department of Educational Methodology, Policy, and Leadership by:

Gerald Tindal	Chair
Joseph Stevens	Core Member
David Conley	Core Member
Kenneth Doxsee	Institutional Representative

and

Kimberley Andrews Espy	Vice President for Research and Innovation; Dean of the Graduate School

Original approval signatures are on file with the University of Oregon Graduate School.

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DISSERTATION ABSTRACT

Kelly W. Talbert

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This study explored whether the effects of student-faculty interaction on various outcomes - degree aspiration, college GPA, satisfaction with faculty contact, and satisfaction with the college experience - vary by student gender, ethnicity, social class, and first-generation status. The study used data on 95,537 students attending nine colleges who took the 2011 administration of the Student Experience in the Research University (SERU) survey. The findings revealed differences in the frequency of student-faculty interaction by social class and ethnicity, differences in the level of satisfaction with advising and access to faculty by social class, and positive relations between degree aspiration and specific interaction behaviors. The findings provide implications for educators, administrators, and others charged with maximizing the benefits of student-faculty interactions for all students to positively affect college persistence and retention.

CURRICULUM VITAE

NAME OF AUTHOR: Kelly W. Talbert

GRADUATE AND UNDERGRADUATE SCHOOLS ATTENDED:

University of Oregon, Eugene

DEGREES AWARDED:

Doctor of Education, 2013, University of Oregon
Bachelor of Arts, Journalism, 2000, University of Oregon
Bachelor of Arts, Spanish, 2000, University of Oregon

AREAS OF SPECIAL INTEREST:

College Retention
Higher Education Enrollment Management

PROFESSIONAL EXPERIENCE:

Senior Assistant Director for Recruitment, UO Admissions, 2007 to present
Assistant Director, UO Admissions, 2006-2007
Admissions Counselor, UO Admissions, 2001-2006

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For my parents Mike and Sharon Woolfolk, who told me I could successfully navigate any path in life that I chose to walk. And for my husband Erik, who walks beside me.

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CHAPTER I

INTRODUCTION AND LITERATURE REVIEW

Researchers have paid significant attention to the factors that contribute to the rates of postsecondary non-completion among students. Interaction with faculty—whether it occurs during lab research, office visits, or class time—has been identified as one of the key aspects affecting student engagement and persistence. My literature synthesis explores factors affecting college completion for first-generation college students, with a particular emphasis on student-faculty interaction as a construct of interest. In this synthesis I will discuss findings regarding the effect of institutional size and characteristics on student engagement, as well as the precollege attributes of students' lives that may disproportionately affect certain undergraduates' ability to interact with faculty. I provide an overview of previous findings regarding the general and conditional effects of student-faculty interaction on academic performance and degree aspiration, particularly as they relate to race and ethnicity, first-generation students (defined here as students for whom both parents did not complete formal education beyond high school), social class, and gender. Common student engagement instruments are described, with particular emphasis on the SERU survey used in the current study. It is valuable for institutions to consider how various types of academic engagement are related to student outcomes. Contributing to the knowledge base in this area enables postsecondary institutions to identify students who may be at a higher risk of not completing college, and make strategic decisions regarding outreach and development resources aimed to assist them.

Research of Student Engagement, Student-Faculty Interaction and Retention in Colleges and Universities

Researchers have been studying the impact college has on students for several decades, analyzing myriad aspects such as academic gains, psychosocial development, occupational and economic outcomes, and conceptions of morality and civic engagement (Feldman & Newcomb, 1969; Pascarella & Terenzini, 2005). The topic of student engagement and its relation to college outcomes became a more prominent construct of interest in the 1970s, with researchers primarily analyzing how it related to students' choice to stay in college (widely called "retention"), as well as choices related to consistency and patterns of enrollment toward degree attainment, referred to as "persistence" (Astin, 1977; Pascarella, 1980; Pascarella & Terenzini, 1976; Tinto, 1993). As a result, theoretical frameworks seeking to explain and predict the interaction between student engagement and college retention emerged; I will briefly discuss the most prominent theories and recent developments to our understanding of these frameworks here. Additionally, researchers have sought to parse out the many behaviors and characteristics that form the construct of student engagement (Bean, 1980; Bean & Metzner, 1985; Braxton, Sullivan, & Johnson, 1997; Tinto, 1993).

One key student engagement behavior is interaction between students and faculty. There is now substantial empirical evidence pointing to the beneficial effects of student-faculty contact (Astin, 1993; Bean & Metzner, 1985; Cabrera, Colbeck, & Terenzini, 2001; Kim, 2010; Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006; Pascarella & Terenzini, 2005; Tinto, 1993). In the second edition of the landmark *How College Affects Students*, Pascarella and Terenzini (2005) follow up on previous meta-analyses of college

impact research of the previous three decades, and add findings of research from the 1990s and early 2000s. Their conclusion was consistent with Pascarella's (1980) finding that, even after controlling for a range of student input characteristics, statistically significant positive relations exist between both formal and informal types of student-faculty interaction, and a variety of student outcomes grouped into five categories: career plans and educational aspirations, satisfaction with college, intellectual and personal development, academic achievement, and college persistence. Student-faculty interactions that are both formal (e.g., classroom-based conversations) and informal (e.g., meetings with a professor outside of class for a project) are the behaviors of interest in this study as they relate to outcome variables of college GPA, degree aspiration, satisfaction with access to and advising by faculty, and overall satisfaction with the college experience.

Theoretical Frameworks

There are a variety of theoretical frameworks that address and explain student-faculty interaction and its relation to college students' persistence and retention. Perhaps the best known is Tinto's (1975) theory of student departure. Astin's (1984) student involvement theory is particularly relevant to the research question and conceptual approach of this study. Using these theories as a foundation, this literature review describes revisions and expansions on these theories that have emerged in the last two decades, with particular attention given to the Berger and Milem (1999) model. Berger and Milem (1999) proposed a model that connects key social and academic integration components of Tinto's (1975) model and student involvement behaviors of Astin's (1984) model. While it has not been widely tested, Berger and Milem's (1999) model

provides perhaps the most comprehensive predictive representation of how student-faculty interaction and other behaviors relate to students' persistence and retention patterns.

Tinto's theory of student departure. Tinto's (1975) interactionalist student departure theory is widely cited, and for a few decades enjoyed what Braxton (1999) called "nearly paradigmatic stature" (p. 93), as a concept to guide the connections among persistence-related variables within the college experience. Tinto (1987, 1993) stated that students' precollege characteristics will not only predict the degree of commitment they will have to the institution, but will also predict their likelihood of dropping out. The three primary characteristics in the model are family background, individual attributes, and precollege schooling experiences. Family background elements include social class and parent education level, individual attributes include academic ability, race, and gender, and precollege experiences include measures of academic ability in high school like grades or test scores. According to Tinto (1975), these characteristics explain the level of students' goals and commitments, their integration into the social and academic life of the campus, and their subsequent likelihood of departing college without a degree. Tinto's (1975) descriptions of how these characteristics interact resulted in 13 propositions that are empirically testable. Tinto (1993) subsequently added precollege attributes that may influence academic or social integration. Pascarella's (1985) General Model for Assessing Change shares many of Tinto's key factors, with additional weight given to direct and indirect effects of an institution's structure and environment on students.

Astin's student involvement theory. According to Astin (1984), student involvement is defined as "the quantity and quality of the physical and psychological energy that students invest in the college experience" (p. 528). Drawing from his previous research in the 1970s on college dropouts, Astin sought to identify factors in students' environment that were critical to their persistence towards earning a degree. As the author reported, "the factors that contributed to the student's remaining in college suggested involvement, whereas those that contributed to the student's dropping out implied a lack of involvement" (Astin, 1984, p. 523). According to the theory, the more a student is involved the greater his or her educational and personal development will be. Within Astin's (1984) discussion of student involvement theory, student-faculty interaction is noted as one of six key types of involvement affecting developmental outcomes. The author asserted that "Frequent interaction with faculty is more strongly related to satisfaction with college than any other type of involvement or, indeed, any other student or institutional characteristic" (Astin, 1984, p. 525). Astin (1993) further expanded on his theory with the Input-Environment-Outcome model, or I-E-O model, which seeks to control for input and environment characteristics when evaluating the outcome of assessments used in the classroom. Astin (1993) defined inputs as "those personal qualities the student brings initially to the education program (including the student's initial level of developed talent at the time of entry)" (p. 18). Environment "refers to the student's actual experiences during the educational program" (Astin, 1993, p. 18). Outputs "refer to the 'talents' we are trying to develop in our educational program" (Astin, 1993, p. 18). Outputs were considered to be outcome variables such as GPA, test scores, persistence and degree attainment, and course satisfaction.

Revisions and reconsiderations of student engagement and persistence models. From early on, researchers studying college retention and academic integration supported the general effects of student-faculty interaction on outcomes like GPA, persistence, satisfaction with experience overall, and other educational outcomes (Astin, 1993; Cabrera et al., 2001; Pascarella, 1980). Empirical findings support the beneficial impact of both formal (within the classroom) and informal student-faculty interaction on degree persistence and attainment (Pascarella & Terenzini, 2005). Institutional characteristics such as size, admission selectivity or type (such as public versus private) have also been a topic of interest for some time (Kamens, 1971; Kim et al., 2003). Hurtado and Carter (1997) argued that Tinto's (1975) model for explaining retention does not make space for the role that institutional characteristics may play in influencing student persistence. A Boyer Commission report suggested that access to faculty interaction may be easier for students attending small, liberal arts colleges and tougher for students attending large research universities (Boyer Commission on Educating Undergraduates in the Research University, 1998). Astin (1977), Astin and Chang (1995), and Kim and Sax (2009) asserted that students at large research universities tend to encounter challenges to accessing faculty for two main reasons: (a) the larger class sizes on average, which limit the opportunity to interact one-on-one; and (b) the tendency for research universities to focus faculty on graduate students, which leaves undergraduates at a disadvantage for such interaction. Stoecker and Pascarella (1991) found that, at most, institution size plays an indirect negative role in educational attainment, and even that role might be overstated." Pascarella and Terenzini's (2005) supported that idea in their meta-analysis, which found the overall effect of institutional

size to be generally nonsignificant. Kuh et al. (2006) found that large institutions actually performed better on some aspects of engaging students, concluding that "estimating institutional performance in terms of student engagement requires probing more deeply into the nature of the student experience at a particular institution because not all colleges of certain types and sizes are comparable on these types of indicators" (p. 36). Titus (2004) concluded that when it comes to persistence, differences between colleges and universities may not be as important as differences between students in regard to their degree aspirations, commitment to college, and experiences within the institution.

As they did with institutional size, researchers began taking more interest in exploring beyond general effects to understand if the impact of student-faculty interaction varied for different kinds of students. Studies emerged that disaggregated samples by student-level characteristics such as gender, race, parent education level and socioeconomic status (Allen, 1999). As a whole, their findings generally identified what Kim and Sax (2009) called a "conditional" relation, which "assumes that the effects of the same intervention or experience might not have the same impact for all kinds of students" (p. 438). Given the increasingly nuanced picture of the dynamics of student engagement created by these findings in the 1990s, researchers were compelled to question and revisit retention and persistence models that formed the conceptual foundation for so many college impact studies conducted in the previous two decades.

Braxton et al. (1997) tested each of the 15 core propositions within Tinto's (1975) student departure theory, evaluating the empirical evidence relevant to each. The authors concluded that the data provided only "partial support" (Braxton et al., 1997, p. 155) for the model overall, and that for specific groups (males and females) the data provided

"frail support" (p. 156). They concluded that the phenomenon of student departure cannot be explained by one persistence or departure theory, and proposed that social integration be added to the model as a critical behavior. Pascarella and Terenzini (2005) agreed, stating, "the evidence consistently indicates that student involvement—both generally and in an array of specific academic and social areas and activities—is related in some fashion to intended or actual persistence into the next academic year" (p. 426). Braxton (2000) supported this sentiment, stating that existing models

> depicting social and academic systems of colleges as two separate boxes mask the fuller relationship between these two spheres of activity. A more accurate representation would show academic and social systems as two nested spheres, with the academic system occurring within the broader social system that pervades the campus. (p. 91)

In a later study, Braxton, Hirschy, and McClendon (2004) widened the connection to Astin's (1984) theory of student involvement, proposing that "psychosocial engagement," or the energy invested in social activities, influences their degree of social involvement on campus. Using more recent and comprehensive persistence models, researchers and other stakeholders continue to be challenged to identify effective models to explain (and practices that increase) persistence and retention among students traditionally underrepresented in higher education. Researchers have reached the consensus that access and persistence in higher education are multidimensional concepts consisting of interconnected behaviors (Braxton, 2006; Kuh et al., 2006).

The Berger and Milem (1999) model predicts that institutional characteristics—e.g., institutional size, control (private vs. public), selectivity, institution type, and location (rural vs. urban)—will have an effect on educational outcomes. The model further states that student academic and social integration, background characteristics

(such as gender, ethnicity, and socioeconomic status), and peer group directly influence persistence. Berger and Milem (1999) noted that student activities should be measured by both behaviors and perceptions in three areas of a college environment: social, academic, and functional. The Berger and Milem (1999) model connected the concepts of social and integration found in Tinto's (1975, 1993) interactionalist retention theory to Astin's (1984) student involvement framework. It also addressed a critique of both Tinto's (1975) and Astin's (1984) frameworks, which viewed involvement from the standpoint that minority students must assimilate into the dominant culture, overlooking the institution's responsibility to support students of all cultural backgrounds individually and collectively (Lundberg, Schreiner, Hovaguimian, & Miller, 2007). While the Berger and Milem (1999) model may provide an improved framework to better explain the complicated interactions between the individual and the institution that relate to persistence, Kuh et al. (2006) concluded in a meta-analysis of retention studies that "no one theoretical perspective is comprehensive enough to account for all the factors that influence student success in college" (p. 16). Pascarella and Terenzini (2005) concluded that the theories emphasize

> a series of academic and social encounters, experiences, and forces . . . [that] can be portrayed generally as the notions of academic or social engagement or the extent to which students become involved in (Astin, 1985) or integrated (Tinto 1975, 1987, 1993) into their institution's academic and social systems. (p.425)

This progression in understanding is important as researchers seek to understand how these variables interact for all students, but particularly for the increasing numbers of first-generation college students arriving on college campuses.

Changing Student Demographics and Educational Contexts

The demographic make-up of students in the United States K-12 public education system is shifting quickly. First-generation (FG) students, defined as those whose parents have not completed formal education beyond high school, account for nearly 50% of college students today, but they are not attaining bachelor's degrees at the same rate as their continuing-generation peers (Lundberg et al., 2007; Warburton, Bugarin, & Nuñez, 2001). The ethnic composition of student bodies is also changing; between 1988 and 2008, the percentage of public school students who were White decreased from 68% to 55% (National Center for Education Statistics [NCES], 2010). In 2008, 26% of Latinos were enrolled in a college or university, compared to 44% of White students (NCES, 2010). More ethnically diverse students are entering college, but fewer ethnic minority or FG students are completing college compared to their White, non-FG counterparts (Gonzalez & Szecsy, 2002; Titus, 2004). Regarding degree attainment, researchers institutions of higher education are interested in other key sociocultural factors such as social class and gender, as well as how issues of economic need influence students' decisions to balance studies with other work and familial responsibilities. A sharp national economic downturn and subsequent policy questions focused on the viability and investment value of a college degree have further increased the sense of urgency on the part of colleges and universities to better understand and create policy and programmatic solutions to affect the persistence and degree attainment for an increasingly diverse college-going population.

Variables of Note for First-Generation (FG) College Students

Precollege attributes, institutional characteristics, economic, and sociocultural factors have been identified as they relate to degree attainment for FG students. I provide an overview of the literature on these factors here, including a brief examination of research concerning the effect of student-faculty interaction on various college outcomes within these four areas.

Precollege student attributes. Given the importance of a high-skilled, diverse workforce in an increasingly competitive global marketplace, researchers and other stakeholders have paid significant attention to precollege factors that contribute to the rates of postsecondary noncompletion for FG students and ethnic minorities (Fann, Jarsky, & McDonough, 2009; Kim, DesJardins, & McCall, 2009; Pascarella and Terenzini, 2005; Prospero & Vohra-Gupta, 2007; Smith & Zhang, 2010; Torres Campos et al., 2008). Researchers have found that precollege attributes are empirically related to persistence and degree attainment in college (Hossler, Schmidt, & Vesper, 1999). Rendon (1998) notes,

> By the time students reach the twelfth grade, it is too late to . . . increase the numbers of students who are ready for college. In fact, it could be said that students begin to drop out of college in grade school. (p. 61)

Authors widely acknowledge the contribution of precollege factors such as parent involvement and parent education level (Auerbach, 2002; Fann et al., 2009), income level (Allen, 1999; Kim et al., 2009; Lundberg et al., 2007; Smith & Zhang, 2010), motivation and self-efficacy with regard to completing college (Allen, 1999; Prospero & Vohra-Gupta, 2007), and curricular tracking in high school (Oakes, Rogers, Lipton, & Morrell, 2001) to rates of college degree completion. Precollege academic variables have been

examined as well, including strength of curriculum or curricular alignment between high school and college (Conley, 2007; Kuh et al., 2006; Robbins et al., 2004; Tinto, 1987), and the disproportionate rates at which students of color are placed in low-tracked or non-college preparatory classes in high school (Oakes, 1985; Oakes et al., 2001).

Institutional characteristics. Because significant variance exists within students' precollege attributes and their K-12 experiences, researchers have explored how institutional characteristics and student-faculty interaction relates to educational outcomes for specific subpopulations of students (Kim & Sax, 2009). Examining the issue of institutional size within this context, Astin, Tsui, and Avalos (1996) found a college's size to be statistically significantly related to degree completion for White and Latino students, but not for other ethnic groups. A statistical analysis conducted by Wolf-Wendal, Baker, and Morphew (2000) found college size to be negatively related to degree completion for women, but both these authors and Crosby et al. (1994) found that gender was not as impactful as ethnic identity and average SAT verbal scores on degree completion. Titus (2004) concluded that, while institutional size affects students differently based on personal demographic characteristics, student-level variables did not fully explain the differences in persistence between the colleges analyzed. In terms of differences between institutions in general, Titus (2004) supported Bean's (1990) claims that persistence is positively affected by student academic profile, academic performance in college, involvement, and commitment to the institution, but concluded that, "although helping to predict persistence within 4-year colleges and universities, student-level variables drawn from Bean's (1990) student attrition model do not fully explain differences between institutions in the average chance of persistence (p. 692)."

Economic factors. Completing a bachelor's degree continues to open the door to career opportunities and increased earnings for all graduates, regardless of gender and across socioeconomic (SES) levels (Allen, 1999; Pascarella & Terenzini, 2005). In fact, researchers suggest that first-generation (FG) students and low-income students benefit the most from these increased earnings, as a bachelor's degree enables them to more easily secure employment and earn salaries comparable to their non-FG peers (Pascarella & Terenzini, 2005). However, those in low-SES strata appear to face added challenges from the start; Kuh et al. (2006) stated,

> The higher the family income, the more likely it is that a student will aspire to earn a bachelor's degree, intend to enroll in college, complete an application, and gain college admission. SES also dictates high school students' curricular preparation for college. (p. 23)

Chatman (2011) analyzed survey data of 16 public research universities, concluding that 30% of students were engaging in ways to reduce college costs, which included not buying a required textbook even when they believed it would cause their performance to suffer in that course.

Given the transformative role a college education has on future potential earnings contrasted with an environment of escalating tuition each year, it is not surprising that the impact of student financial aid on persistence and college completion is a topic of interest for researchers (Astin, 1993; Kim et al., 2009). Researchers have concluded in more recent studies that financial aid has a generally positive effect on persistence and degree completion, particularly among low-income students. Pascarella and Terenzini (2005) noted an exception, in which a group of studies suggested that financial aid was not exactly ineffective, rather, it was insufficient and therefore negated the expected positive

effect on persistence. This concept is generally referred to as *unmet need* (Cofer & Somers, 1999; Kuh et al., 2006). Paulsen and St. John (2002) found that financial factors influenced students' enrollment and persistence issues, while Kim et al. (2009) asserted that the expectations and responses to certain types of financial aid offers (grants, loans, work-study) differed by ethnicity among low-income students applying to the same university. The authors reported that enrollment probabilities decrease more for Latino and African American students than they do for White and Asian students, as certain populations are more averse to acquiring debt. In a survey of 574 college freshmen about key factors involved in the high-school-to-college transition, Smith and Zhang (2010) found that having a scholarship, race, and academic ethic made the most difference in college GPA and the quality of the transition, more so than being a FG student. Kuh et al. (2006) supported the same finding that *type* of aid matters, especially in regard to merit-based scholarships versus need-based financial aid.

Researchers overwhelmingly have found that increases in tuition negatively affect persistence (Cofer & Somers, 1999; Pascarella & Terenzini, 2005). Insufficient aid, aversion to loan debt (Lundberg et al., 2007), and many other factors are among the reasons that many students seek on- or off-campus employment at some point during college (Amelink, 2005; Cofer & Somers, 1999). In regard to hours worked per week, Pascarella and Terenzini (2005) stated,

> The negative effects of hours worked on just about any criterion measure (such as persistence to the next year, graduation, or time-to-degree) remain in national studies both with and without controls for such factors as gender, race-ethnicity, age, attendance level (new versus continuing), full-time or part-time enrollment status, income, institutional sector, job location, and receipt and types of financial aid. (p. 414)

However, Kuh et al. (2006) cited different research suggesting that work and school are not necessarily competing goals; some studies found that, among students identified as working and paying their own expenses, greater persistence rates were evident among those who worked on campus for fewer than 15 hours per week, especially if those jobs were work-study positions within a student's area of interest. While student-faculty interactions are not directly affected by hours worked, it is true that the more hours a student works, the less opportunity he or she will have to engage in formal or informal interactions with faculty, contact which has been shown to positively affect degree aspiration, career choice, and institutional commitment (Pascarella & Terenzini, 2005).

Sociocultural factors. Research findings of the last 20 years solidly support the positive impact of student-faculty interaction on persistence, GPA, academic satisfaction, and other outcomes variables for all undergraduates (Astin, 1977, 1984; Chickering & Gamson, 1987; Kuh et al., 2006; Pascarella & Terenzini, 2005). However, in addition to the income level research I just discussed, researchers have identified ways in which the impact of certain types of interaction varies by student-level background characteristics, such as ethnicity, gender, and whether a student is an FG student. Recent research has highlighted the faculty member's role in the interaction, as well (Lillis, 2012). Drawing from a sociological framework, Lillis suggested that a professor's emotional intelligence (a set of behaviors that include the ability to listen empathetically and connect emotionally) could counteract some of the differential effects of such interactions that are suggested by researchers to stem from differences in one or more of these background characteristics between student and faculty member.

Ethnicity and student-faculty interaction. Understanding the connection between ethnic differences and certain kinds of academic engagement is a key piece to understanding what contributes to the persistence and academic achievement for minority students (Allen, 1999; Cole, 2007, 2010; Kuh et al., 2006). A 2009 Pew Hispanic Center report noted that, of the Latino college students surveyed, 57% stated they "strongly agreed" that their professors helped with their success (Lopez, 2009). Yet, despite Latinos' reported support of higher education and aspirations to earn a bachelor's degree (Kuh et al., 2006; Lopez, 2009), there appear to be mitigating forces at work once they are enrolled. Fry (2004) reported,

> White youth beginning at community colleges are nearly twice as likely as Hispanic youth beginning at community colleges to finish a bachelor's degree. Significant gaps in completion rates are evident among those starting in the four-year college sector as well. Comparing the best prepared white and Latino college students at non-selective colleges and universities, 81 percent of whites complete a bachelor's degree and 57 percent of Latinos. (p. 6)

Hurtado and Carter (1997) found that Latino/a college students perceived that White students had a disproportionate level of faculty support, and Kim and Sax (2009) found that student-faculty interaction had a significantly positive effect for White students' degree aspirations, but not for African Americans, Latinos, or Asian Americans. In somewhat of a contrast, Cole (2010) asserted that racism and race-related issues have resulted in feelings of alienation and social disengagement for minority students at predominantly White institutions, and found African American students' GPAs to be the most positively affected by their interactions with faculty compared with other ethnic subgroups. Berger and Milem (1999) suggested that the earlier African American students connect with faculty, the better it is with respect to impact on college GPA.

Analyzing survey data from 9 public universities in California, Kim and Sax (2009) also identified a positive relationship between research experience and college GPA for African American students. In a college retention program called the Futures Project, Saunders and Serna (2004) made the interesting finding that just the involvement of their research participants in examining issues germane to equity and college access to faculty changed their feelings of self-efficacy. According to these researchers, "marginalized youth developed and demonstrated the skills and competencies needed for college access while also acquiring a critical perspective of schools as potentially dominant and oppressive structures" (p. 149). As these youth "began to view themselves as 'intellectuals,' . . . a college-going identity was further developed" (p. 149).

***Gender and student-faculty interaction*.** Researchers have generally pointed to positive outcomes for either sex when faculty-student interaction occurs (Sax, Bryant, & Harper, 2005). These include increased feelings of self-efficacy and womens' sense of their influence on others (Kezar & Moriarty, 2000), mens' self-assessed public speaking ability (Kezar & Moriarty, 2000), womens' aspirations to earn a graduate degree (Tsui, 1995), and mens' confidence in their path to becoming engineers (Cabrera et al., 2001). However, Sax et al. (2005) concluded that not all these interactions would result in a positive impact, stating,

> the literature suggests that the quantity of students' involvement with faculty must be understood in the context of the quality that defines such interactions. In other words, frequent encounters with faculty do not necessarily translate into beneficial outcomes . . . careful analysis of the "conditional" effects of college—that is, effects that may be dissimilar for different student subgroups—is necessary for a more refined understanding of how college affects students. (p. 643)

In a large-scale longitudinal study, Sax et al. (2005) did not find a "widespread imbalance" between genders in the amount of time spent with faculty, but did find the results of the type of interaction resulted in differential impacts. The authors found that women reported that faculty provided them emotional support, respect, and encouragement to attend graduate school, while men found statistically significantly different support in areas of perceived mathematics abilities, and motivation by faculty to pursue medical careers. Interestingly, the impact of "challenging a professor's ideas" was statistically significantly different between genders as well. The authors found that

> For women only, the experience of challenging professors' ideas related to declining interest in elementary education careers and less traditional views regarding appropriate roles for married women. Interestingly, challenging professors' ideas appears to have opposite effects on women and men when it comes to stress, as it predicted higher rates of feeling "overwhelmed" among women, but lower rates among men. (p. 651)

***First-generation (FG) students and student-faculty interaction*.** The "clear and consistent" effect (Pascarella & Terenzini, 2005) of having parents familiar with the world of higher education has often been explained within a social capital and cultural capital framework stemming from work by Bourdieu (1973, 1986) and Coleman (1988). Coleman published some of the earliest definitions of social capital, expressing it as anything that empowers an individual or group and can be used to make progress or solve problems. According to Bourdieu (1973), educational systems serve as mechanisms to perpetuate a stratified society in which cultural capital is unevenly allocated to those in the dominant culture. The cycle of unequal acquisition of social and cultural capital, which consists of benefits, networks and behaviors shared by those at the top of the social

strata, has been the subject of study by social scientists in the last few decades (Oakes et al., 2001; Stanton-Salazar, 1997).

Students who are the first in their family to attend college or whose parents did not complete college do not integrate socially and academically in the same way as their continuing-generation peers (Lundberg et al., 2007; Pike & Kuh, 2005). Lundberg et al. (2007) cited various reasons for this phenomenon, including financial need that requires students to work or support family members, less information (both explicit and implicit) about how to navigate the institution, off-campus housing that requires students to commute, differences in motivations for earning a degree, perceived or real family support in for students educational goals, and cross-cultural boundaries that make integration more difficult (p. 59-60). In a survey of Latino parents conducted by Tornatzy, Cutler, and Lee (2002) in Chicago, New York, and Los Angeles, some of the respondents were immigrants to the U.S., while others were U.S.-born, but none had attended college. The authors indicated that "college knowledge" deficits were higher for parents who immigrated to the U.S. Their basic assertion was that a low parent education level and a lack of familiarity with the higher education system creates critical gaps in the information that both students and parents need to navigate the system (Auerbach, 2002; Saunders & Serna, 2004; Tornatzky et al., 2002).

Once a student is in college, however, findings differ in terms of the importance placed on parent involvement or support, education level, and their relation to persistence or graduation. For example, Allen (1999) stated that family emotional support had a positive effect on desire to finish college for both White and non-White students; however, parent education level was not related to college GPA or persistence rates for

either group. This finding directly conflicts with that of Warburton et al. (2001), who discovered that parent education level was directly tied to student retention and persistence. Lundberg et al. (2007) noted that FG students may perceive their parents to be less supportive of going to college, and they may be less supportive of the debt incurred. There appear to be differences in this factor as it relates to ethnic identity. For instance, Torres and Marquez (2005) outlined why Latino parents were not able to support their children in regard to college academic endeavors, but found that (at least for Latino parents) a great value was placed on higher education, particularly for parents without college degrees.

Previously noted precollege attributes also factor in; Prospero and Vohra-Gupta (2007) noted that FG students have, on average, lower standardized test scores and GPAs from high school, have taken fewer rigorous courses, have lower family incomes, and are more likely to be employed full-time. Ishitani (2003) found that FG students are 71% more likely to drop out of college compared with non-FG peers, even after controlling for race, gender, high school grade point average, and family income. After conducting a meta-analysis and controlling for background characteristics like ethnicity, income, high school academic preparation, full- or part-time enrollment and employment status, academic performance in college, type of institution attended, and measures of social and academic integration, Pascarella and Terenzini (2005) concluded that FG students were between 4% and 7% less likely than their non-FG peers to be "on the persistence track" toward completion of a bachelor's degree after 5 years. The authors concluded,

> Thus, in terms of the odds that they will earn a bachelor's degree, first-generation students enrolling in a four-year institution are at a disadvantage throughout their college careers for reasons that are

> independent of other personal characteristics and college experiences. (p. 436).

In regard to student-faculty interaction, Kim and Sax (2009) analyzed survey data of 58,281 students regarding differences in student-faculty interaction across gender, race, social class, and first-generation status. Among their findings was that research-related faculty interaction were related to higher college GPAs and degree aspirations for all students, and that as a student's social class rises, so does frequency of communicating or interacting with faculty. This study, as well as those of Pike and Kuh (2005) and Smith and Zhang (2010), found that FG students are less likely to interact with faculty; however, when they did, students who assisted faculty with research got higher grades, had higher degree aspirations, and were more likely to attain a college degree. Kuh et al. (2006) summarized findings from a variety of studies that suggest initial FG student expectations of how often they will engage with faculty are much higher than what they report at the end of the first year. Kuh et al. (2006) posited, "the discrepancy between what students expect and experience in terms of interacting with faculty may also be partly due to reward systems and large first-year classes that discourage such contact" (p. 34). Research suggests that some of the characteristics associated with being FG students may have an indirect effect on the ability to interact as often, or as profoundly, with faculty when compared with non-FG peers.

Methodological Issues of Research on Student Engagement and Retention

I will provide a brief history of the inception of student engagement and retention research, with descriptions of common survey instruments used and their respective settings and procedures. I will follow with a brief overview of common statistical

analyses employed in studies of this nature. Lastly, I will provide a summary of recent developments that have called into question the predictive, construct, and internal validity of arguably the most popular measure currently used among colleges, and possible implications for future student engagement research.

The Inception of Modern Student Engagement Research

Often considered the founder of modern college impact research, Astin (1977) asserted in *Four Critical Years: Effects of College on Beliefs, Attitudes, and Knowledge* that studies prior to the 1970s lacked multi-institutional, longitudinal data sets, and survey instruments lacked sufficient scope and design to address pressing questions relevant to the impact of institutions of higher education on college students. Astin (1977) noted some of the elements missing from previous studies concerned with how students engage and are ultimately impacted by college:

> large and diverse samples of students and institutions; multiple measures of student development; including both cognitive and effective outcomes; multivariate designs for controlling differences among students entering different types of institutions; and methodological provisions for separating college effects from maturational effects or the simple process of growing up. (p. 3)

The idea of "student engagement" itself is multifaceted and has generated a wealth of literature that focuses on the best ways to define that construct (Axelson & Flick, 2010). Kuh (2009) has proposed perhaps the most comprehensive definition of student engagement to date, describing it as "the time and effort students devote to activities that are empirically linked to desired outcomes of college *and* what institutions do to induce students to participate in these activities" (p. 683). This definition implies

that the responsibility lies with both the student and the institution to attain the desired outcomes of both parties (Axelson & Flick, 2010; Umbach & Wawrzynski, 2005).

Trowler (2010) conducted a review of some 1,000 pieces of student engagement literature, including articles in peer-reviewed journals (both print and online), books, monographs, project reports, syllabi, conference papers (both published, refereed conference proceedings and "raw" presentations), evaluation reports, pamphlets, action guides, and speeches. In regard to methodology, Trowler (2010) noted that

> the unit of analysis varies between individual student, minority group, or institutional level, and the scale ranges from small, intimate studies to national and international surveys. Levels of complexity range from uncritical, vague use of the term in an evaluation study to complicated multiple regressions of interwoven, related aspects seeking to understand correlation and robustness of terms and concepts. (p. 9)

Trowler (2010) further identified seven engagement "targets" that studies attempt to measure: engagement to improve learning; engagement to improve persistence and retention; engagement for equality/social justice; engagement for curricular relevance; engagement for institutional benefit; engagement as marketing; and economics of engagement.

Common student engagement survey instruments. In general, the items on student engagement surveys aim to measure how undergraduates spend their time, what behaviors (both social and academic) they are engaging in, and what they perceive to be gaining from attending college. The survey items are organized and nested within thematic areas that, based on empirical data, connect to constructs believed to be "best practices" in the retention of undergraduates. The Cooperative Institutional Research Program (CIRP), initiated by the American Council on Education in 1966 and

transitioned to the Higher Education Research Institute at the University of California at Los Angeles in 1973 (Astin, 1977), was the first longitudinal student engagement survey of its kind; the CIRP is now the nation's largest empirical study of higher education, involving about 1,900 institutions and surveying more than 15 million students (Higher Education Research Institute, UCLA, 2012). Another measure, the College Student Experiences Questionnaire (CSEQ), was first administered in 1979. Items were designed to measure three aspects of student experience: college activities, which include interaction with faculty; college environment; and estimate of gains. According to the CSEQ website (2012), the cornerstone of the survey (and what makes it unique) is that it "assesses the quality of effort students expend in using institutional resources and opportunities provided for their learning and development. Quality of effort is a key dimension for understanding student satisfaction, persistence, and the effects of attending college." Created in 1998, the National Survey of Student Engagement (NSSE) is now arguably the best known and most broadly used student engagement survey in the nation. The NSSE is grouped around five NSSE Benchmarks of Effective Educational Practice: level of academic challenge; active and collaborative learning; student-faculty interaction; enriching educational experiences; and supportive campus environment (Pascarella, Seifert, & Blaich, 2010). The NSSE has counterpart surveys designed for faculty members (FSSE) and for beginning college students. The latter focuses on high school academic and extracurricular elements, as well as expectations related to their college experience (BCSSE). The Student Experience in the Research University (SERU) survey was first administered at the University of California at Berkeley in 2002, and in 2008 expanded to undergraduates attending schools in a SERU consortium of 18

Association of American University (AAU) research universities. A pilot version of the survey is also in production among the SERU International Consortium, currently a group of eleven universities in Brazil, China, South Africa, the United Kingdom, Japan and the Netherlands. One key difference between SERU and NSSE is that student responses are matched with institutional background data such as college GPA. The SERU is also somewhat unique in that it focuses specifically on student and faculty interaction within the setting of complex research universities, most of which are publicly funded and have a wide array of disciplinary offerings. The SERU is the measure I have chosen to use in my study.

Common statistical analyses employed in student engagement research. Kuh, Cruce, Shoup, Kinzie, and Gonyea (2008) identified variables commonly analyzed in student engagement research: Student background characteristics, many of which are precollege; institutional characteristics such as size and mission; student-faculty and student-peer interactions; and "the quality of effort students devote to educationally purposeful activities" (p. 541). In order to best address research questions regarding the relation between these variables, researchers employ a variety of correlational analyses that vary in complexity based on the number of dependent variables being studied. Regression models are a common way researchers can attempt to predict or determine the odds of given outcome variables based on other predictors. As I noted earlier, however, the complexity of these relationships and the potential overlap of constructs can make it difficult at times to determine direct and indirect effects. Researchers commonly perform tests of differences between the means of subgroups on a given outcome variable, to find out if certain types of engagement behavior are conditional by group.

Recent Questions Surrounding Engagement Surveys and Possible Implications

Recent developments have brought certain inferences drawn from student engagement surveys (the NSSE and CIRP in particular) under the microscope. Specifically, researchers have called into question the statistical conclusion validity of student self-reported survey data on issues of academic growth and learning, and others have countered that these instruments were not designed to specifically measure academic growth and learning to begin with.

Student engagement surveys—what are they designed to measure? In 2009, just 3 days prior to the publication of annual NSSE results, professor Stephen Porter of Iowa State University delivered a paper at the Association for the Study of Higher Education conference stating that the NSSE "fails to meet basic standards for validity and reliability" (p. 72) due in part to construct validity issues that impact how students interpret words such as *frequently*, *often*, and *sometimes*. Within a series of articles following up on Arum and Roska's (2010) provocative study published in the book *Academically Adrift: Limited Learning on College Campuses*, Herzog and Bowman (2011) wrote, "The lack of direct, empirical measures of student learning and development has given rise to student questionnaires as proxy instruments to gauge cognitive growth and change in affective disposition (p. 1)." Further, Campbell and Cabrera (2011) analyzed the predictive validity of the five NSSE benchmarks, and concluded that their findings concluded, "If each of the five benchmarks does not measure a distinct dimension of engagement and includes substantial error among its items, it is difficult to inform intervention strategies that will improve undergraduates' educational experiences" (p. 97). The relatively small but growing number of critical

voices is countered by some researchers who assert that NSSE data has been used to draw conclusions that it was never designed to make. In a September 2011 response on the website Inside Higher Ed, NSSE directors Peter Ewell, Kay McClenney, and Alexander McCormick (2011) wrote, "As cogently observed by the late Samuel Messick of the Educational Testing Service, there is no absolute standard of validity in educational measurement. The concept depends critically upon how the results of measurement are used." The authors added that conclusions drawn from surveys such as NSSE and CCSSE are best held to a test of "consequential validity". This threshold considers the extent to which findings can contribute to a larger framework of evidence that inform policy and practice, versus the test of "validity" used in the pure research sense of the word.

The implications of this recent debate may affect the degree and fashion in which institutions use student engagement data to make an array of institutional decisions in the future. From a standpoint of future research, I think it underscores an important reminder regarding the questions researchers ask when analyzing student engagement survey research, and the subsequent inferences that can be drawn from the findings. Researchers must be aware and critically analyze the construct and internal validity of the survey instrument used, as there are differences between them, as well as the institutional characteristics of the colleges that utilize them. The SERU survey is designed such that it addresses some of the concerns recently presented regarding the NSSE, and lead researchers have published technical reports that provide support for its use to inform faculty, higher administration, and other institutional leaders. I have provided specific examples of such empirical support in the summary section to follow. In the end, the

SERU appears to be a sufficient instrument for its potential to record outcomes with theoretical underpinnings that are also sensitive to demographic and contextual issues.

Summary of the Literature Review

Several decades of college student engagement research support the knowledge that various kinds of interaction between students and faculty play a significant, positive role in the persistence and retention puzzle. In drilling down within the big ideas, though, we can identify areas that are not yet fully defined, or in which there is no consensus among researchers. I describe some of those areas here, as they form the context for my research questions that follow.

First, theoretical models and extensive empirical evidence gathered over decades of college impact research support the assertion that student-faculty contact is statistically and critically linked with persistence, retention and better educational outcomes overall. Whether those relations are direct or indirect, and the circumstances under which we can determine that for sure, however, are sources of scholarly debate. Second, such interactions are now understood to be "conditional"; while FG students share many of the same barriers and challenges as minority students (who may or may not also be FG), research suggests there are some effects that are specific to ethnic identity. This same phenomenon exists related to gender and social class as well. This knowledge informed the analytical methods I used in my study. Lastly, the research suggests an uneasy consensus among researchers that size of a college or university is not a statistically significant factor in whether student-faculty contact occurs, or whether it impacts college GPA or overall satisfaction with the college experience. While I did not include this as a variable of interest in my study, more clarity is needed in this area. Particularly as

renewed debate has emerged regarding survey instruments such as the NSSE, researchers have expressed the need for more multi-institutional data sets. Within this argument, some have noted that survey instruments such as the NSSE were designed for private liberal arts colleges of approximately 8,000 students, and that there may be unique factors at play in research universities that pose both challenges and opportunities, in terms of student-faculty interaction, that the NSSE and similar surveys are not designed to capture.

The SERU survey contains features that can better address this need. I suggest that the sample population of the SERU survey make it an ideal instrument to contribute to future research related to institutional size and type, and how those factors relate to student outcomes. Sufficient technical reports and analyses of the instrument have been published to support the internal validity and reliability of the survey. In 2011, researcher Steve Chatman conducted the fourth round of factor analyses of the 2011 SERU questionnaire responses from a simple random sample of 47,000 students from nine campuses. Chatman (2011) recommended a few changes to the order of items based on his findings, but otherwise found students' individual factor scores had not varied much since 2006. The author reported internal consistency factors, as measured by Cronbach's coefficient alpha, ranging from 0.53 to 0.92, and noted "all reliability estimates of factors and subfactors have been remarkably consistent over time" (p. 3).

CHAPTER II

METHODS

In this chapter, I provide a description of the relevant elements of the SERU survey, including institutional consortium members, the timing and method of data collection, and survey design. This is followed by a description of the sample population in my study, research questions, and statistical methods I employed.

Student Experience in the Research University (SERU): Description of the Measure

The SERU survey has been administered online since its first administration in 2002, when it was known as the University of California Undergraduate Experience Survey (UCUES). According to the website of the UC Berkeley Center for Studies in Higher Education (CSHE), the SERU is "among the few, if only, surveys designed as a longitudinal study on the student experience at research universities" (Center for Studies in Higher Education [CSHE], 2012). In the interest of expanding utilization of the survey outside of California, the SERU Consortium was established in 2008. The Consortium currently consists of 23 Association of American Universities (AAU) institutions in the U.S., and 11 institutions abroad. All U.S. members are comprehensive research universities. The population sample in my study consists of undergraduates who responded to the SERU survey during the 2011 data-collection period. These undergraduates were enrolled in one of the nine SERU Consortium universities that chose to participate in the 2011 survey administration. These institutions were the University of California Berkeley, University of Florida, University of Michigan Ann Arbor,

University of North Carolina Chapel Hill, University of Oregon, University of Pittsburgh, Rutgers University, and the University of Southern California.

Timing of Data Collection

The survey is administered annually, although as noted above, not every consortium member chooses to administer the survey annually. Students were invited to complete the survey beginning in either March or April; there was some variation for each consortium campus due to scheduling and academic calendar considerations. The data-collection period also varied slightly by campus; for example, during the 2011 SERU administration, the University of North Carolina at Chapel Hill publicized to students that it would collect data from April 9, 2011, until June (no date specified). However, the University of Florida reported that it made the survey available beginning March 16, 2011, and planned to follow up with a reminder email in the summer, closing the data-collection phase in July. The University of Michigan collected data from March 18, 2011, until sometime in late May. Generally, the data-collection spanned approximately 2 months. The estimated time needed to complete the survey varied by campus. Survey administrators communicated to students that the survey itself takes between 20-25 minutes to complete, likely based on whether students were administered one or both of the additional "wild card" module and major-specific survey items.

Data Collection Method

Although it is centrally administered from UC Berkeley, the SERU *looks* local, in that email invitations and other campaign elements include campus-specific references and institutional branding. Each campus works with the Office of Student Research and Campus Surveys (OSR-CS) at UC Berkeley to administer the survey via existing

channels at the participating institution; those responsible for administering the survey on participating campuses have included individuals or groups within a student affairs unit, an academic provost, or designated individuals in an institutional research department. Eligible students on each campus are sent a personalized email from a representative on their campus asking them to participate, with a link to the survey provided. Nonresponders are sent reminders via email during the survey period. An opt-out link is provided for those who do not wish to take the survey or receive the reminder emails. Many institutions also set up a web page with frequently asked questions regarding the survey, presumably to avoid sending lengthy emails that may not be read in their entirety. Once a student logs in (often with a student ID number), the survey can be saved and completed at a later time.

Incentives

While participating universities vary in the extent to which they publicize their goals for survey completion rates, research indicated that most created strategies with the goal of yielding a 40-50% completion rate for their undergraduate population. In all aspects of the public relations campaigns surrounding the survey, coordinators used various strategies to entice students to participate. They also used email wording designed to spur participation, and some institutions subsequently analyzed the response rate to the varied wording used in the subject header of the email invitations to see which were most effective. In regard to incentives offered for completion of the survey, these varied by campus. Some examples previously used include Apple iPads, free membership in the alumni association, daily drawings for $100 gift cards from online businesses, and weekly drawings for $50 gift certificates from the campus bookstore. Via email or on

their website's page of frequently asked questions, many campuses also stated that completion of the survey was voluntary and had no bearing on a student's grades, registration eligibility or enrollment.

Survey Design

According to the UC Berkeley's CSHE website, survey items are organized around three modules (referred to as the *Core Items*): (a) academic experience and globalization skills, (b) student development, and (c) civic and community engagement. Students with a declared major are also administered items pertaining to their major department; these responses are then matched to institutional data provided by each participating campus. Some participating campuses choose to also develop an additional wild card module, focusing on campus-specific items measuring issues of interest to a particular campus. Approximately 25% of participating students on these campuses also assigned items from the wild card module.

Data Source and Sample

My study used data from the 2011 Student Experience in the Research University (SERU), a survey created and administered by the UC Berkeley Center for Studies in Higher Education (CSHE). The population sample consisted of undergraduates who responded to the SERU survey during the 2011 data-collection period. The SERU Consortium was established in 2008 and currently consists of 23 Association of American Universities (AAU) institutions; all members are comprehensive research universities. The undergraduates in my population sample were enrolled at one of the nine SERU Consortium universities that participated in the 2011 survey administration. These institutions were the University of California Berkeley, University of Florida,

Rutgers University, University of Michigan Ann Arbor, University of North Carolina Chapel Hill, University of Pittsburgh, University of Oregon, and University of Southern California. Figure 1 illustrates the distribution of participants by campus. Undergraduates were at least 18 years old and were all degree-seeking students on the main campus. Students who had graduated from the university during the data-collection period were also eligible to participate. Those who were admitted but not yet enrolled, those enrolled in distance education programs, and graduate students were not eligible to take the survey.

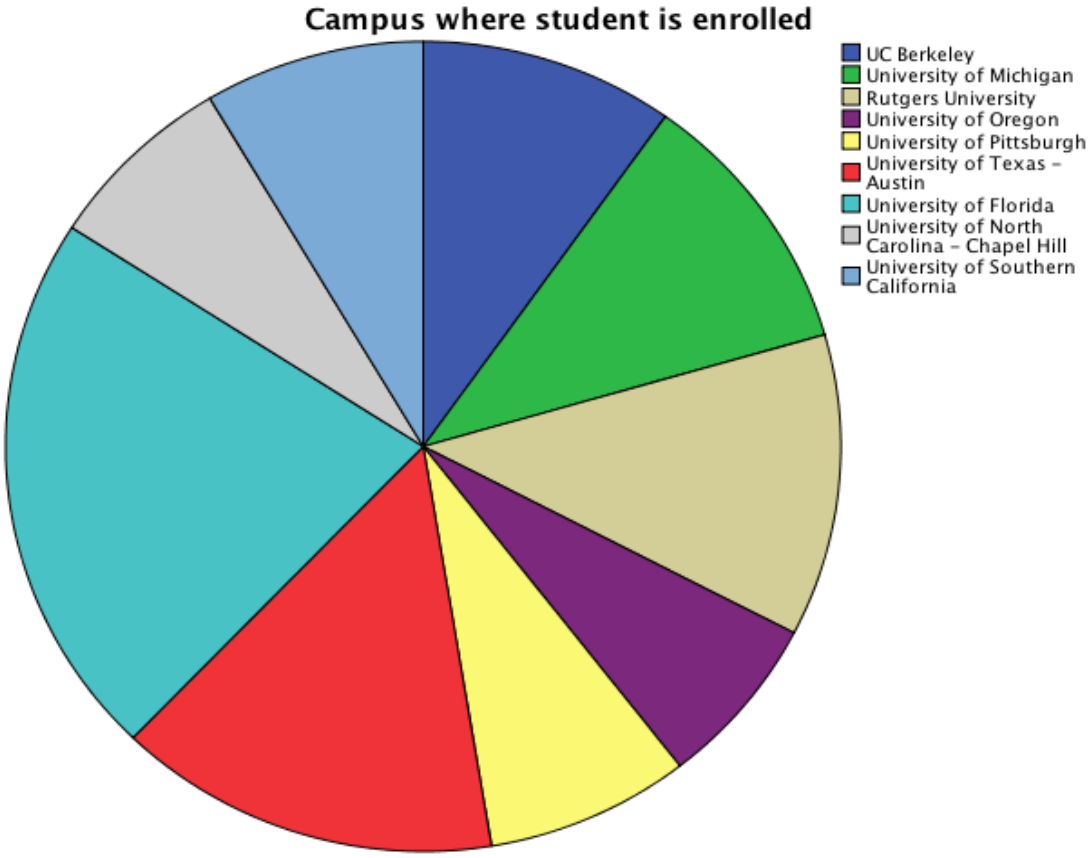

FIGURE 1. Distribution of population sample by participating campus.

Sample

The SERU Core Items were administered to a pool of 95,537 undergraduates across the nine campuses, yielding an average response rate of 33.2%. The highest rate of response on a single campus was 63.4% and the lowest was 23.7%. The sample included more female students (n = 54,955; 57.5%) than male students (n = 40,582; 42.5%). There were more upperclassmen in the sample, with 62.9% indicating they were a college junior or senior, and 36.5% being freshmen or sophomores. The ethnic identity distribution was as follows: 55.9% White, 16.6% Asian Pacific Islander, 11.3% Latino, 5.4% African-American, 0.4% American Indian/Alaska Native. An additional 4.9% were classified as international students, 1.4% were identified as *other*, and 4.1% were unknown or missing. See Table 1 for complete ethnicity statistics. Students primarily identified their families as middle-class (32.3%) and working-class or low-income/poor (18.5%), with 26.3% identifying themselves as upper-middle class or wealthy. Table 2 illustrates this distribution.

TABLE 1. Ethnicity

Ethnicity	*n*	%
African American	5,135	5.4
Latino	10,780	11.3
Asian-Pacific Islander	15,880	16.6
American Indian/Alaskan Native	373	0.4
White	53,412	55.9

Note. M = 1.30; SD = 1.72. Missing data (n = 3,938) accounted for 4.1% of total sample.

TABLE 2. Social Class

Social class	*n*	%
Low-income/poor	4,288	4.5
Working	13,395	14.0
Middle	30,861	32.3
Upper-middle	23,207	24.3
Wealthy	1,937	2.0

Note. $M = 2.93$; $SD = .911$. Missing data ($n = 21{,}849$) accounted for 22.9% of sample.

Sample: First-Generation College Students

First-generation (FG) college students comprise 17.7% of the unimputed population sample (see Table 3). For the purposes of this study, I defined *first-generation* as students who either reported that neither parent had attained a bachelors degree, or indicated as such for one parent and did not provide a response for the other parent. Perspectives vary in higher education research regarding how best to identify a FG student. Thomson (2011), cited a range of existing definitions and added,

> It is not uncommon for administrators to refer to the number of students at their institution who are 'first in their family to attend college' when the figure really represents the number of students with parents without four-year degree attainment. (Thomson, 2011, p. 5)

Students identifying their social class as either working-class or low-income were more likely to also report being a FG student ($r = .67$).

TABLE 3. Parental Education Level

Parental education level	*n*	%
Mother		
None (no formal education)	83	0.10
Less than h.s. diploma	704	0.70
H.S. diploma	10,446	10.90
Associate's degree or equivalent	6,515	6.80
Bachelor's degree	17,828	18.70
Post-baccalaureate certificate	747	.80
Master's degree	8,576	9.0
A professional degree	2,106	2.20
Doctoral degree	1,694	1.80
Father		
None (no formal education)	142	0.10
Less than h.s. diploma	1,061	1.10
H.S. diploma	10,574	11.10
Associate's degree or equivalent	4,304	4.50
Bachelor's degree	15,551	16.30
Post-baccalaureate certificate	502	0.50
Master's degree	8,921	9.30
A professional degree	3,596	3.80
Doctoral degree	4,337	4.50

Note. Mother's education level: $M = 5.02$; $SD = 1.68$. Father's education level: $M = 5.35$; $SD = 1.97$. Missing data accounted for 49.8% of mother education responses ($n = 46{,}921$) and 48.8% of father education responses ($n = 46{,}549$).

Data Management and Outcome Variables

I computed descriptive statistics to determine percentages of missing data on variables of interest. Researchers generally advocate for the use of imputation methods in handling missing data, as opposed to older methods such as listwise deletion (Schafer &

Graham, 2002). In my study, expectation-maximization (EM) single imputation algorithm was used to predict the missing values on survey items of interest. I analyzed multiple outcome measures derived from 21 survey items. I analyzed three additional student background characteristics provided by each campus (gender, race/ethnicity, and college GPA).

Prior research has established that student-faculty interaction has a relation with a variety of student educational and personal outcomes (Pascarella & Terenzini, 2005). Therefore, my study identified a number of outcome variables to address the research questions: (a) college grade point average (GPA), (b) degree aspiration, (c) satisfaction with advising and access to faculty, and (d) satisfaction with overall college experience. The appendix table details the survey items with imputed means and standard deviations related to each outcome measure. College GPA was based on the cumulative GPA provided by each campus as reported on the student's transcript. Degree aspiration was measured by students' self-reported highest level of degree they planned to earn as of spring 2011. Satisfaction with advising and access to faculty was based on a composite measure created from two items related to satisfaction with faculty advising on academic matters and satisfaction with access to faculty outside the classroom (Cronbach's alpha = .69). Satisfaction with college experience overall was based on a composite measure I created from two items related to students' satisfaction with their social and academic experiences, respectively (Cronbach's alpha = .64).

Student-Faculty Interaction Items on SERU

In addition to the composite measure of student satisfaction, my study analyzed six items that assessed how often students reported interacting with faculty, both in and outside the classroom. Three items were based on research-related student-faculty interaction, in which students reported the frequency with which they assisted faculty with research either for pay, as a volunteer, or for course credit. The remaining three items targeted three other interaction behaviors: (a) communication with faculty by email or in person, (b) talking with faculty outside of class about issues and concepts studied in a class, and (c) interacting with faculty during lecture class sessions.

Student Background Variables on SERU

Current college impact and retention literature suggests that precollege characteristics matter when examining the relation between student-faculty interactions on outcomes of interest and in fact may be conditional by subpopulation (Kim & Sax, 2009; Pascarella & Terenzini, 2005). As such, my study involved four background characteristics: gender, ethnicity, social class and parent education level. Gender and ethnicity data were provided by each campus, one item captured students' self-reported social class when growing up, and one asked students to report the highest level of education attained by one or more parents, which I used to identify first-generation (FG) college students.

Research Questions

Kuh et al. (2008) identified variables commonly analyzed in student engagement research: student background characteristics, many of which are precollege; institutional characteristics such as size and mission; student-faculty and student-peer interactions; and "the quality of effort students devote to educationally purposeful activities" (p. 541). In *How College Affects Students*, Pascarella and Terenzini (2005) reinforce Pascarella's (1980) earlier findings that both formal (in-class) student-faculty interaction and informal (outside class) interaction positively affect a variety of outcomes for students, including attitude toward college and degree aspiration. I formed the research questions to further explore how both precollege attributes and student-faculty interaction relate to attitudes (such as satisfaction with access to faculty and with the college experience) and outcomes (such as degree aspiration).

My study poses the following research questions:

1. Is the frequency of student-faculty interaction different by student gender, race/ethnicity, social class, and first-generation (FG) status? I will use descriptive statistics to address this question.

2. How does the relation between these student characteristics and outcomes of college GPA, degree aspiration, vary by overall satisfaction with the college experience? This question will be addressed using multiple regression analyses.

3. Are student demographic variables of gender, race/ethnicity, social class, and FG status significantly associated with student satisfaction with faculty contact? I will address this question using multiple regression analyses.

Analyses

Prior to running analyses, missing data on the variables of interest were imputed, with the exception of ethnic identity and college GPA. Descriptive statistics reported about the population sample are of the nonimputed data set; as means and standard deviations were nearly identical for the imputed sample, all other statistics reported in the results section are based on the imputed data set, with the exception of ethnic identity and college GPA. For the multiple regression analyses, the average I used was for a middle class female identifying as White. All multiple regression analyses are based on that coding as the average. Further, the categories for ethnic identity are based on SERU survey definitions as opposed to more recent federal racial and ethnic categories.

CHAPTER III

RESULTS

I will report the results of the analyses for the three research questions, followed by discussion of how these results either reinforce or refute the conclusions of previous studies and how they may influence future research in this area.

Research Question 1 investigated the frequency of student-faculty interaction differentiated by student gender, race/ethnicity, social class, and FG status. I will first report findings about interactions related to students assisting faculty with research, and follow with results on items related to other types of interaction behaviors not related to faculty research.

Student-Faculty Interaction: Assisting Faculty in Research Activities

Three survey items asked students whether they had assisted a professor with research activities either for course credit, for pay with no course credit, or as a volunteer. For imputed subgroups, n = 95,537. For all imputed variables, breakdown of sample sizes were as follows: males (n = 40,582); females (n = 54,955); low-income/poor (n = 4,288); working-class (n = 13,408); middle class (n = 52,669); upper-middle class (n = 23,235); wealthy (n = 1,937); non-first-generation (n = 76,101); first-generation (n = 19,436). For the nonimputed ethnicity subgroup, sample sizes were as follows: African American (n = 5,135); Latino (n = 10,780); Asian-Pacific Islander (n = 15,880); American Indian/Alaska Native (n = 373); White (n = 53,412).

Of the population sample, 13.7% reported earning course credit for these activities, 8.2% received payment, and 11.5% volunteered. While there were no major differences in these activities reported by gender, students of Asian American or Pacific

Islander descent assisted faculty in research more than any other ethnic group (15.3% earned course credit, 9.5% were paid, and 13.5% volunteered). Whether paid or as volunteers, FG students reported assisting with research more than their non-FG students peers. Consistently, students who identified their social class as middle class were the least likely to assist faculty in research (whether compensated or not); 8.7% of middle-class students reported assisting faculty with research as volunteers, compared with 14.8% of those who identified as low income or poor, and 17.4% of those identified their social class as wealthy. Table 4 displays descriptive results for research-related student-faculty interaction items.

Student-Faculty Interaction: Other Interaction Behaviors

Three items asked students to report the frequency with which they engaged in specific types of non-research-related interactions with faculty. These included communicating with faculty either via email or in person, talking with faculty outside class about concepts derived from the course, and interacting with faculty during lecture class sessions. For imputed subgroups, n = 95,537. For all imputed variables, breakdown of sample sizes were as follows: males (n = 40,582); females (n = 54,955); low-income/poor (n = 4,288); working class (n = 13,408); middle class (n = 52,669); upper-middle class (n = 23,235); wealthy (n = 1,937); non-FG (n = 76,101); FG (n = 19,436). For the nonimputed ethnicity subgroup, sample sizes were as follows: African American (n = 5,135); Latino (n = 10,780); Asian-Pacific Islander (n = 15,880); American Indian/Alaska Native (n = 373); White (n = 53,412).

TABLE 4. Descriptive Statistics for Research-Related Student-Faculty Interaction Items

	No (%)	Yes (%)
Assisted faculty with research for pay		
Gender		
Male	91.1	8.9
Female	92.2	7.7
Ethnicity		
African American	91.6	8.4
Latino	92.5	7.5
Asian-Pacific Islander	90.5	9.5
American Indian/Alaska Native	94.0	6.0
White	92.1	7.9
Social Class		
Low-income/poor	88.4	11.6
Working	89.8	10.2
Middle	93.6	6.4
Upper middle	89.8	10.2
Wealthy	89.0	11.0
First-Generation		
Yes	90.3	9.7
No	92.2	7.8
Assisted faculty with research for course credit		
Gender		
Male	86.9	13.1
Female	85.8	14.2
Ethnicity		
African American	86.6	13.4
Latino	86.9	13.1
Asian-Pacific Islander	84.7	15.3
American Indian/Alaska Native	87.9	12.1
White	61.7	59.9
Social Class		
Low-income/poor	82.6	17.4
Working	83.9	16.1
Middle	89.6	10.4
Upper middle	81.3	18.7
Wealthy	80.6	19.4
First-Generation		
FG	84.1	15.9
Non-FG	86.9	13.1

TABLE 4. Continued

Assisted faculty with research as volunteer		
Gender		
Male	88.7	11.3
Female	88.4	11.6
Ethnicity		
African American	88.3	11.7
Latino	87.8	12.2
Asian-Pacific Islander	86.5	13.5
American Indian/Alaska Native	88.2	11.8
White	89.2	10.8
Social Class		
Low-income/poor	85.2	14.8
Working	85.8	14.2
Middle	91.3	8.7
Upper middle	85.1	14.9
Wealthy	82.6	17.4
First-Generation		
Yes	86.2	13.8
No	89.1	10.9

Note. n = 85,580 for ethnicity; n = 95,537 for all other subgroups.

Males and females did not report substantively different frequency of such engagement, except that females reported communicating very often via email or in person slightly more (25.4%) compared with males (19.9%). Asian American/Pacific Islander students were the least likely to report engaging in any of these behaviors very often. Students who identified as such reported interacting very often with faculty during lecture classes notably less (5.5%) than both American Indian/Alaska Native students (13.7%) and White students (10.4%). First-generation (FG) college students reported lower engagement activity compared with their non-FG peers; among FG students, 32% reported communicating with faculty via email or in person occasionally, rarely, or never. Twenty-two percent of their non-FG peers reported these same rates of engagement.

When I analyzed the rates of all types of student-faculty interaction (both

research- and non-research-related) by students' reported social class, students who identified as middle class were consistently the least likely to report engaging in such interactions often or very often. For research-related engagement items, middle-class students reported an average of 8.5% participation, compared with an average of 16.0% of peers identifying as wealthy. Students identifying as wealthy reported the highest levels of communication with faculty, a trend consistent across all types of interactions. For example, while 35% of middle-class students reported reaching out to faculty via email or in person often or very often, 55% of wealthy students reported doing the same. For all non-research interaction items, an average of 39% of wealthy students reported communicating with faculty often and very often compared with the average for middle-class students (23%) and low-income students (33%)

The reported rates of engagement for all other social classes (low-income or poor, working class, and upper middle class) were very similar. Table 5 displays descriptive results for non-research-related student-faculty interaction items.

Research Question 2: College GPA, Degree Aspiration and Overall Satisfaction With College Experience by Student Background Characteristics

Research Question 2 explored whether the relation between college GPA, the highest degree a student planned to earn (called *degree aspiration*) and overall satisfaction with college experience varied by student background characteristics. First, I ran descriptive statistics for the dependent variables; the results are reported in Table 6.

TABLE 5. Descriptive Statistics for Non-Research-Related Student-Faculty Interaction Items

	M	*SD*
Communication with faculty member by email or in person		
Gender	1.58	.50
Ethnicity	1.30	1.72
Social class	2.95	.80
First-generation	.20	.40
Talked with instructor outside of class about issues and concepts		
Gender	1.58	.49
Ethnicity	1.30	1.72
Social class	2.95	.80
First-generation	.20	.40
Interacted with faculty during lecture class sessions		
Gender	1.58	.49
Ethnicity	1.30	1.72
Social class	2.95	.80
First-generation	.20	.40

Note. n = 85,580 for Ethnicity; n = 95,537 for all other subgroups. Scale responses are as follows: never = 1; rarely = 2; occasionally = 3; somewhat often = 4; often = 5; very often = 6.

TABLE 6. Descriptive Statistics of College GPA, Degree Aspiration, and Overall Satisfaction Composite Measure

	N	*M*	*SD*	Min	Max
College GPA	61,684	3.29	.508	.11	4.30
Degree aspiration	95,537	6.05	2.799	1.0	11.0
Overall satisfaction	95,537	4.68	.869	1.0	6.0

I analyzed descriptive statistics regarding degree aspiration among FG and non-FG respondents. Generally, students for whom one or more parents did not earn a bachelor's degree were as likely to indicate plans to earn a degree beyond a bachelor's compared with their FG peers. However, there was a significant disparity between FG and non-FG respondents regarding plans to earn a law degree; of those planning to earn a

law degree, 25.9% were non-FG compared with 1.5% of FG students.

Next, I ran correlation analyses to identify any multicollinearity among the variables. Generally, if variables are correlated at .90 or higher, researchers must strongly consider whether keeping that variable in a regression analysis is worthwhile given the overlap among variables and subsequent difficulty in interpretation. Table 7 displays the results of the correlation analysis.

TABLE 7. Correlation Matrix of Relevant Variables

Variable	Ethnicity	Social class	FG status	Gender
Social class	.19**			
FG status	.10**	.57**		
Gender	.01*	.01**	.03**	
College GPA	-.07*	-.15**	-.12**	.07**

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

Table 7 displayed that no variables were correlated to the extent that multicollinearity was of concern; therefore, I kept all variables of interest in the subsequent regression analyses.

Evaluation of the overall regression equation showed that there was a statistically significant relationship between the four student background characteristics and college GPA, F (8, 57,428) = 422.67, $p < .001$, $R^2 = .056$. Table 8 provides results from the multiple regression with college GPA as the outcome and social class, gender, ethnicity and FG status as the predictor variables. Table 8 shows that all variables were significant ($p < .05$). Inspection of the standardized coefficients showed that identifying as African-American (ß = -.138) had a slightly larger unique relationship than social class (ß = .111).

The standardized beta also suggested that students who reported a higher social class were slightly more likely to have a higher GPA than their middle class or low-income peers (.111). The semipartial correlation for social class (.091) was slightly stronger than that for gender (.086) but represented only about one percent of the variance in GPA.

TABLE 8. Multiple Regression of College GPA on Student Background Characteristics

	Unstandardized coefficients		Standardized coefficients		
	B	Standard error	Beta	*t*	Sig.
(Constant)	3.193	.007		442.601	.000
Gender	.087	.004	.085	20.801	.000
American Ind	-.174	.027	-.026	-6.316	.000
Af-American	-.299	.009	-.138	-32.826	.000
Latino	-.127	.006	.088	-20.550	.000
Asian-Pac Isl	-.016	.005	-.013	-2.978	.003
Other	-.060	.017	-.014	-3.454	.001
Social Class	.067	.003	.111	21.901	.000
FG Status	-.040	.006	-.032	-6.543	.000

Degree Aspiration

Correlation analyses revealed that for all students, non-research-related communication with faculty was highly correlated with higher degree aspiration (see Table 9). Table 9 shows that communicating with faculty via email or in person (r = .83), discussing issues and concepts with faculty outside of class (r = .92), and interacting with faculty during a lecture class (r = .80) were highly related to high degree aspiration.

TABLE 9. Correlation Matrix of Student-Faculty Non-Research Interactions and Degree Aspiration

Variable	Degree aspiration	Communication by email or in person	Interacting with faculty within a lecture class
Communication by email or in person	.83**		
Interacting with faculty within a lecture class	.80**	.55**	
Discussing concepts outside of class	.92**	.64**	.62**

**$p < .01$.

Inspection of the overall regression equation showed that there was a statistically significant relation between gender, ethnicity, social class, and FG status and degree aspiration, F (8, 86,908) = 61.84, $p < .001$, $R^2 = .006$. Table 10 provides results from the multiple regression with degree aspiration as the outcome and the four student background characteristics as the predictor variables. Table 10 shows that, with the exception of those identifying as American Indian/Alaska Native or *other,* all variables were significant ($p < .001$). Evaluation of the standardized coefficients showed that gender (ß = .041) had a slightly larger unique relationship than social class (ß = -.035). The semipartial squared for gender showed that it uniquely explained .16% of the variance when the effect of other variables was removed. Effect size of the large population sample caused results that were statistically significant, but not substantive.

TABLE 10. Multiple Regression Results of Degree Aspiration on Student Background

	Unstandardized coefficients		Standardized coefficients		
	B	Standard error	Beta	*t*	Sig.
(Constant)	5.660	.033		170.609	.000
Gender	.231	.019	.041	11.955	.000
American Ind	.279	.146	.006	1.911	.056
Af-American	.405	.042	.034	9.713	.000
Latino	.120	.030	.014	3.978	.000
Asian-Pac Isl	.289	.026	.040	11.277	.000
Other	.119	.078	.005	1.529	.126
Social Class	-.121	.014	-.035	-8.352	.000
FG Status	-.299	.028	-.043	-10.573	.000

Overall Satisfaction

Evaluation of the overall regression equation showed that there was a statistically significant relationship between the four student background characteristics and overall satisfaction with the college experience, F (8, 86,908) = 352.07, $p < .001$, $R^2 = .031$. Table 11 provides results from the multiple regression with overall satisfaction as the outcome and social class, gender, ethnicity and FG status as the predictor variables. Table 11 shows that, with the exception of those identifying as American Indian/Alaska Native or *other*, all other student background variables were significant ($p < .001$). Inspection of the standardized coefficients showed that identifying as Asian-Pacific Islander (ß = -.101) had a slightly larger unique relationship than social class (ß = .088). The semipartial squared for Asian-Pacific Islander showed that this variable uniquely explained about one percent of the variance when effects of other variables were removed.

TABLE 11. Multiple Regression Results of Overall Satisfaction on Student Background

	Unstandardized coefficients		Standardized coefficients		
	B	Standard error	Beta	*t*	Sig.
(Constant)	4.694	.010		465.946	.000
Gender	.045	.006	.026	7.662	.000
American Ind	-.063	.044	-.005	-1.426	.154
Af-American	-.137	.013	-.037	-10.852	.000
Latino	.023	.009	.009	2.501	.012
Asian-Pac Isl	-.227	.008	-.101	-29.136	.000
Other	-.023	.024	-.003	-.958	.338
Social Class	.094	.004	.088	21.385	.000
FG Status	-.130	.009	-.061	-15.090	.000

While these and most other student background characteristics analyzed were statistically predictive of the given outcome variables ($p < .05$) in Research Question 2, the large sample size should be noted as a factor influencing the statistical significance of modest standardized coefficients.

Research Question 3: College GPA, Degree Aspiration and Satisfaction With Faculty Accessibility and Advising

Research Question 3 explored whether student background characteristics were predictive of level of student satisfaction with advising by faculty on academic matters or satisfaction with access to faculty outside of class. First, descriptive statistics were run from the imputed data set for the variables of interest. Table 12 displays cases, means, and standard deviations for these two items.

TABLE 12. Descriptive Statistics of Satisfaction With Faculty Advising and Access

Item	*N*	*M*	*SD*	Min	Max
Advising by faculty	95,537	4.39	1.011	1	6
Access to faculty	95,537	4.67	.907	1	6

Note. Scale responses are as follows: very dissatisfied = 1; dissatisfied = 2; somewhat dissatisfied = 3; somewhat satisfied = 4; satisfied = 5; very satisfied = 6.

While there were no substantive differences in satisfaction level by gender, the analyses did reveal differences in satisfaction by ethnicity. Asian-Pacific Islander students were the least likely to report being satisfied or very satisfied with advising by faculty on academic matters (38.2%) compared with their African American (46.8%) or White (49.0%) peers. Asian-Pacific Islanders reported being the least satisfied with access to faculty outside the classroom, with 59.8% being satisfied or very satisfied, compared with their Latino (67.8%) and African American (68.4%) peers.

Descriptive results by social class revealed that middle-class students were the least likely to report being satisfied or very satisfied with advising by faculty (38.7% compared with 53.2% for low-income students and 55.1% for wealthy students), but they were the most likely to be satisfied with access to faculty outside class (71.5% compared with 56.4% for low-income students and 61.1% for wealthy students).

When analyzing by FG status, I discovered a similar pattern. Non-FG students were less likely to be satisfied with faculty advising on academic matters than their FG peers (43.7% compared with 55.6%), but they were more satisfied with access to faculty outside the classroom than FG students (68.7% compared with 59.8%).

To gain further insight, I conducted a multiple regression analysis using an average of the two items related to satisfaction with faculty advising and access (called *faculty contact* below) as the dependent variables and student background characteristics as the predictor variables. First-generation status accounted for 19% of the variance in satisfaction with faculty contact, and gender accounted for 27%.

Additionally, correlation analyses revealed a modest positive relation between students' satisfaction with faculty contact and degree aspiration, and a strong relation between satisfaction with faculty contact and overall satisfaction with college experience (see Table 13).

TABLE 13. Correlation of Faculty Contact With Degree Aspiration and Overall Satisfaction With College Experience

Variable	Degree aspiration	Satisfaction with faculty contact
Satisfaction with faculty contact	.39**	
Overall satisfaction with college experience	.37**	.83**

**$p < .01$.

Table 13 shows moderate, positive correlations between satisfaction with faculty contact and degree aspiration ($r = .39$) and between degree aspiration and satisfaction with college experience ($r = .37$). The strongest relation was found between satisfaction with faculty contact and overall satisfaction with college experience ($r = .83$).

Next, I ran regression analyses to determine the predictive nature of student background characteristics on their satisfaction with two items pertaining to faculty

advising and access (a composite variable I created and named *faculty contact*). Inspection of the overall regression equation showed that there was a statistically significant relationship between the four student background characteristics and satisfaction with faculty contact, F (8, 86,908) = 106.99, $p < .001$, $R^2 = .010$. Table 14 shows results from the multiple regression with satisfaction with faculty contact as the outcome and social class, gender, ethnicity and FG status as the predictor variables. Table 14 shows that, with the exception of those identifying as American Indian/Alaska Native or *other,* all variables were significant predictors of satisfaction with faculty contact ($p < .001$). Evaluation of the standardized coefficients showed that identifying as Asian-Pacific Islander (ß = -.086) had a slightly larger unique relationship than social class (ß = .037).

TABLE 14. Multiple Regression Results of Satisfaction With Faculty Contact by Subgroups

	Unstandardized coefficients		Standardized coefficients		
	B	Standard error	Beta	*t*	Sig.
(Constant)	4.486	.010		461.831	.000
Gender	.046	.006	.027	8.122	.000
American Ind	.002	.043	.000	0.40	.968
Af-American	.003	.012	.002	.492	.623
Latino	-.183	.009	.001	.390	.697
Asian-Pac Isl	.018	.008	-.086	-24.419	.000
Other	.018	.003	.003	.778	.436
Social Class	.038	.004	.037	8.984	.000
FG Status	.039	.008	.019	4.674	.000

The semipartial correlation analysis I conducted showed identifying as Asian-Pacific

Islander (-.083) to be strongest of the four background characteristics. While the regression analyses found that nearly all student background characteristics analyzed were statistically predictive of satisfaction level with faculty advising or access ($p < .001$), the large sample size should be noted as a factor influencing the statistical significance of modest standardized coefficients. The semi-partial squared for Asian-Pacific Islander showed that this variable uniquely explained 0.67% of the variance when effects of other variables were removed.

Results Summary

Three research questions examined whether specific types of student-faculty interaction were positively related to outcome variables known to affect retention and persistence in college. Differences in frequencies and correlations were found between students' perception of faculty accessibility and quality of academic advising, and also between outcomes of degree aspiration and overall satisfaction with their college experience. For both research-related and non-research-related behaviors, middle-class students were the least likely to report engaging in such interactions with faculty. Middle-class students reported the lowest rates of assisting faculty with research (6.4%), compared with students self-identifying as low-income/poor students (11.6%), working class (10.2%), upper-middle class (10.2%), and wealthy (11%). Additionally, middle-class students reported reaching out to faculty via email or in person often or very often much less (35%) than peers identifying as wealthy (55%).

Asian-Pacific Islander students assisted in research more than students of any other ethnic background. Of these respondents, 15.3% earned course credit, 9.5% were paid, and 13.5% volunteered. However, students of this ethnicity were least likely to

engage with faculty outside the classroom. Whether by email or in person, students identifying as Asian American/Pacific Islander were the least likely to report talking with faculty outside of class or communicating via email very often; this group reported interacting during class sessions much less (5.5%) compared with American Indian/Alaska Native students (13.7%) and White students (10.4%). First-generation (FG) students were not as engaged with faculty outside of class, as well; among FG students, 32% reported communicating with a professor via email or in person occasionally, rarely or never; 22% of their non-FG peers reported the same. Wealthy students were the most connected to faculty outside of class; for all non-research interaction items, an average of 19.3% reported communicating with faculty often and very often compared with middle-class students (11.7%) and low-income students (16.8%).

Correlation analyses found a strong, positive relation between degree aspiration and communicating with faculty via email or in person ($r = .83$), discussing issues and concepts with faculty outside of class ($r = .92$), and interacting with faculty during a lecture class ($r = .80$). Moderate, positive correlations were found between satisfaction with faculty contact and degree aspiration ($r = .39$), and between degree aspiration and satisfaction with college experience ($r = .37$).

Descriptive statistics found that students who planned to earn a law degree were overwhelmingly non-FG; of the 27.3% indicating this degree aspiration, 1.5% were FG students. Regression analyses showed that gender, social class, and FG status were statistically predictive of college GPA, degree aspiration and overall satisfaction with the college experience ($p < .001$). This was also the case for students of most ethnicities, with

the exception of American Indian/Alaska Native. While many of the student background characteristics analyzed in regression analyses were statistically predictive of the given outcome variable ($p < .001$), the large sample size should be noted as a factor influencing the statistical significance of modest standardized coefficients.

For all students, correlation analyses found a strong relation between satisfaction with faculty contact and overall satisfaction with college experience ($r = .83$). Compared to all other ethnic groups, Asian-Pacific Islander students were the least likely to report being satisfied or very satisfied with advising by faculty on academic matters (38%), compared with both Latino and White students (49%), African American students (47%), and American Indian/Alaska Native students (51%). This group was also least likely to report being satisfied or very satisfied with access to faculty outside of class, compared with peers of other ethnicities.

Middle-class students reported the lowest rates of being satisfied or very satisfied with advising by faculty (39%), compared to low-income (54%) and wealthy (55%) peers, but they reported the highest levels of satisfaction with access to faculty outside class (72%), compared with low-income (56%) and wealthy (61%) peers. Non-FG students were less likely to be satisfied with faculty advising on academic matters (44%) compared with their FG peers (56%), but they were more satisfied with access to faculty outside the classroom (69%) than FG students (60%).

For all students, the composite measure of satisfaction with contact by faculty (including access to faculty and advising by faculty) was moderately correlated with degree aspiration ($r = .39$). Gender, social class and FG status were statistically predictive of satisfaction level with faculty advising or access ($p < .001$); for ethnic identity, only

Asian-Pacific Islander identity was statistically predictive of satisfaction level with faculty advising and access. In both cases, however, the standardized coefficients were modest and the effect size was exaggerated due to the large sample size.

CHAPTER IV

SUMMARY AND DISCUSSION

Set in the context of nine comprehensive research universities across the U.S., my study examined the influence of research-related and non-research-related student-faculty interactions on outcomes known to affect college retention and completion. Recent research has explored conditional effects of these types of interactions by student background characteristics, and my study's descriptive statistical results did suggest some engagement that is conditional by subgroup. Before discussing the possible implications of these findings, I will identify possible limitations to my study design and analysis.

Potential Threats to Validity and Study Limitations

There are potential threats to the validity of the inferences made from SERU and other similar student-engagement surveys that are based on self-reported student data. In terms of construct validity, *engagement* as a construct cannot be fully captured in any survey; it is feasible that there are other types of meaningful academic engagement not collected in the SERU survey. Also, using grade point average (GPA) as a proxy for c*ollege success* is a potential threat, as some may argue that GPA is just one element in a more comprehensive notion of college success. However, I think it is relevant to note that a solid body of research exists supporting the predictive validity of GPA in determining likelihood of college graduation. External threats to validity include sampling/nonresponder bias and subsequent statistical conclusion validity in the event that the sample population is statistically significantly different from the nonresponding group on any of the analyzed variables. A Little's Missing Completely at Random Test

found that these data were not missing completely at random. Because data are missing at random, caution should be used when generalizing the results. In an effort to address the common concern of nonresponder bias, Chatman (2011) conducted nonresponse bias analysis of the 2011 SERU administration. While previous technical reports found small levels of nonresponse bias, Chatman concluded that it was not extensive enough to threaten the generalizability of the findings to the population of college students enrolled in research universities. In regard to subsequent statistical conclusion validity, Chatman (2011) added,

> Recognition of the differences is often where nonresponse bias analysis concludes with admonitions to be cautious when using the results. Instead, this study asks the simple question whether those differences matter . . . in sum, the differences in response rates observed for subgroups had no appreciable effect on the overall mean value. (p. 2)

In the analyses, Chatman (2011), identified six instances in which deviation from the overall response rate for a subgroup was higher than 5%, which were a) students in the top two quintiles of GPA responded at greater rates than those with lower GPAs; b) students whose SAT scores were in the top two quintiles responded more frequently than those in the bottom quintile; c) transfer students responded less often than those who never transferred from another college; d) sophomores and juniors responded at a higher rate than seniors did; e) underrepresented students responded at lower rates overall; and f) African-American and international students responded at particularly low rates compared with the overall mean response rate.

Statistical conclusions inferred about students identifying as American Indian/Alaska Native should be taken with caution, given the small sample size (n = 373). Additionally, though it was noted in the previous section, conclusions drawn from the

multiple regression analyses should be made with considerable caution. Although the results showed that most of the student background characteristics were predictive of level of satisfaction with faculty contact and overall satisfaction with the college experience, the large sample exaggerated the effect size. Therefore, the multiple regression results, which were largely statistically significant, are realistically viewed as educationally significant. Finally, because SERU is census-based and is not a truly longitudinal study, outcome variables could not be compared with those taken at another point in time to compare whether student-faculty interaction made a difference in students' reported degree aspiration in high school versus college.

Findings and Implications

As discussed previously, no one model currently explains the construct of student engagement; however, current revisionist models (Berger & Milem, 1999; Pascarella & Terenzini, 2005) are the best available framework based on research, and they have informed the design and items of the SERU survey from which my sample population came. As I noted in the literature review, Astin's (1984) oft-cited student involvement theory posited that "Frequent interaction with faculty is more strongly related to satisfaction with college than any other type of involvement or, indeed, any other student or institutional characteristic" (p. 525). My findings supported a more conditional assertion; while interacting with faculty (both in a research setting and in more informal communication) did not strongly relate to or predict higher overall satisfaction with the college experience, students' perception of faculty accessibility and satisfaction with the advising they received by faculty strongly correlated with both overall satisfaction and

degree aspiration. These kinds of patterns that emerged in the results support college-impact researchers' more recent assertions that no one model explains the complex, interconnected actions that influence persistence and retention (Braxton, 2006; Kuh et. al., 2006). Regression analyses in my study supported the theory of a multidimensional engagement model with interconnected variables (Pascarella & Terenzini, 2005) in which statistically significant predictive relations existed between nearly all dependent and independent variables of interest. I should reiterate, however, that a large sample size resulted in statistical significance for modest standardized coefficients.

The descriptive findings in my study also supported previous findings regarding general positive outcomes of student-faculty interaction by gender (Sax et al., 2005). When considering the construct of first-generation (FG) college students, my study's findings partially supported assertions by Lundberg et al. (2007) that students whose parents did not complete a bachelor's degree do not integrate socially and academically in the same way as their non-FG peers. While FG students in my study did not communicate as often with faculty outside of class and were slightly less likely to be satisfied with their college experience compared with their non-FG peers, I did not find that they were less academically engaged. First-generation college students reported higher engagement on assisting faculty with research than their non-FG peers did. The findings did support conclusions by Pike and Kuh (2005) and Smith and Zhang (2010) that, although FG students are less likely to interact with faculty outside of class, they have higher degree aspirations when they do. This appears to support research by Lillis (2012) that suggested a professor's ability to listen empathetically and connect

emotionally could counteract some of the differential effects that FG students may experience when interacting with a faculty member.

Ethnicity-based patterns of faculty contact emerged from my analyses. Previous research found lower levels of student-faculty engagement by Asian-American/Pacific Islander students compared with other ethnic groups (Lundberg et al., 2007). My findings are consistent with Kim and Sax's (2009) conclusion that, while this is true for non-research interactions, it is actually the opposite for research-related interactions. Asian-American/Pacific Islander students assisted faculty with research more than any of their peers of other ethnicities.

Findings based on social class revealed some interesting patterns. Using the same measure (SERU), Kim and Sax (2009) reported that low-income and FG students were the least engaged in both research and non-research interactions. My findings differed substantially in regard to social class, in that middle-class students were the least likely of any social class group to report engaging in such interactions with faculty often or very often; all other social class groups reported similar frequency of interaction. While middle-class students were the least satisfied with advising by faculty, they were the most satisfied with access to faculty outside of class compared with peers in other social classes. This same pattern was true of non-FG students, although one could argue that the dynamics of social capital and expectations may help explain why students in each of these subgroups were more or less satisfied. My results did align with Kim and Sax's (2009) finding that wealthy students were the most communicative with faculty outside the classroom. In regard to FG status, my findings partially support Kim and Sax's (2009) results, in that FG students were the least engaged with faculty outside the classroom;

however, my study found they were more engaged in assisting faculty with research than their non-FG peers.

Implications for Practice

Based on the findings of my study, conditional effects of student-faculty interaction across subgroups were observed on some of the outcome variables of interest. Patterns emerged from descriptive statistics based on FG status, ethnicity and social class that have practical implications for educators and administrators.

The strong, positive relation between types of contact with faculty and outcomes of interest, particularly as they related to academic advising and accessibility, has significant implications for both administrative and academic unit leaders charged with improving persistence and success of all students, especially those statistically more likely to not complete a bachelor's degree. Students in my population sample were attending one of nine large, complex research universities at the time of the SERU survey. Responses to student-faculty engagement items suggested that students who identify socioeconomically as middle class may be experiencing unique challenges in these complex environments related to accessing both research opportunities and successful academic advising opportunities with faculty. I suggest that scarce financial and human resources (both at secondary and postsecondary levels) are among the factors driving this dynamic.

Both at the high school and college levels, some low-income students are eligible to take part in federal, state, or privately funded programs designed to support them in accessing higher education while in high school and to help them navigate a complex institution once they enroll in college. These programmatic supports are often designed

partly to impart the kinds of skills that most educational researchers recognize as the elements of *social capital*, strategies that students from wealthier families have already acquired growing up. Skills such as advocating for oneself, networking to advance one's goals, and relating academic content and concepts to transferrable skills in the job market are a focus of such programs. Some middle-class students may be in need of these same kinds of skills but are less likely to qualify when the eligibility criteria for such programs is based on family income alone. They are also statistically more likely to be FG college students. These findings suggest that this population may not be connecting with faculty to the extent they should to improve their likelihood of success. My study found that whether students emailed their professors often, talked with them outside of class about the course, or interacted with them inside the classroom, they were much more likely to aspire to earn an advanced degree. This is important not just because it is an indicator of self-efficacy, but because it suggests that students who interact even in an informal way with faculty are more likely to understand the academic pathway required to reach a career goal and have a plan to attain it. Additionally, whether it was for pay, for credit, or as a volunteer, assisting faculty with research projects was modestly correlated with degree aspiration, as well. This may signal yet another venue or opportunity in which faculty can relay knowledge to a student about the education attainment required for a given career goal.

Students' satisfaction with the academic and social experiences at college formed a composite variable called *overall satisfaction* in my study. High levels of satisfaction with access to faculty, as well as advising by faculty on academic matters, was highly related to being satisfied with the overall college experience. Disparities in engagement

with faculty by ethnic identity should also be of note to educational researchers, administrators, and faculty. Compared with other ethnicities, Asian-Pacific Islander are the most active in assisting faculty with research but are the least likely to communicate with faculty in and outside the classroom. They are also less likely to be satisfied with the academic advising they are receiving. It is possible that language heritage and cultural dynamics may help explain these engagement patterns; faculty and others should assess advising strategies that could increase communication in a way that is culturally competent (perhaps more communication via email, more opportunity for one-on-one rather than group discussions, etc.).

Clearly, there remains a great need to support low-income students at both secondary and postsecondary levels to enroll in and complete college. Institutional leaders should, however, look beyond existing systemic or programmatic solutions whose eligibility criteria are singularly based on family income, in an effort to reach middle-class students who aren't traditionally identified as high-risk and are not maximizing the investment in college by utilizing well-trained, approachable academic advisors on their path to a degree. While engaging more students of all ethnic backgrounds in research with faculty may bolster feelings of satisfaction with college, my results suggest that meaningful, caring, and timely interactions with all students are likely to result in greater student satisfaction with college, as well as greater understanding of how college connects to future educational and career goals.

Future Research

The results from my study signal a variety of avenues that could be pursued in future studies. First, of primary interest is whether this study can be replicated with a different population sample attending different institutions. Also of interest is whether these findings would still be supported if academic discipline areas or majors were included in analyses. For example, do students from the subgroups of interest in my study respond at the same rates if they are majoring in business, or within the college of arts and sciences, or if they have not declared a major? Do findings differ within and between these groups across a single university, or within and between a group of universities, as was sampled in my study? Research using SERU as a data source is small but growing; therefore, replicability of findings is of great interest.

Second, my study did not use two items on the SERU survey related to the construct of "belonging," as they did not align methodologically with my research questions. While research based on SERU continues to grow, some early studies have identified these items as important in regard to predictive or correlative power for the outcomes of interest in this study. Future research focusing on outcomes affecting student retention and completion would benefit from integrating those two items in the analyses.

My literature review identified size of institution as a variable of interest; however, the nature of my research questions did not allow me to make any conclusions regarding the affect of college size on the outcome variables of interest. Given that first-generation college students are more likely to attend large, public universities, future research requires focusing specifically on factors affecting retention of this population within complex institutions. Continued use of SERU is recommended in such research, as

it is scaled for large research universities and serves to build from, and connect with, findings from other popular student-engagement surveys mentioned in my literature review (NSSE, etc.) that have traditionally been scaled for smaller, liberal arts institutions. Given the increasing diversity of our college population, especially at large, often public universities like the ones included this study, it is important that analyses affecting policy or practice involve institutions of this type. While researchers generally feel institution size does not put students at a disadvantage, more research utilizing SERU data could bring a more definitive conclusion around the factor of institutional size.

My literature review also identified type of college (2-year or 4-year) as a variable of interest. Would students respond similarly at community colleges or other degree-granting institutions with substantively different student demographic characteristics? While SERU is only administered at 4-year colleges, future research should examine how findings from student engagement surveys designed for community colleges (such as the CCSSE) support or refute the findings of this study when student background characteristics of gender, ethnicity, FG status and social class are examined by similar outcomes of interest.

Reflection on the Data

To facilitate future research, it is important to clearly identify ways in which both the survey instrument design and analytical methodology used in this study introduce the error which threatens the generalizability and statistical conclusion validity of my findings. I briefly summarize the areas that present the most significant potential for error, with the understanding that, in terms of reducing the possibility of bias, some of

these elements have greater inherent capacity for improvement than others in future research.

The nature of the participant sample along with the common issue of non-responder bias in student engagement surveys like SERU are of great importance and limit generalizbility. A broad spectrum exists amongst institutions of higher education in the United States; while the survey respondents attended nine different large research universities (with all but one being publically-funded), it is relevant to underscore that this participant sample represents a "best-case scenario" of the college-going undergraduate population nationally. These students attended relatively selective, well-resourced institutions, compared to peer institutions of similar size and type. As I stated earlier, non-responder bias was an issue within this population sample; the differences found in response rate by ethnicity and grade point average is further caution that the participant sample represents a subset of students that may be even more academically driven than the overall populations attending these nine universities. And the overall populations attending these nine universities are already amongst the highest achieving academically, compared to their counterparts nationwide. The design of SERU is to measure students' experiences at complex research universities; currently the SERU consortium institutions are all members of the Association of American Universities (AAU). While this does not mean the findings cannot be useful to other, non-AAU institutions, it is important for researchers and practitioners to compare the demographics and characteristics of enrolled undergraduates at participant institutions when attempting to make inferences for use more broadly.

Missing data on a few variables of interest, as well as the low number of items forming the composite variables, should be considered so researchers can take whatever steps possible to avoid these in future studies. Items concerning parent education level and students' reported social class had high levels of missingness; while data was imputed for these items and I found nearly identical means with the unimputed data, this is ultimately less reliable than participants' actual responses. It may be difficult for survey creators to improve response rate on parent education level; while placing it closer to the beginning of the survey may result in higher response rates, some students will simply not know the answer to this question.

Furthermore, measurement of social class is difficult given the inherent cultural and other interpretations that students bring to bear when responding. If I were to improve this research I would couple this item with two other SERU survey items (one for students describing themselves as dependent financially, and another for financially independent students) that ask students to report their or their guardians' annual income before taxes. With such a change, a more sensitive scale is thus available, allowing researchers to more accurately operationalize social class level based on reported income ranges.

Lastly, composite measures for student satisfaction with faculty contact and student satisfaction with the overall college experience contained two items each; composite measures with additional items would strengthen the psychometric power of future analyses and subsequent inferences.

Conclusion

This study advances our understanding of how different groups of students experience, and benefit from, interaction with faculty. While regression analyses found student background characteristics to be largely predictive of degree aspiration, satisfaction with faculty contact, and overall satisfaction with the college experience, the strength of the predictive relations are realistically best viewed as educationally significant. Conditional effects between subgroups were observed within descriptive patterns of interactions, and offer educational practitioners insight into how resources and strategies could be best utilized to assist students of particular backgrounds to engage in specific behavior that is shown to increase their chances for college completion. These findings provide researchers a foundation from which to further delve further into the nature of these interactions, to determine whether they hold across institutions of varying sizes and types, and ascertain whether they support or refute findings of other student-engagement measures.

APPENDIX

OUTCOME MEASURES

Outcome measure	Survey item	*M*	*SD*
College GPA	Campus provided GPA	3.29	.51
Degree aspiration	What is the highest degree you plan to earn eventually?	6.05	2.80
Satisfaction with faculty contact	How satisfied are you with experience in your major: Advising by faculty on academic matters?	4.39	1.01
	How satisfied are you with educational experience overall: Access to faculty outside of class?	4.67	.91
Overall satisfaction with college experience	Level of satisfaction of university education: Overall academic experience.	4.67	.96
	Level of satisfaction of university education: Overall social experience.	4.70	1.03

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