STUDENT ENGAGEMENT AND HIGH-IMPACT PRACTICES:

PATHWAYS TO SOCIAL REPRODUCTION OR SOCIAL MOBILITY?

by

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I would like to dedicate this dissertation in memory of my mother, whose endless love and care for others continue with me.

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Abstract

The research first seeks to understand among bachelor's degree recipients the ways student engagement and high-impact practices (HIPs) mediate the relationship between students' socioeconomic status (SES) and two post-graduation outcomes: early career earnings and graduate degree attainment. Next, the research explores how SES moderates the relationship between engagement experiences and these post-graduation outcomes. Educational Longitudinal Study (ELS) 2002 subsamples are used and analyzed using generalized structural equation modeling (GSEM) and multiple-group GSEM techniques.

Results indicate that extracurricular involvement, faculty interactions, internships, research with faculty, and community-based projects mediate the relationships between SES and earnings and graduate degree attainment, thereby acting as a sorting mechanism of social inequities. Multiple-group analysis finds effects on post-graduation outcomes of engagement experiences are dependent on student SES quartile. Research with faculty is a positive predictor of graduate degree attainment among the lowest quartile, but no other engagement experience had a significant positive impact on earnings or graduate degree among those from this quartile. Internship experiences elicit positive effects among the middle-SES quartiles when predicting earnings. Extracurricular activities and community-based projects increase one's odds of graduate degree attainment among the second SES quartile. An exception to these conditional effects for low-to-middle quartiles is interactions with faculty. Students from the highest SES quartile had increased odds of graduate school attainment within this experience while lower quartiles are not. Results provide direction for higher education policy and practice to widen and reroute student engagement and HIPs as pathways for social mobility and not social reproduction.

Chapter 1: Introduction

A widely held belief within the United States is that a Bachelor's degree serves as the "great equalizer" of social and economic inequality, mitigating socioeconomic disparity and providing for upward mobility through higher wages and increased occupational status (Hout, 1984; 1988; Torche, 2011; 2014). This belief is reflected by families who report that getting a good job requires a college education (Gallup, 2014) and is a leading reason for enrollment (Eagan et al., 2017). A college degree within the current economic climate has remained important following the Great Recession. Since the economic recovery started in 2010, 73% of new jobs created have targeted workers with at least a bachelor's degree (Carnevale et al., 2016).

Witteveen and Attewell (2017), who addressed and then challenged the "equalization hypothesis," reported that universities do not erase class inequalities among bachelor's degree graduates – they reflect them. The authors hypothesize that differences in family income affect students' abilities to access student engagement opportunities and the benefits these produce upon entering the labor market (Witteveen & Attewell, 2017). These results suggest that to focus solely on degree attainment is insufficient when studying post-graduation earnings, and that student engagement experiences should be considered as influential predictors of earnings.

Background

Student engagement is described as the time and effort students invest in educationally purposeful activities and the role institutions have in inducing participation in these experiences (Kuh, 2009). Decades of research on student engagement have continuously demonstrated positive effects on outcomes including student learning, development, and persistence (Pascarella et al., 2016). However, researchers have only recently started to examine engagement's relationships with a graduate degree and with career outcomes. High-impact practices (HIPs) are recognized as the most effective student engagement experiences across student groups in terms of student learning, development, and persistence (Kuh, 2008; Finley & McNair, 2013). Early findings on post-graduation outcomes suggest that student engagement and HIPs increase one's likelihood of pursuing graduate school and improve career outcomes such as earnings and employability upon graduation (Hu & Wolniak, 2010; 2013; Miller et al, 2018; Wolniak & Engberg, 2019).

Sociological qualitative approaches to studying the undergraduate experience offer a more complete picture of students' participation in engagement opportunities and how these opportunities shape post-graduation trajectories for social mobility or social reproduction. Researchers point to the social and cultural capital derived from socioeconomic status (SES) as gateways to student engagement experiences, which generate additional capital (Armstrong & Hamilton, 2013; Stuber, 2011; Hurst, 2015). Newly obtained social and cultural capital compounds capital already derived from high SES, which benefits students seeking employment or a graduate degree following graduation. Stuber (2011) theorizes that, through this process, student engagement acts as a sorting mechanism and reproduces social inequalities. Armstrong and Hamilton's (2013) ethnographic research maps different pathways involving student engagement experiences that influence one's likelihood to achieve social mobility. Rivera's (2015) study shows the ways students from the most privileged backgrounds end up obtaining the most prestigious and well-paying jobs through signaling of their social and cultural capital in the hiring process (Rivera, 2015).

High impact practices have considerable and broad-based buy-in from college administrators but the perceived neutrality they are afforded has been increasingly contested by higher education and student affairs researchers and practitioners. Harper (2009) describes a lack of race-conscious approaches that result in white-centric engagement experiences in HIPs, which exposes students to possible microaggressions or racist behaviors and places them in harmful situations (Patton et al., 2015). Lange and Stewart (2019) used critical theories to disrupt the neutral narrative that HIPs serve all students and the public good. Stewart and Nicolazzo (2018) examine HIPs through a lens of "whiteness as a container," represented as "[whiteness]," to explain how whiteness ideology normalizes the perceived best practice of HIPs. [Whiteness] HIPs provide access to and create experiences for students with the most privilege. The normalization of [Whiteness] HIPs harms students from the margins, in particular, trans* students of color. These theoretical perspectives explain the ways HIPs may not serve those from lower-income backgrounds, especially low-income students with multiple marginalized social identities. With respect to assertions that a bachelor's degree equates to social mobility, this research extends these perspectives through a socioeconomic lens to further explore who has access to the experiences and in what ways they impact post-graduation outcomes across student SES backgrounds.

Significance of the Study

Critical Empirical Quantitative Research

Although well-articulated perspectives explain how student engagement experiences, especially HIPs, serve as a policy and practice for those from the most privileged backgrounds (Harper, 2009; Patton et al., 2015; Lange & Stewart, 2019; Stewart & Nicolazzo, 2018), the narrative of HIPs as a best practice continues across college campuses. Signature qualitative research has illustrated the crucial role social and cultural capital through SES has on engagement participation and post-graduation outcomes that influence social mobility (Rivera, 2015, Armstrong & Hamilton, 2013; Stuber, 2011), yet large-scale quantitative research has yet to investigate their hypothesis. Existing quantitative research exploring student engagement and HIPs lacks critical perspectives and direct investigations of power structures within student engagement experiences (Kahu, 2013; McInnis, 2001; Lange & Stewart, 2019). These studies may position SES measures as controls within their models, but social class is not the primary variable of interest guiding the research.

Jury et al. (2017) call for more research to understand better how university structures either reduce or contribute to existing social inequalities. This research aims to answer that call with a critique of student engagement and HIPs by examining how these undergraduate experiences remove or add to social inequalities. Kilgo et al. (2015) and Kim and Sax (2017) have further argued for the need for empirical research to examine conditional effects of student engagement and HIPs on outcomes across student groups. Research is especially needed on post-graduation outcomes to understand longitudinal outcomes across student groups (Kim & Sax, 2017; Pascarella et al., 2016)

Higher Education Policy and Practice

Higher education researchers and professional organizations recommend investing in student engagement to explicitly support career-readiness and job placement outcomes (Chan, 2016; Cleary et al., 2017; Smith et al., 2018). The National Association of System Heads (NASH) has launched “High Impact Practices: An Educator’s Guide,” which provides strategy and support to state higher education systems to implement quality and equitable participation of diverse students in HIPs (NASH, 2020a). Before reformatting engagement experiences and changing policies and practices regarding student engagement and HIPs, system administrators, institutional leaders, and educators need critical, empirical research to understand the implications and outcomes of student engagement across student populations. For researchers and practitioners interested in advancing equity and upward mobility, examining patterns and outcomes across SES categories will inform future student engagement policy and practice that can advance these goals.

Purpose of the Study

The purpose of this study is to bridge higher education with social mobility research by examining the role that student engagement and HIPs have in mediating and moderating between socioeconomic background and post-graduation outcomes that anchor one's social class. The research helps understand whether student engagement and HIPs serve as factors leading to social mobility or social reproduction. Specifically, the study will first examine the mediating effects of different forms of undergraduate engagement on the relationship between socioeconomic status and two post-graduation outcomes: graduate degree enrollment and early career earnings. A mediation approach provides a better understanding of who has access to these experiences and the subsequent benefits they provide. Secondly, the study seeks to understand, among those who do participate in student engagement and HIPs, how the potential effects differ according to SES background. This approach will provide an understanding of how SES may moderate the effects between student engagement and HIPS and post-graduation outcomes. Student engagement is examined through two experiences: a) extracurricular involvement, and b) interactions with faculty. Six HIPs are evaluated: a) internship, b) research with faculty, c) study abroad, d) community-based project, e) culminating senior year experience, and f) mentorship.

Methodology

Generalized structural equation modeling (GSEM) is used to examine mediating effects of student engagement and HIPs between SES and post-graduation outcomes. A multiple-group

GSEM analysis is then conducted to evaluate the moderating effects of SES between student engagement and HIPs and post-graduation outcomes. This study extends existing research informed by a commonly used student engagement framework (Kuh, 2008; 2009) using cultural, social, and economic theoretical perspectives to better explain the interactions between SES, student engagement and HIPs, and the post-graduation outcomes of graduate degree enrollment and early career earnings.

Chapter 2: Literature Review

The massification of higher education has improved college access and economic mobility for working and middle-class students (Carnevale & Strohl, 2010; Scott, 1995). Research has continued to reflect upward social mobility and expressed support for the equalization hypothesis, which states that a bachelor's degree has an equalizing effect on one's pre-college social class (Hout, 1984; 1988; Pfeffer & Hertel, 2015; Torche, 2011, 2014). That is, a student's social destination upon graduation is not dictated by their social origin (Hout, 1988). A gradational analysis of bachelor's degree recipients using students' family income as a measure of social class showed persisting inequalities, thereby challenging the equalization hypothesis (Witteveen & Attewell, 2017). The authors posit that student engagement experiences serve as a sorting mechanism to reproduce social inequalities instead of equalizing them.

Examinations of social class stratification within higher education focus on three different points. These are the initial decision to attend college, the type of college enrolled, and persistence. These factors are well documented in the literature, but research has paid less attention to stratification within the undergraduate experience of student engagement. Stevens et al., (2008) drew attention to the need for more sociological inquiries on the "experiential core" of college life. The experiential core describes moments within the undergraduate experience when students encounter opportunities to build social networks and develop cultural attributes that benefit them when leaving college (Stevens et al., 2008). Examples of the experiential core include involvement in clubs and organizations, mentorship, undergraduate research, and Greek life, which are termed student engagement in higher education literature (Kuh, 2008, 2009).

This literature review first documents research on earnings and degree attainment, showing their importance for one's social mobility. Next, there is an overview of how the literature addresses the core components of the conceptual understanding of engagement experiences revealed in sociological research (Armstrong & Hamilton, 2013; Stuber, 2011). The review demonstrates three main pathways in the literature explaining these outcomes (See Figure 1): a) the impact of socioeconomic status on career earnings and graduate degree attainment, b) the impact of socioeconomic status on student engagement and HIPs participation, and c) the impact of student engagement and HIPs participation on graduate degree attainment and career earnings. The literature then describes existing research that informs the moderating effects of SES between student engagement and HIPs and early career earnings and graduate degree attainment (See Figure 2). Lastly, literature is summarized and the study's contribution is described.

Figure 2

Conceptual Model Explaining Early Career Earnings and Graduate Degree Attainment Partially Mediated by Student Engagement and HIPs

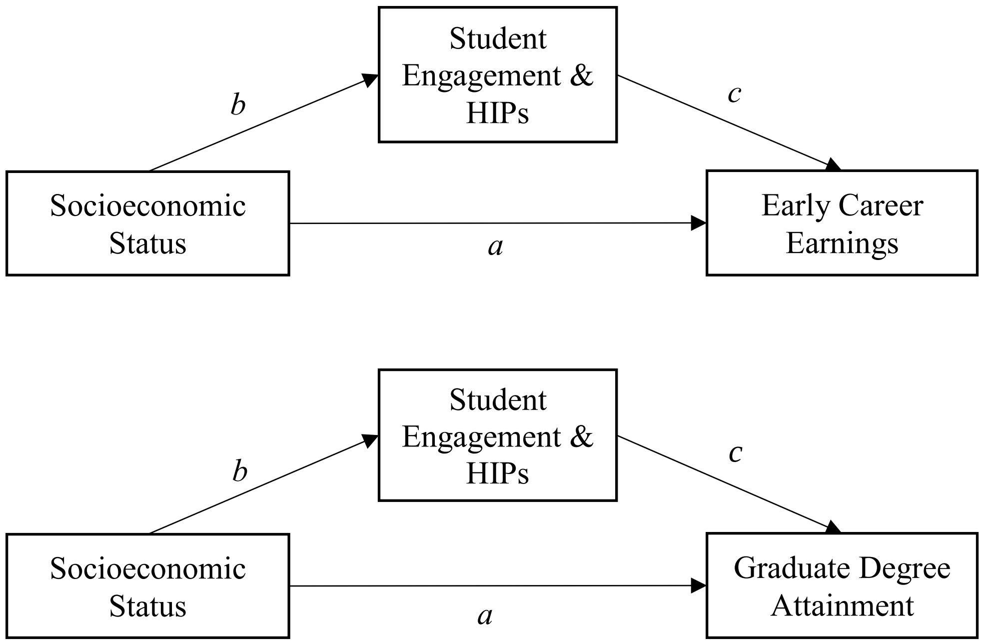
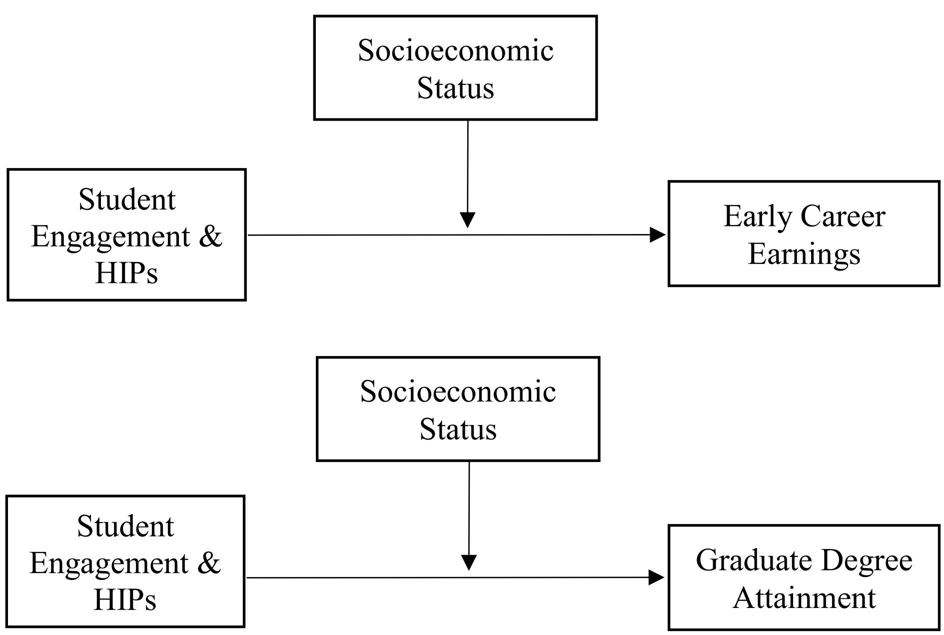


Figure 2

Conceptual Model Explaining Moderating Effects of Socioeconomic Status on the Relationship Between Student Engagement and HIPs and Early Career Earnings and Graduate Degree Attainment



Earnings and Degree Attainment

Obtaining a well-paid job and completing a graduate degree that provides access to more prestigious and higher-paying occupations are markers to upward mobility. Attaining a bachelor's degree results in a higher likelihood of being employed and greater earning over time compared to attaining only a high school diploma. In 2015 the median earnings among workers with bachelor's degrees, and without advanced degrees, was $61,400, which is $24,600 (67%) higher than the earnings of high school graduates (Ma et al., & 2016). The earnings gap between high school graduates and bachelor's recipients has also widened over time (Oreopoulos & Petronijevic, 2013). When examining earnings over a worker's lifetime, the average college graduate is expected to earn $700,000 to $1.5 million more than the average high school graduate, depending on the academic degree received (Weber, 2014). Even when controlling for academic discipline, student loan debt, and innate ability factors, attending college continues to be a worthwhile investment for most individuals (Weber, 2016).

Obtaining an advanced degree further increases earning potential by facilitating access to higher-paid professions. An analysis of research on earnings gains due to post-secondary education found that each additional year of college provided a 5-9% increase in earnings, increasing over time (Pascarella et al., 2016). The 2015 median earnings for workers with master's degrees were $75,200, and over $100,000 for doctoral or professional degree holders, compared to the previously stated figure of $61,400 for bachelor's degree recipients (Ma, et al., 2016).

Graduating from college is associated with additional individual and societal benefits. An extensive review of college outcomes found that bachelor's degree holders are more likely to have retirement plans, engage in healthy behaviors, experience happiness, and have longer life expectancy when compared to high school graduates (Trostel, 2015). College graduates are also more likely to vote, volunteer, and donate to charitable causes (Trostel, 2015). As demonstrated in the literature, college degree attainment continues to be associated with increased individual earnings along with associated societal benefits. Career earnings and graduate degree attainment are not consistent, however, among students from different SES backgrounds.

SES Impact on Career Earnings and Graduate Degree Attainment

Student socioeconomic backgrounds influence student career exploration, choice, and transition into the labor market. Career decisions and expectations are often shaped by how students self-identify within a social class position (Metheny & McWhirter, 2015). A student's own class-rooted understanding informs what type of occupational employment is perceived to be available to them and how best to achieve those occupations (Hurst, 2015; Stuber, 2011). Those from higher SES backgrounds are already thinking about graduate degree study for professional positions (such as dentists and lawyers) when they arrive at college (Armstrong & Hamilton, 2013; Stuber, 2011). The differences in career expectations are formed from external indirect and direct messages, and perceptions and knowledge about career options and career choice (Olson, 2014, Parks-Yancy, 2012; Silver & Roksa, 2017; Tate et al., 2015).

Parents and families can "bridge" their students' graduate degree and career outcomes through their established resources and networks as students enter the job market or seek out continued education opportunities. Parental bridging describes the process whereby higher-SES parents provide their children with financial support that allows for geographical mobility within their job search, share strategies on career advancement, and utilize connections, all of which result in higher labor market outcomes for students (Stuber, 2011). Parental bridging is available due to the current inequities in education and society which provided these advantages to higher-

SES parents (Grusky, 2019). These advantages are then further extended to their children in higher education and in their transition to the workplace or graduate school. Students' class-based understandings, supported by family and parent influence, help explain why students from lower-SES backgrounds are less likely to enroll in and graduate from a graduate degree program and to receive higher wages.

Career Earnings

Inequalities in earnings after graduation exist between bachelor's degree graduates from different family incomes. Bachelor's degree holders from lower incomes made 91% more over their careers than high school graduates (Hershbein, 2016). However, higher-income students made 162% more compared to high school graduates (Hershbein, 2016). Further, the gap between earnings from lower-income and higher-income graduates increases over a worker's career (Hershbein, 2016).

After controlling for grade point average, academic major, and institution, Witteveen and Attewell (2017) found an approximate 15% income gap between graduates from lower-income families 10 years after graduation compared to middle and upper-class families within the same job sector. Thus, higher SES is associated with increased earnings and the likelihood of receiving advanced degrees. These gaps in earnings are also reflected in graduate degree attainment.

Graduate Degree Attainment

Although low-SES students' educational attainment within graduate and professional degrees has increased over time, enrollment in these programs continues to be overrepresented by those from privileged socioeconomic classes. Among students in the highest quartile of family income, 45% are enrolled in graduate school four years after receiving bachelor's degree, while the lowest quartile enrolls at 39% (Baum & Steele, 2017).

The graduate degree enrollment gap is also apparent when examining graduate degree completion by parents' level of education. Sixty-seven percent of students with parents who earned at least a bachelor's degree entered a master's degree or higher graduate program within four years of earning their bachelor's degree, compared to only 33% of their first-generation peers (Cataldi et al., 2018).

SES Impact on Student Engagement and HIPs

Lower-SES students are less likely to be involved and participate in student engagement experiences than their higher-SES peers (NSSE, 2018; Rubin, 2012; Walpole, 2003). Institutional level, control, and selectivity are primary factors for why these differences exist between students from different SES backgrounds. Lower-SES students are more likely to attend public and community colleges while higher SES quartiles are attending the more selective four-year and private institutions, including elite and highly selective institutions (Carnevale & Rose, 2004; Golden, 2007; NCES, 2015; Paulsen & St. John, 2002). The choice of where to attend shapes different institutional contexts (two-year versus four-year, public versus private, selective versus non-selective), which results in different levels of access to campus resources, including student engagement experiences (NSSE, 2018; Porter, 2006). Stuber (2011) found lower-SES students to access more student engagement opportunities in a small private liberal arts college than in a large public flagship university.

An additional explanation for the engagement gap is that higher-SES students have positive dispositions toward engagement experiences based on prior knowledge about their benefits, leading to increased participation (Engle & O'Brien, 2007). Stewart and Lange (2019) clarify that these more positive attitudes towards engagement experiences are due to the ways HIPs center students from privileged backgrounds. Lower-SES students have less time available to spend on student engagement activities (Kezar et al., 2014) due to increased needs to work more during college (Soria et al., 2013; Rubin & Wright, 2017), and a tendency to stay connected with friends from high school and to live with family members (Engle & O'Brien, 2007; Kezar et al., 2014; Stuber, 2011). These behaviors lessen their awareness of engagement opportunities and reduce their availability to participate if desired (Engle & O'Brien, 2007).

Parents not only provide connections when graduates transition out of college but also help their children identify institutions with the right resources to support engagement experiences that will benefit them in the job market (Hamilton et al., 2018). Shared parent insider knowledge of college experience advantages students when they seek employment (Hamilton et al., 2018). Higher-SES parents encourage their child's involvement in critical extracurricular activities and social engagement experiences (Hamilton et al., 2018). If colleges do not have adequate opportunities available, such as internships, higher SES parents work within their career and social networks to develop these experiences for their children (Hamilton et al., 2018; Suber, 2011). For students who access student engagement opportunities, the resulting outcome is increased opportunities within the job market and graduate degree attainment.

Impact of Student Engagement and HIPs on Earnings and Graduate Degree Attainment

Research shows the ways student engagement participation benefits workforce and graduate school outcomes through extracurricular activities and interactions with faculty. Hu and Wolniak (2010; 2013) report that participating in residence hall activities, participating in events reflecting one's own culture, and participating in community service are contributors to career earnings. Wolniak and Engberg (2019) find students who participated in internships or study abroad experiences have increased earnings in their early careers. Kim and Sax's (2017) comprehensive review of effects of interactions with faculty describes demonstrated impact on cognitive or intellectual skills or development (Kuh & Hu, 2001; Flowers, 2004; Kim & Sax, 2011), social or personal skills (Flowers, 2004; Kim & Sax, 2009, 2014), cultural or social awareness (Kim & Sax, 2009), career preparedness (Flowers, 2004; Kuh & Hu, 2001), occupational awareness (Cabrera et al., 2001), and earnings (Hu & Wolniak, 2010; 2013). Hurtado et al. (2011) describe the ways underrepresented students' interactions with faculty support an individual student's identity as a researcher within science; this results in increased degree aspirations (Kim & Sax, 2009).

High-impact practices are recognized as the most effective student engagement experiences across student groups on student learning, development, and persistence (Kuh & O'Donnell, 2013, Kuh, 2008; Finley & McNair, 2013). HIPs include a) first-year seminars and experiences, b) common intellectual experiences, c) learning communities, d) writing-intensive courses, e) collaborative assignments and projects, f) undergraduate research, g) diversity or global learning (e.g. study abroad), h) ePortfolios, i) service learning and community-based learning, j) internships, an k) capstone courses and projects (Kuh & O'Donnell, 2013).

Acquired skills, competencies, or affective outcomes from participation in HIPs subsequently support graduate degree enrollment and career outcomes. Internships provide discipline-related knowledge and skills (Aldas et al., 2010), professional development (Simons et al., 2012), and fieldwork, which can lead to preparedness for graduate school and the workforce (Simons et al., 2012). Research with faculty provides opportunities for acquisition of discipline-related knowledge as well as work and career skills (Carney et al., 2011), increases one's critical thinking and intercultural effectiveness (Kilgo et al., 2015), and increases understanding of, interest in, and plans for graduate school (Lopatto, 2007; Seymour et al., 2004). Study abroad is positively associated with an ability to work with people from other cultures, an understanding of the complexities of global issues, an application of disciplinary knowledge in a global context, and linguistic and cultural competency (Stebleton et al., 2013). Service-learning leads to openness to diversity (Jones & Abes, 2004) and multicultural competence (Einfeld & Collins, 2008). Completing a senior capstone project is associated with one's ability to integrate and apply course knowledge into practice (Kinzie, 2013) and facilitates critical thinking (Kilgo et al., 2015). Mentorship is associated with leadership development (Cambell et al., 2012) and the opportunities to develop social assets that can be used for economic gains (Cole & Espinoza, 2008).

Harper (2008) describes the ways involvement outside of the classroom in leadership or involvement in clubs and organizations resulted in social connections that were activated for professional and economic advancement. Graduate school opportunities were more easily accessed due to the ways social networks were leveraged to obtain strong letters of recommendation from university presidents or deans in an application (Harper, 2008). Reflecting Harper's results, longitudinal ethnographic research illustrates the ways cultivated cultural and social capital may be used after graduation to gain higher employment positions or attend a graduate program (Armstrong & Hamilton, 2013; Hurst, 2015; Stuber, 2011).

Socioeconomic Status Conditional Effects of Student Engagement and HIPs

There is a lack of strong evidence to make claims regarding the way students' SES moderates the effects of student engagement and HIPs (Stewart & Lange, 2019; Stewart & Nicolazzo, 2018; Kilgo et al., 2015; Kim & Sax, 2017). A highly referenced study, which lacks controls, shows the ways HIPs are beneficial for all students and may specifically benefit students from lower-income backgrounds and other underserved populations (Finley & McNair, 2013). First-generation students self-report higher levels of deep learning, general education, practical competence, and personal and social development when participating in one or more HIPs (Finley & McNair, 2013). Kuh (2008) uses the term “compensatory effects” to describe findings that indicate HIPs participation particularly benefits underserved student populations. Kim and Sax (2009) found effects of faculty interactions dependent on first-generation status were not as strong compared to other moderating factors. They do report effect differences dependent on a student’s class background when it comes to research-related faculty interactions. Their more robust study with controls contradicts the findings of Finley and McNair (2013). Kim and Sax (2009) report that research experience with faculty had a positive effect on student critical thinking and communication skills in middle- and upper-class students, but not in lower-class students. Further, interactions with faculty within research settings had a small negative effect on middle-class student gains in cultural appreciation and social awareness, with no significant effects on upper- or lower-class students (Kim & Sax, 2009).

Summary and Contributions to Literature

This study will contribute to the literature in three. First, the research will bridge higher education and social mobility literature by examining the role student engagement has on post-graduation outcomes across SES backgrounds. Research points to the common belief that obtaining a bachelor’s degree removes prior social class inequalities (Hout, 1984; 1988; Torche, 2011; 2014) and results in individual and societal benefits for graduates (Trostel, 2015). However, career earnings and graduate degree enrollment are conditional on student SES when entering college (Baum & Steele, 2017, Cataldi et al., 2018; Hershbein, 2016; Witteveen & Attewell, 2017). Qualitative studies describe one explanation for this social stratification within a college is that student engagement acts as a sorting mechanism that perpetuates class inequality (Armstrong & Hamilton, 2013; Hurst, 2015; Rivera, 2015; Stuber, 2011). Witteveen and

Attewell (2017) argue that this mechanism may explain their results, which demonstrate persistent income inequalities, but which lacked empirical evidence to substantiate this point. The present research further explores these hypothesized relationships to understand how varying undergraduate student engagement among different SES backgrounds impacts the outcomes that shape one's likelihood of social mobility.

Second, the research uses a multiple-group analysis to assess if the effects of student engagement and HIPs on post-graduation outcomes are dependent on one's SES. Some research has examined the role of SES as a moderating variable on cognitive outcomes (Kim & Sax, 2009), with descriptive studies indicating first-generation students, students from lower-income backgrounds, and students of color may experience higher gains in learning and development (Kuh, 2008; Finley & McNair, 2013). The present research will help to remedy the notable lack of attention to the conditional effects of student engagement overall (Kilgo et al., 2015; Kim & Sax, 2017). This research will provide empirical evidence that reports how the effect of student engagement and HIPs may benefit students differently depending on their SES background.

Third, student engagement literature is extensive but lacks critical sociocultural research. Studies that directly apply the sociocultural lens of class derive from qualitative research and focus on a handful of institutions (Armstrong & Hamilton, 2013; Stuber, 2011). The present study employs a quantitative multi-institution sample to supplement qualitative findings and offer additional empirical insights of the relationships uncovered between SES, engagement experiences, and post-graduation outcomes. Research typically applies a variable-centered approach in student engagement data analysis, while the present study uses a person-oriented research design (von Eye & Bogat, 2006) when examining moderating effects. Pendakur et al. (2020) have expressed a need to shift the onus for engagement on to institutions instead of putting the expectation on students. By positioning SES as the focus of a study explaining student engagement participation and effects on graduate degree enrollment and early career earnings, this research will inform decision-makers from staff to institutional leaders in their planning and policies regarding student engagement.

Theoretical Framework

Student Engagement Theory

The student engagement framework introduced by Kuh (2008; 2009) explains the time and effort invested in educationally purposeful activities that support learning and development. Previously identified highly effective forms of student engagement, or HIP, provide deep learning experiences due to eight key characteristics: 1) Performance expectations set at appropriately high levels 2) Significant investment of time and effort by students over an extended period of time 3) Interactions with faculty and peers about substantive matters 4) Experiences with diversity, wherein students are exposed to and must contend with people and circumstances that differ from those with which students are familiar 5) Frequent, timely, and constructive feedback; 6) Periodic, structured opportunities to reflect and integrate learning; 7) Opportunities to discover relevance of learning through real-world applications; and 8) Public demonstration of competence (Kuh & O’Donnel, 2013, p. 2). Students who participate in student engagement experiences obtain skills and competencies that benefit them after college (Kuh, 2008). Kuh’s framework of student engagement lacks a social class perspective by not accounting for social and cultural factors that exist within higher education institutions; this study will supplement Kuh’s framework by including that perspective, with a predominant focus on the theory of social reproduction.

Theory of Social Reproduction

Social reproduction theory explains how institutions and actors reproduce social relationships that result in class differences, which reflect varying degrees of access to power and socioeconomic inequalities (Bourdieu, 1984). Pierre Bourdieu's conceptualization of social inequalities and their reproduction is useful in researching strategies that reinforce or improve social class positions (Bourdieu, 1984; Lareau, 2003). The literature signals that one strategy that perpetuates social inequalities is college student engagement experiences (Armstrong & Hamilton, 2013; Hurst, 2015; Stuber, 2011). To further extend the understanding of implications and outcomes of student engagement with respect to SES, Bourdieu's theory is the main theoretical framework applied to the present study. Bourdieu's theory is expressed within three types of interrelated capital: cultural, social, and economic (Bourdieu, 1984; Bourdieu & Wacquant, 1992; Winkle-Wagner, 2010).

Cultural capital includes an individual's abilities, preferences, and mannerisms that are acquired through family or social origin and education (Bourdieu, 1984). These attributes are cultivated and used to achieve social benefits, such as acceptance as a member of a community or social mobility (Winkle-Wagner, 2010). Cultural capital is thus associated with one's class (Bourdieu, 1984). What are determined in society to be highly valued interests, behaviors, and norms include cultural characteristics of those within higher SES positions (Winkle-Wagner, 2010). Social capital includes available and trustworthy social networks that can provide recognition of one's group membership, and access to experiences to increase one's cultural capital (Bourdieu & Wacquant, 1992; Winkle-Wagner, 2010). Economic capital, also known simply as financial means, is readily converted to access other forms of capital and status (Bourdieu, 1984).

Bourdieu's theoretical explanation for cultural and social reproduction (Bourdieu, 1984; Bourdieu & Passeron, 1977; 1990; Bourdieu & Wacquant, 1992), when applied to higher education, situates student engagement as a process that reinforces and perpetuates existing social inequalities. Students bring with them to college a class-based position and related habitus that influences their access to and participation in engagement experiences. Lower-SES students may not have enough money (economic capital) to pay for experiences or dedicated time to participate when working multiple jobs. A lack of social connections (social capital) due to living off-campus with family instead of in on-campus residence halls limits awareness of and access to opportunities. Lower-SES students' inability to demonstrate the perceived correctly valued interests, dispositions, and mannerisms (cultural capital) results in restricted access to opportunities with faculty members, Greek life, or internships in more elite professions. Parents from higher-SES backgrounds are also able to mobilize their capital to boost their children, thus endowing these students with greater capital to pursue engagement experiences. If the experiences do not exist, higher-SES students, through their parents, utilize their capital to create them.

Summary

The present research seeks to understand the role student engagement and HIPs have as a sorting mechanism within higher education that contributes to social reproduction through early career earnings and graduate degree enrollment. Literature and theory describe how, through increased access to student engagement and HIPs, higher-SES students can accrue additional social and cultural capital, along with skills and competencies, which benefit them in graduate degree enrollment and the job market. Conducting research or having interactions with faculty outside the classroom develops one's social network and supports navigation of the graduate degree enrollment process. Participating in an internship similarly builds social connections and cultural interests and mannerisms that elite and higher-paid professions value and seek out in employees.

Subsequently, among those who do participate, the research explores how effects on early career earnings and graduate degree attainment are dependent on one's SES background, with lower quartiles experiencing positive effects compared to upper quartiles. It is not fully known how SES moderates these effects. Theory suggests students who do participate obtain social and cultural capital, which can be leveraged within the post-graduation experience into achieving a better career prospect or enrolling in and completing a graduate degree program. It is more likely the case that higher SES quartiles will not experience these significant effects compared to lower SES quartiles, given the social and cultural capital which they already possess. Research questions informed by the theoretical framework are presented below.

Research Questions

Four questions guide the study. The study seeks to examine the potential mediating effects of student engagement experiences and HIPs between SES and early career earnings (RQ 1a) and graduate degree attainment (RQ 2a). Subsequently, the study evaluates the moderating effects of student engagement and HIPs on early career earnings (RQ 2b) and graduate degree attainment (RQ 2b) by SES background.

RQ 1a: How do student engagement and HIPs mediate the relationship between socioeconomic status and early career earnings?

RQ 1b: How do student engagement and HIPs mediate the relationship between socioeconomic status and graduate degree attainment?

RQ 2a: How does the effect of student engagement and HIPs on early career earnings differ across socioeconomic status backgrounds?

RQ 2b: How does the effect of student engagement and HIPs on graduate degree attainment differ across socioeconomic status backgrounds?

Chapter 3: Methodology

Research Design

The present study follows two lines of inquiry. First, it seeks to understand the mediating effects of student engagement and HIPs on the relationship between socioeconomic status and two post-graduation outcomes: early career earnings and graduate degree attainment. Second, the study subsequently explores moderating effects by seeking to understand how these experiences have different effects on these post-graduation outcomes dependent on one's socioeconomic status. Student engagement is examined through two engagement experiences: extracurricular involvement and interactions with faculty outside the classroom. Six HIPs are evaluated: a) internship; b) research with faculty; c) study abroad; d) community-based project; e) culminating senior experience; and f) mentorship.

The present research follows a quantitative postpositivist philosophy. This position pursues objective and generalizable knowledge but does not believe in the ability to gain absolute truth (Phillips & Burbules, 2000). A researcher is influenced by cultural experiences and biases, leading to subjective errors in measurement and research (Phillips & Burbules, 2000).

The present research uses the Education Longitudinal Study 2002/2012 (ELS) dataset available through the National Center for Educational Statistics (NCES) within the U.S. Department of Education. The dataset provides sequential measures with a robust set of variables required to conduct the analyses that will answer the research questions. Statistical analyses are performed using Stata statistical software package version 15. ELS variables, missing data management, and statistical analysis plans are described below.

Sample and Data Source

ELS's purpose was to explore transitions and educational experiences as related to post-secondary education and workforce outcomes (Bozick & Lauff, 2007; Ingels et al., 2004; Ingels et al., 2014). ELS is ideal for this study because it contains data on post-secondary experiences and workforce outcomes and takes a longitudinal approach. Additionally, the longitudinal study was the only multi-institutional data source identified that measured pre-college SES, student engagement and HIPs, graduate degree attainment, and early career earnings.

Ingels et al. (2004) provide an overview of the ELS sample framing of the target population of spring term 2002 sophomores in high school. The sampling method was accomplished in two stages. First, a sample of 1,221 eligible public, Catholic, and other private schools were selected based on stratified probability proportional to size (PPS) from a population of 27,000 high schools. The PPS design avoids the underrepresentation of subgroups within the sample to better represent an intended population (Ingels et al., 2004). This is accomplished by calculating different probabilities of a group being selected as a sample member dependent on the size of the population group. Units from larger groups (i.e., public schools, white students) are less likely to be selected due to a smaller assigned probability than units from a smaller group. Stratification accounted for the United States region, control (Public versus Private), and metropolitan status (Urban, Suburban, Rural). Sampling occurred as a condition of the assigned probability that occurred for each sample pool strata. The 2002 base year sampling method resulted in 752 schools out of 1,221 eligible schools contacted, representing a 61.6% participation rate

Secondly, schools provided a list of enrolled sophomore students. The same sampling method was conducted for approximately 26 students at each school, resulting in 15,362 eligible students. Strata used in the sampling were Hispanic, Asian, Black, and other race/ethnicity. The sophomore students' parents were also contacted as part of the study. At least one parent or guardian completed a form indicating family demographics and their child's educational activities (Ingels et al., 2004). A total of 15,362 parents were eligible and had an 87.8% response rate (n=13,488).

Students within the dataset were eligible unless they were foreign exchange students. Given the longitudinal nature of the survey, ineligible categories were established through the data collection process: a) deceased, b) incarcerated, c) institutionalized, d) out of scope, e) out of the country, and f) physically/mentally incapable (Ingels et al., 2004; Bozick & Lauff, 2007; Ingels et al., 2014). This resulted in different eligible samples of students across the different data collection periods. Students may have been ineligible for one round but became eligible in future rounds and vice versa.

Data Collection

Ingels et al. (2014) describe the ELS survey data collection methods through the four time periods of 2002, 2004, 2006, and 2012. Data were collected using school surveys, mail, online surveys via email, computer-assisted telephone interviews, computer-assisted personal interviews, telephone interviews, or field interviews. Incentives for data collection ranged from $5–$60 depending on the collection year, administration method, and respondent likelihood of response.

First, the base-year survey was administered to the high school sophomore sample in Spring 2002. The overall response rate for students was 87.3%, accounting for 15,362 high school sophomores out of the 17,591 eligible sampled students (Ingels et al., 2004). Second, a follow-up was conducted in Spring 2004 to represent students enrolled as high school senior students. This year included a sample freshening in which 202 new students were added to reflect Spring 2004 seniors in high school using the NCES freshening procedure (Bozick & Lauff, 2007). This resulted in an eligible sample of 16,515, of which 14,989 participated, for a response rate of 90.8% (Bozick & Lauff, 2007). Third, a second follow-up was conducted in the spring of 2006 among eligible students two years after graduating from high school, eliciting an 89.1% response rate (N=15,892) (Bozick & Lauff, 2007). A final follow-up was conducted in 2012 of 15,724 sample members, eliciting an 84.3% response rate (Ingels et al., 2014). Results also reflect similar response rates across student groups within the third follow-up (Ingels et al., 2014).

The NCES links student and institutional datasets to ELS respondents. NCES-provided Barron's Admission's Competitive Index data files, linked to the Integrated Postsecondary Education Data System (IPEDS), identify ELS respondent institutions. Within the restricted data file, postsecondary education transcripts were also linked to ELS participants, with outcomes including persistence, completion, course-level information, grade point average, and other academic outcomes (Christopher, 2015).

Data Sample

Out of the total ELS respondents who completed a survey (N=16,197), two subsamples are used for the present study. For research question 1a, the 4,852 ELS respondents who completed a bachelor's degree between May 2006 and December 2010 were included. Although bachelor degree completion is reported through June 2013, a cutoff point of December 2010 was selected, given that associated earnings encompassed 2011. This provides time after obtaining a bachelor's degree to enroll in the workforce. For research question 2a, sample (N=4,835) omitted 17 students who identified as Native American due to cell sizes being less than 10, which does not support the GSEM multiple-group method (Kline, 2016). A total of 701 high schools and 1,051 universities where bachelor degrees were conferred are represented.

The remaining two research questions, 1b and 2b, have a slightly larger sample. All ELS respondents who completed a bachelor's degree through June 2013 are used to examine graduate degree attainment. This results in 33.7% (N=5,463) of ELS respondents for research question 1b. For research question 2b, sample (N=5,445) omitted 18 Native American respondents to maintain 10 or more for cell size. Among these ELS respondents, 715 high schools and 1,137 universities are represented.

Variables

This section describes and defines the variables that are analyzed in the study. The variables selected are those informed by the literature review. The use of appropriate controls meets the assumption of omitted variable bias when analyzing mediating and moderating effects (Judd & Kenny, 1981). Appendix A details the ELS full survey questions and response options.

Socioeconomic Status

Social and educational research into inequality has not settled on how best to measure SES. The operationalization of social mobility using a "big class" definition of occupational type does not reflect the current state of US society and life experiences that have been associated with occupational positions in the past (Weeden & Grusky, 2012). Weeden and Grusky (2012) advocate for income to be used as a more appropriate measure of social origin in inequality research, given the prominent role it has played in today's class inequalities. Within post-secondary education research, first-generation status is often used to measure SES.

Reflecting the complexity of socioeconomic status, the present study uses a more robust measure of SES than prior higher education research that may have a limited measure of an individual's SES. A latent variable is created for SES measured by five observed measures: a) Mother's education level, b) Father's education level, c) Family income, d) Mother's occupational level, and e) Father's occupational level. These five measures are collected in a parent survey in the base year collection of 2002, when students were sophomores in high school. The comprehensive measure of SES reflects different levels of social, cultural, and economic capital. Based on the SES measure, quartiles are calculated which is necessary within the analysis to answer research questions 2a and 2b.

Mother and Father's Education Level. Parents' education level in the present study uses the ELS parent survey measure. This ranged across eight levels, with the parent survey asking "What is the highest level of education you and your spouse/partner have reached?" Categories were a) Did not finish high school, b) graduated from high school or GED, c) Attended two-year school, no degree, d) Graduated from two-year school, e) Attended college, no four-year degree, f) Graduated from college, g) Completed Master's degree of equivalent, and h) Completed PhD, MD, or other advanced degree.

Family Income. Parents were asked "What was your total family income from all sources in 2001? (If you are not sure about the amount, please estimate)," to measure family income. ELS 2002 results were used in the present study, with 12 ordered income categories: a) $1,000 or less, b) $1,001–$5,000, c) $5,001–$10,000, d) $10,001–$15,000, e) $15,001–$20,000, f) $20,001–$25,000, g) $25,001–$35,000, h) $35,001–$50,000, i) $50,001–$75,000, j) $75,001–$100,000, k) $100,001–$200,000, and l) $200,001 or more. The ELS measure of family income is used for the present study.

Mother and Father's Occupation Level. Parents were asked "Please describe your present or most recent job for pay in the United States. If you hold more than one job, describe only one job that you consider to be your main job." Occupational categories were selected based on 17 occupations based on the Occupational Information Network (OIN) labor market classifications developed by the U.S. Department of Labor/Employment and Training Administration (Ingels et al., 2014). If respondents inputted their occupation information (job title, duties, closest category), these were coded by ELS staff using the OIN classifications. The categories were recoded to an ordinal variable, with three categories to support the model's ability to fit as opposed to a more complex categorical variable with 16 unique categories across two occupation level indicators. The three distinctive ordered categories reflect occupation levels from OIN classifications and reflect increases in degrees of social and cultural capital.

Occupation level 1 represents broad employment types of technical support, military, teaching, and sales. Occupation level 2 reflects the ELS 2002 OIN combined categories labeled "Professional 1" which includes accountants, registered nurses, librarians, social workers, and engineers. Occupation level 3, which reflects the ELS 2002 OIN category of "Professional 2," represents the highest ranked positions in terms of prestige and reflects the highest social and cultural capital. These occupations reflect parents who reported their most recent jobs as similar to scientists, professors, lawyers, or doctors.

Using a factor-based latent measure through GSEM with confirmatory factor analysis (CFA) is a more accurate method for constructing a variable compared to commonly used composites, where each factor is made proportionately equivalent by averaging scores together (Ledgerwood & Shrout, 2011). GSEM provides the ability to correct for measurement error, reducing bias (Acock, 2013; Jöresko, 1977), and allows for the evaluation of measurement models (Acock, 2013). SES is measured as a continuous variable when estimating mediating effects. In order to conduct a GSEM multiple-group analysis that informs how these experience effects are dependent on one's SES, quartiles are created and used to compare between the four groups.

Early Career Earnings

Early career earnings are measured as a continuous variable in the 2012 follow-up. The survey asks respondents, "About how much did you earn from employment in 2011 before taxes and all other deductions?" Qualifying information is included in the question along with a note about marking respondent earnings only and not the earnings of those who may have a combined income with a spouse.

Graduate Degree Attainment

The study measures graduate degree attainment using NCES post-secondary transcript data merged with the ELS survey results. This dataset provides student-institutional level information that reports a respondent's highest completed educational level as of June 2013**.**

Mediating Variables

Student engagement experiences were measured in 2006. Among ELS 2002 respondents who enrolled in college following their senior year of high school in 2004, the study asked about experiences during year two of college. Respondents were later asked, in the 2012 data collection wave, to indicate if they participated in different experiences as a part of their entire undergraduate education. These included HIP participation with internship, research with faculty, study abroad, community-based project, culminating senior year experience, and mentorship. Variables are further described by how they were measured.

Student Engagement: Extracurricular Involvement. Respondents were asked in 2006 during their time at their first institution, how often they participate in extracurricular activities. Response options available included “never,” “sometimes,” or “often.”

Student Engagement: Interactions with Faculty. Respondents were asked in 2006 during their time in their first institution, “How often did you talk with faculty about academic matters outside of class time?” Response options available included “never,” “sometimes,” or “often.”

High-Impact Practice: Internship. Internship participation was measured in 2012. Respondents were asked if they participated in an “internship, co-op, field experience, student teaching, or clinical assignment.” Response options available included “Yes” or “No.”

High-Impact Practice: Research with Faculty. Research with faculty was measured in 2012. Respondents were asked if they participated in a “research project with a faculty member outside of a course or program requirements.” Response options available included “Yes” or “No.” This question reflects similar questions used in the NSSE instrument which is widely used to assess participation in HIPs across college campuses (NSSE, 2018).

High-Impact Practice: Study Abroad. Study abroad participation was measured in 2012. Respondents were asked if they participated in “study abroad.” Response options available included “Yes” or “No.”

High-Impact Practice: Community-Based Project. Community-based project participation was measured in 2012. Respondents were asked if they participated in a “community-based project (for example, service learning) as part of a regular course.” Response options available included “Yes” or “No.”

High-Impact Practice: Culminating Senior Experience. Culminating senior experience participation was measured in 2012. Respondents were asked if they participated in a "culminating senior experience, such as a capstone, senior project or thesis, or comprehensive exam." Response options available included "Yes" or "No."

High-Impact Practice: Mentorship. Mentorship participation was measured in 2012. Respondents were asked if they participated in a "program in which you were mentored." Response options available included "Yes" or "No."

Control Variables

Institutional Level (Two-Year versus Four-Year). ELS includes student-institution transcript level data for each semester. These data track whether respondents attended two-year and/or four-year universities within their post-secondary experience. The data were used to create a measure indicating if a student attended a two-year institution or if semesters enrolled were only at a four-year university.

Institutional Control. ELS student-institutional transcript data was also used to identify whether the respondents graduated from public, private, or for-profit institutions. The data were used to generate a variable that marks if the institution that conferred the respondent's first bachelor's degree was a public, private, or for-profit institution.

Institutional Selectivity. Institutional selectivity, often conflated in the literature as institutional quality, was defined by Barron's Competitiveness Index, which NCES ties to institutions ELS respondents attended. Although other institutional quality measures exist, Barron's index gives a more robust estimate when measuring the impact institution quality has on earnings outcomes (Pascarella et al., 2016). Ratings include six categories (Non-competitive, Less Competitive, Competitive, Very Competitive, Highly Competitive, Most Competitive) and a category for “Special” institutions, such as those in the fine arts. Respondents may have attended multiple institutions before graduating with their first bachelor’s degree. The present study uses Barron’s rankings based on the institution that conferred the respondent’s first bachelor’s degree.

Academic Field. Academic field is measured by the first known bachelor’s degree major or field using two-digit Classification of Instructional Programs (CIP) codes from post-secondary transcripts, which mark 35 different categories. These academic programs were merged into 12 academic fields, informed by the literature (Miller, 2018), which better support statistical analysis with required sample sizes: Arts, Biological Sciences, Business, Communications and Journalism, Education, Engineering and Computer Science, Health Sciences, Humanities, Social Sciences, Physical Sciences, and Other Majors or Interdisciplinary. The academic field CIP code is pulled from student post-secondary transcripts that are merged with ELS data.

Undergraduate GPA. Undergraduate coursework grade point average (GPA) is calculated using postsecondary transcripts. GPA ranges from 0.00 to 4.00 points. The respondent’s first bachelor’s degree GPA is used.

Race/Ethnicity. Respondent race/ethnicity is self-reported in the 2004 data collection round or taken from 2002 if not available. Students marked one of five different options: Asian American/Pacific Islander, Black/African American, Hispanic/Latino, Native American, White, or Multiracial.

Sex. Respondent sex is self-reported in the 2004 data collection round or taken from the 2002 survey if not available. Respondents marked if they were male or female.

Advanced Degrees. Postsecondary transcript data measured whether respondents completed additional degrees after obtaining their first bachelor's degree. Response options included master's degree, post-master's certificate, or doctoral and professional degrees.

Number of Hours Worked Per Week. Respondents in 2012 were asked how many hours they worked for pay during a typical work week in 2011. Response options were continuous by whole number ranging from 5 to 90 hours.

Time Elapsed Since Graduation. The month and year of the respondent's most recent bachelor's degree is recorded in ELS 2002. The data were used to calculate the number of months between an individual's most recent bachelor's degree and January 2011.

Data Analysis Plans and Procedures

Missing Data

Large-scale longitudinal surveys, such as the ELS 2002, entail a variety of reasons for missing data. NCES uses reserve codes for nine different types of missing data, which directly informs decisions about how to treat missing data. Reserve codes include: -1 = Don't know, -2 = Refused, -3 = Item legitimate skip/item not applicable, -4 = non-respondent, -5 = Suppressed, -6 = Multiple Responses, -7 = Not administered—abbreviated interview or break off, -8 = Survey component legitimate skip, and -9 = Missing where respondents were expected to respond. Variables were scanned by reserve codes and then recoded to missing or zero when appropriate. Average hours worked per week reported -3 "Item legitimate skip/NA" and -8 "Survey component legitimate skip/NA," which were transformed into 0. The reserve code -3 reflects students who reported not working on a prior question, with -8 indicating students who reported not working any weeks in 2011. These two conditions reflect 0 hours per week of work.

A multifaceted approach is used to manage the missing data in the present study through the use of logical imputation, statistical imputation, and listwise deletion. First, missing data were treated by replicating the same measure's response at an alternate time period (Ingels et al., 2014). For example, if a respondent's sex in 2006 is missing, the 2004 data completed response for their sex. This was used only one or two times for respondent race and sex (see Table 1).

Table 1

Logical Imputations

Variable	Number and Percent of Logical Imputations	
	Early Career Earnings Sample	Graduate Degree Attainment Sample
Race	1 (0.02%)	2 (0.02%)
Sex	2 (0.04%)	2 (0.02%)

After logistical imputation was performed, variables that were determined by ELS 2002 staff to be of critical analytical value included statistical imputation (Ingels et al., 2014). The variables deemed of importance and used in the present study samples were Mother's education level, Father's education level, Mother's occupation level, Father's occupation level, Family income, and early career earnings. Table 2 describes the variables used within the present study and the number of cases that were statistically imputed by ELS staff. Statistical imputation used a weighted sequential hot deck procedure (Cox, 1980).

Table 2

Statistical Imputations

Variable	Number and Percent of Statistical Imputations	
	Early Career Earnings Sample	Graduate Degree Attainment Sample
Mother's education	95	118

	(2.0%)	(2.2%)
Father's education	253 (4.9%)	304 (5.6%)
Mother's occupation	124 (2.6%)	152 (3.2%)
Father's occupation	35 (0.7%)	45 (0.8%)
Income	1,056 (21.8%)	1,204 (22.0%)
Earnings	141 (2.9%)	n/a

Hot deck imputation procedures result in missing values being substituted by an observed response from a "similar" unit (Andridge & Little, 2010). This process entails a 'recipient' consisting of a non-respondent's missing values being replaced by a 'donor' (Andridge & Little, 2010). The recipient and donor cases have similar observed characteristics (Andridge & Little, 2010). Hot deck imputation techniques are a widely used approach in practice. Andridge and Little (2010) report that out of the 20 NCES surveys, 11 use a form of hot deck imputation.

Third, listwise deletion is used for remaining variables within the model that had a smaller number of missing values. Statistical analysis resulted in omitting cases when variables were coded as missing. Using logical imputation, statistical imputation, and listwise case deletion resulted in supporting further data analysis to meet sample size requirements for GSEM and in missing data not being a significant issue.

Descriptive Analyses

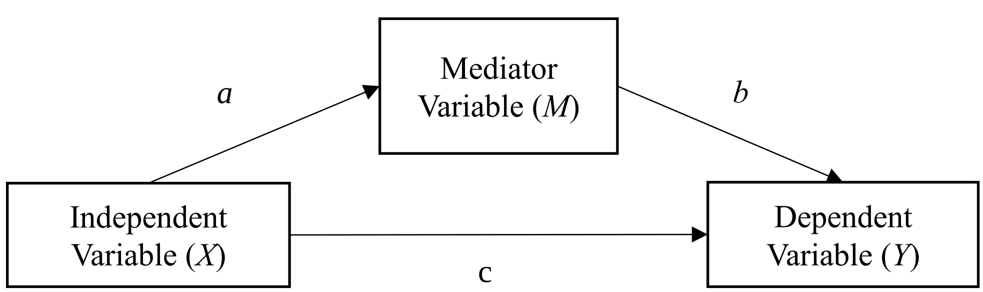
Descriptive statistics were first performed to understand sample measures of SES, participation in student engagement and HIPs, and post-graduation outcomes. Control variables were also described using descriptive statistics to broaden the knowledge of who is represented in the ELS samples. Patterns were examined by conducting Spearman's correlation to see how SES indicators relate to each other. Spearman's correlation is used to measure the strength of association between two variables (Spearman, 2010). This correlation technique was used rather than other methods because SES indicators are ordinal (Mukaka, 2012; Spearman, 2010).

Mediation Analysis

Mediation analysis helps understand how one variable influences another variable through a mediator variable. Complete mediation occurs when a mediating variable accounts for the effects between an independent and dependent variable (MacKinnon, 2008). The present study was informed by the theoretically driven conceptual model of partial mediation, where the relationship between the independent variable, *X*, and the dependent variable, *Y*, is not entirely explained by the mediator, *M* (see figure 3). The ELS's data collection and the study's sequential order of variables through a longitudinal study reduce the unnecessary assumption of temporal precedence that is required within a cross-sectional analysis of mediation effects (MacKinnon et al., 2007). The time sequence is important within mediation analyses that aim to provide causal inference. If variables are collected at the same point in time that appear to show the effect of X on Y, it cannot be certain that Y did not in fact affect X and explain the positive effect. The ELS collects data used in the study in 2004 (SES), 2006 (student engagement), and 2012 (HIPs, Earnings, Graduate school) which supports more causal inference given the sequential order.

Figure 3

Partial Mediation Model



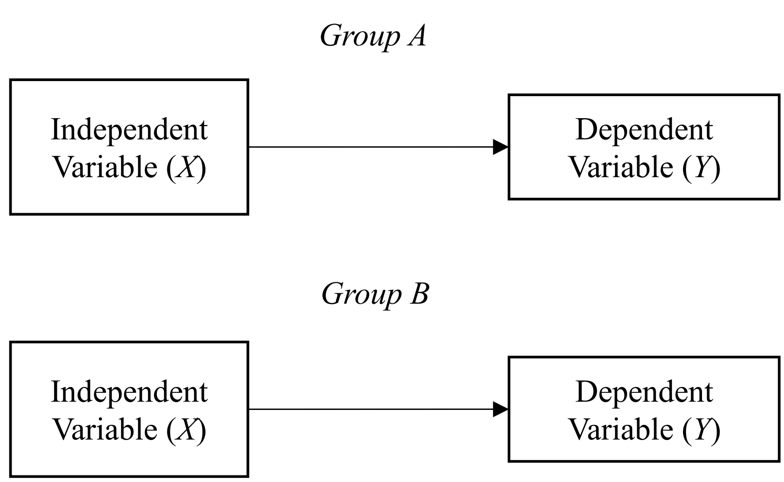
Moderation Analysis

Moderation seeks to understand the ways a condition impacts the relationship between an independent and dependent variable (MacKinnon & Luecken, 2008). The moderating variable affects the relationship between the two variables, such that the effect differs depending on the level of the moderator variable (MacKinnon & Luecken, 2008). One method to conduct moderation analysis is through a multiple-group approach.

A multiple-group model using GSEM allows researchers to model groups to honor unique characteristics instead of aggregating the groups together which averages out estimates (von ye et al., 2015) (See Figure 4). The estimates in each group are "free" which allows all the parameters to vary dependent on the distinctive model informed by the subgroup (Acock, 2013). Results of unstandardized coefficients in the pathways are then able to be efficiently examined by each subgroup (Acock, 2013). Further, Akaike and Bayesian information criteria can be used to inform the ways different models fit and differ across groups (Kline, 2016).

Figure 4

Multiple-Group Model Evaluating Moderation



Multiple-group is one method employed that supports person-oriented research. von Eye et al. (2015) describe two conditions necessary before using a statistical approach for a person-oriented analysis. First, a sample needs to be large enough with each subpopulation needing a sufficient sample size to support the analysis of each group. Second, dimensional identity is demonstrated. Dimensional identity occurs if the interrelations of variables in the set do not change across levels or categories of different subpopulations (von eye & Bergman, 2003). The degree of various between variables is measured by examining differences of effect strength and statistical significance tests (von eye & Bergman, 2003). If dimensional identity does exist, then variable-centered analysis at an aggregate level where averages are utilized is justified (von eye & Bergman, 2003). However, von Eye et al. (2015) describe exceptions where the variables have meaning that do not reflect limitations of instrumentation (e.g., measurement of student engagement and HIPs), but instead meaningful differences between groups.

Generalized Structural Equation Modeling (GSEM). A GSEM method is applied in the current study and is well suited to answer the research questions examining mediation and moderation. GSEM combines the power of modeling capabilities of structural equation models (SEM) (Kline, 2016) with the broader estimation capabilities of the generalized linear model (GLM) framework (McCullaugh & Nelder, 1989). SEM's purpose is theory testing to further develop explanatory structural models of casual effects (Kline, 2016). SEM approaches have advantages over alternative methods of traditional regression techniques. Khine (2013) supports more complex research questions (Khine, 2013), modeling of measurement error to obtain unbiased estimates of relationships (Khine, 2013), and includes observed as well as unobserved variables in the analysis. SEM breaks down total effects into direct and indirect effects. Gunzler et al., (2013) expand on the benefits of mediation analyses. They point out SEM is more accessible in terms of interpretation and estimation and is designed largely to test the types of models that include mediation. SEM also supports the functionality of multiple-group analysis.

This allows for comparing coefficients and the testing of models across groups. Doing so provides an efficient way to examine various moderating effects.

SEM does have restrictions when it comes to non-linear data, such as in the present study. SEM assumes multivariate normality or continuous endogenous variables due to assumptions of fitting standard linear regression modeling (Khine, 2013). Data are not always continuous nor normally distributed, including data used in the current study. Given this, GSEM is utilized by combining SEM with GLM as an estimator which fits continuous, binary, ordinal, count, or multinomial data using non-linear modeling techniques. While keeping the modeling strengths of SEM for estimating mediating and moderation effects, GSEM is further advantaged by broader modeling techniques. The overall goal of GSEM is to find the most parsimonious model that is theoretically justified (Khine, 2013). For these many reasons, GSEM is the appropriate statistical method for evaluating the proposed research of mediating and moderating effects.

The five steps of SEM are applied in GSEM and will be carried out within the present study: 1) Specification, 2) Identification, 3) Estimation, 4) Evaluation, 5) Modification (Khine, 2013). A sixth step is added to describe the approach to interpreting the estimates.

Step 1: Specification. The first step is to present a theory-driven conceptual model where clear relationships are defined and expressed between variables (Khine, 2013). Figures 5, 6, 7, and 8 present the conceptual model and provide demonstrated research and theoretical relationships which informed the relationships between variables.

Step 2: Identification. The next step is to identify the model. Three different identification types are possible: a) just identified, b) overidentified, and c) underidentified (Schumacker & Lomax, 2004). Just identified is a scenario where the model fit will be “perfect.”

This is when the number of pieces of info provided equals the number of estimated parameters, leading to zero degrees of freedom (Khine, 2013). Overidentification occurs when there is more information given, while underidentified happens when parameters are not able to be estimated due to a lack of information (Khine, 2013). A positive figure or degrees of freedom represents an overidentified model which supports continued analysis. This is calculated as the difference between the number of elements inputted into the model and the number of elements in the covariance matrix (Khine, 2013). The formula $[p\ (p + 1)] / 2$ is used to compute the number of elements in the covariance matrix to assist in the calculation of how the model is identified (Khine, 2013).

Step 3: Estimation. Estimation used regression statistical techniques dependent on variable type. Estimating continuous variables will use linear regression techniques. Logistic regression is used for binary and categorical data with ordinal logistic regression is used for predicting ordinal variables.

Observations are not independent but are correlated by schools identified within the ELS 2002 sample. The assumption of independence of errors is relaxed in the analysis using GSEM's cluster option to account for the data being clustered within schools.

Step 4: Evaluation. Model fit is evaluated by the chi-squared statistic. The statistic reports if the model has a significant difference between the observed and estimated variance-covariance matrix (Bagozzi & Yi, 2012). If the estimation is too far off from the observed, a significant value is present (Kline, 2016). Indicating that the model does not fit perfectly. Notably, chi-squared is very sensitive to sample size and is inflated exponentially with samples greater than 200 (Iacobucci, 2010). The model will also be evaluated using theory in relation to the observed estimates in terms of direction, effect size, and significance. Based on these findings and the goal to find the most parsimonious and theory-driven model, alternative models will be tested to determine if they are a better fit through modification.

Step 5: Modification. Hypotheses can be adjusted within the model for re-specification by removing or adding parameters to improve fit (Khine, 2013). Akaike and Bayesian information criteria are used to compare models; lower scores indicate better fit (Khine, 2013). Theory and the research questions drive decisions and are tested with statistics to support a better fitted model.

Step 6: Interpretation. Once a model has been evaluated and determined to be a good fitting model, results will be further analyzed and interpreted. Ordinal logistic and logistic regression results are reported in odds ratio due to the increased accessibility of interpretations (Szulmilas, 2010). The regression coefficient above 1 indicates greater odds of the outcome while lower than 1 represents decreased odds of the outcome occurring (Szulmilas, 2010). An odd ratio exactly 1 indicates there is no effects on the odds of the outcome (Szulmilas, 2010).

To answer RQ1a and RQ2a, mediating effects are first examined. This is accomplished by reviewing and interpreting the effect size, statistical significance, and direction of the pathways between SES and student engagement and HIPS as well the pathway between these experiences and the most endogenous variables of early career earnings and graduate degree attainment. Answering RQ1b and RQ2b is done similarity in the multi-group analysis by examining how effects on post-graduation outcomes differ depending on SES background which is reported and interpreted with odds ratios similarly with the effect size, statistical significance, and direction of the pathways between student engagement and HIP participation and post-graduation outcomes.

Mediation Conceptual Model

A theoretically informed conceptual model is foundational when using the more common structural equation modeling and its extension GSEM used in the present study (Acock, 2013; Khine, 2013). The former figure 3 presented a simple conceptual model mediation. Research paints a more complete picture of institutional and student factors that influence early career earnings and graduate degree attainment. Informed by the literature, Figure 5 and 6 shows a more complex conceptual model of the mediating effects of student engagement and HIPs. Although these variables are interrelated in a multitude of different ways, the model is theoretically informed and aligned to answer the study's RQ1a and RQ2a.

SES directly affects student engagement through access (Armstrong & Hamilton, 2013; Hurst, 2015; NSSE, 2018; Rubin, 2012; Stuber, 2011; Walpole, 2003) while impacting graduate degree enrollment (Baum & Steele, 2017; Cataldi et al., 2018) and early career earnings (Hershbein, 2016; Witteveen & Attewell, 2017). Student engagement directly affects early career earnings (Donhardt, 2004; Hu & Wolniak, 2010; 2013) and graduate degree attainment (Miller et al., 2018). Graduate degree enrollment and early career earnings are also affected by academic field (Miller et al., 2018; Hu & Wolniak, 2010; Robst, 2007), undergraduate GPA (Donhardt, 2004; Thomas, 2003), sex (Hu & Wolniak, 2013; Ma et al., 2016; McFarland et al., 2018), race (Hu & Wolniak, 2013; Ma et al., 2016; McFarland, 2018; Okahana & Zhou, 2017; Semega et al., 2018), and institutional control, level, and selectivity (NSSE, 2018). The model predicting early career earnings in figure 5 includes three additional control variables with demonstrated relationships of advanced degrees (Oreopoulos & Petronijevic, 2013; Ma et al., 2016), hours worked per week (Zhang, 2008), and the number of months that elapsed since graduation representing the longer you are employed equates to increased earnings (Ma et al., 2016).

Figure 5

Conceptualized Model of Access and Impact with Student Engagement and HIPs Mediation Between Socioeconomic Status and Early Career Earrings with Controls

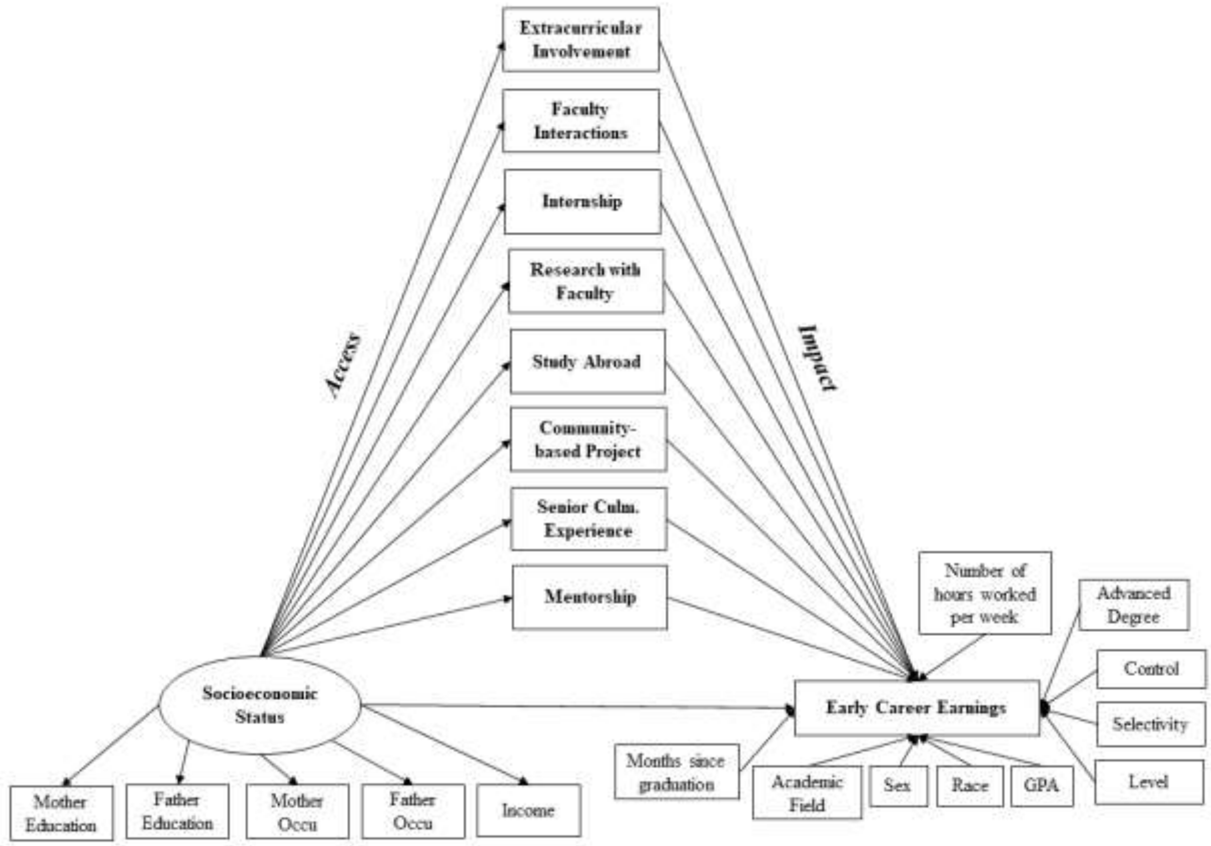
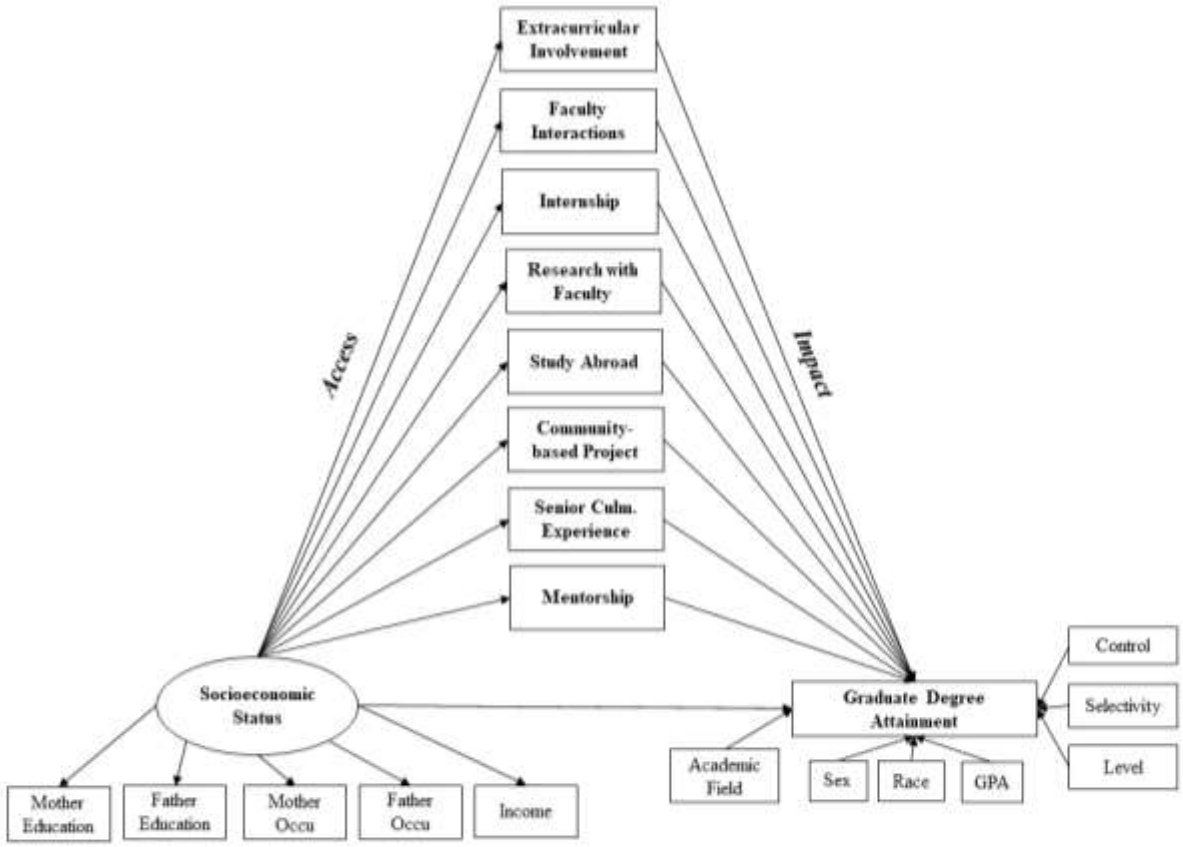


Figure 6

Conceptualized Model of Access and Impact with Student Engagement and HIPs Mediation Between Socioeconomic Status and Graduate Degree Attainment with Controls



Multiple-Group Conceptual Model

Figures 7 and 8 reflect the same theoretically informed relationships from the aforementioned literature, but positions SES as a moderating variable of the effects between student engagement and HIPs on early career earnings and graduate degree attainment. Quantitative research is mixed with findings describing differing effects of student engagement and HIPs impact learning and development outcomes dependent on one's SES background (Kuh, 2008; Kim & Sax, 2009; Finley & McNair, 2013). Qualitative findings further indicate first-generation and lower-income students may benefit more than their peers from engagement experiences on post-graduation outcomes (Armstrong & Hamilton, 2013; Harper, 2008; Stuber, 2011).

Figure 7

Conceptualized Model of Multiple-Group Analysis. Socioeconomic Status Quartiles are Used to Model Student Engagement and HIPs Effects on Early Career Earnings to Estimate Moderation Effects

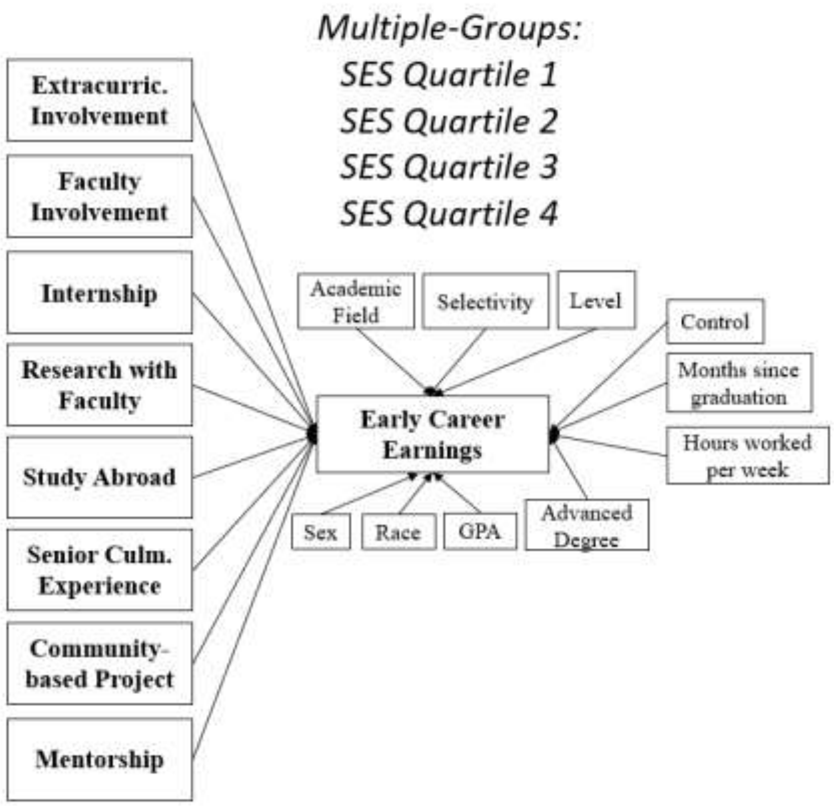
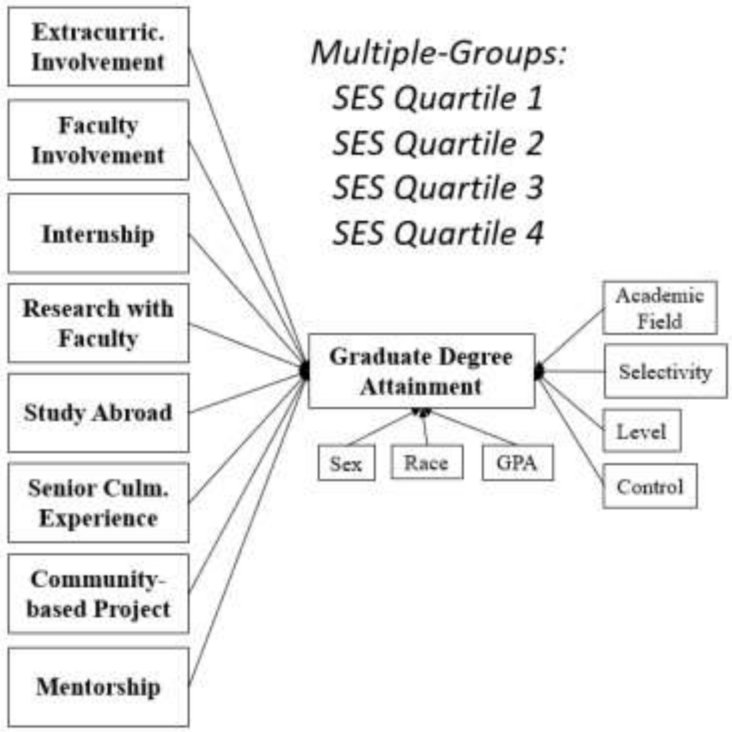


Figure 8

Conceptualized Model of Multiple-Group Analysis. Socioeconomic Status Quartiles are Used to Model Student Engagement and HIPs Effects on Graduate Degree Attainment to Estimate Moderation Effects



Summary

The purpose of this study is to first examine the mediating effects of different forms of student engagement and HIPs on the relationship between socioeconomic status and two post-graduation outcomes: early-career earnings and graduate degree attainment. Second, moderating effects of SES are explored. Student engagement is examined through a) extracurricular involvement and b) interactions with faculty with six HIPs a) internship, b) research with faculty, d) study abroad, e) community-based project, f) culminating senior experience, and g) mentorship. The conceptual mediation model is analyzed using a generalized structural equation model framework to examine the different effects transmitted through student engagement and HIPs that contribute to graduate degree enrollment and early career earnings. Advancing person-oriented research, a multiple-group GSEM analysis is used to understand if the effects of student engagement and HIPs are moderated by SES.

Chapter 4: Results

Results are described in two parts, informed by the two main research questions examining early career earnings and graduate degree attainment. Within each part, results report descriptive statistics that describe the demographics, socioeconomic indicators, student engagement and HIPs, and dependent variables of early-career earnings and graduate degree attainment of respondents. Next, inferential statistics report results through correlational analysis, GSEM analysis, and GSEM multiple-group analysis within the two sections.

Descriptive statistics and correlational results are generally similar to each other with some slight differences. This is due to the sample for early career earnings consists of 4,838 respondents with 5,463 respondents included in the model used to explain graduate degree attainment. The samples are 88.6 % the same which generates very similar results for descriptive and correlation findings. However, given the additional 11.4% representing 625 additional respondents in the graduate degree attainment sample, it was decided to report results for each sample distinctively. Reporting results in two parts will more accurately describe the samples which are important to the construction of subsequent GSEM models.

Results: Early Career Earnings

Descriptive Statistics

Demographics. The sample demographic descriptive statistics are reported in Table 3. There are 57% females and 43% males. Respondent sample race represents 67% White, 14.1% Asian American or Pacific Islander, 7.2% Black, 7.5% Hispanic, 0.3% Native American, and 3.9% more than one race. Respondent bachelor’s degree are described in 12 distinct academic fields, Business (19.4%), Art (5.6%), Biological Sciences (6.7%), Communications/Journalism (6.1%), Education (5.7%), Engineering and Computer Science (7%), Health Sciences (6.7%), Humanities and Liberal Arts (9.6%), Physical Sciences (2.9%), Social Services (3.5%) Social Sciences (17.7%), and Other majors or interdisciplinary (9%).

Institutional characteristics were included in the analysis. Barron's Institutional Selectivity Index of where the respondent's first bachelor degree was conferred was 8.9% most competitive, 16.5% highly competitive, 27.2% very competitive, 35.2% competitive, 5.3% less competitive, 2% Non-competitive, and 4.9% special institutions or unclassified. One-quarter (25%) of respondents attended at least one two-year institution compared to 75% solely attending a four-year institution before receiving a bachelor's degree. Nearly a third, 31.5%, received their bachelor's degree from a private or for-profit institution with 68.5% graduating from a public institution. Among respondents who continued their education after receiving a bachelor's degree, 17.5% received a master's or post-master's certificate degree with 6.4% earning a doctoral or professional degree.

Additional demographic information that were included as controls includes grade point average (GPA), hours worked, and months since receiving one's bachelor's degree (See Table 4). The average GPA for respondent bachelor's degree is 3.14 (*SD* =.47) out of a 1.55 – 4.00 range. Respondents reported working on average 0 to 99 hours a week with an overall average of 37.4 (SD = 16.3). Respondents graduated with their bachelor's degree an average of two years and two weeks (*M*=24.5, *SD*=9.4) before January 2011.

Table 3

Descriptive Statistics of Demographics for Early Career Earnings Sample

Variable (n)	Values	Frequency	Percent
Sex	0 = Male	2,086	43.0
	1 = Female	2,766	57.0

Race	0 = White	3,253	67.0
	1 = Asian/Pacific Islander	684	14.1
	2 = Black	350	7.2
	3 = Hispanic	363	7.5
	4 = Native American	14	0.3
	5 = More than 1 race	188	3.9
Academic Field	0 = Business	929	19.4
	1 = Art	269	5.6
	2 = Biological Sciences	321	6.7
	3 = Communications/Journalism	293	6.1
	4 = Education	274	5.7
	5 = Engineering and Computer Science	334	7.0
	6 = Health Sciences	321	6.7
	7 = Humanities and Liberal Arts	462	9.6
	8 = Physical Sciences	140	2.9
	9 = Social Services	169	3.5
	10 = Social Sciences	854	17.8
	11 = Other Majors / Interdisciplinary	432	9.0
Barron's Institutional Selectivity	1 = Most Competitive	433	8.9
	2 = Highly Competitive	801	16.5
	3 = Very competitive	1,319	27.2
	4 = Competitive	1,706	35.2
	5 = Less competitive	259	5.3
	6 = Non-competitive	98	2.0
	7 = Special/Unclassified	236	4.9
Institutional level	0 = Did not attend two-year institution	3,424	75.0
	1 = Attended a two-year institution	1,144	25.0
Institutional Control	0 = Public	3,322	68.5
	1 = Private and private for-profit	1,530	31.5
Advanced Degree	0 = Bach/Post-bacc cert	3,693	76.1
	1 = Masters/Post-masters cert	848	17.5
	2 = Doctoral / Professional degree	311	6.4

Table 4

Descriptive Statistics of Demographics for Early Career Earnings Sample (Continued)

Variable (n)	Values	Mean	SD
GPA	1.55 – 4.00	3.19	0.47
Hours worked	0 – 99	37.4	16.3
Months total	0 – 55	24.5	9.4

Socioeconomic Status Indicators. SES indicators include ordinal variables of family income, mother's education level, father's education level, mother's occupation level, and father's occupation level (See Table 5). Income ranges from $0 to $200,000+ with a median of $50,001 - $75,000. Mother and father's education ranges from "Did not finish high school" to "Completed PhD, MD, or other advanced degree". Respondent mother's education level shows 47% who graduated with a 4-year degree or higher (Mdn = 6: Attended college, but no four-year degree). Father's education level was 7.6 percentage points above mother's level at 54.6% with having a bachelor's degree or higher (Mdn = 7: Graduated from college). Mother's occupation level includes 74% level 1, 19.9% level 2, and 6.1% level 3 (Mdn = 1: Occupation level 1). Father's occupation level included 71.1% level 1, 16.6% level 2, and 11.7% level 3 (Mdn = 1: Occupation level 1).

Table 5

Descriptive Statistics of SES Indicators for Early Career Earnings Sample

Variable	Values	Freq.	Per.	Median
Income	1 = $0	13	0.3	10 = $50,001-$75,000
	2 = $1 – 1,000	17	0.4	
	3 = $1,001 - $5,000	41	0.9	
	4 = $5,001-10,000	49	1.0	
	5 = $10,001 - $15,000	93	1.9	
	6 = $15,001 – $20,000	110	2.3	
	7 = $20,001 – $25,000	167	3.4	
	8 = $25,001-$35,000	349	7.2	
	9 = $35,001-$50,000	722	14.9	
	10 = $50,001-$75,000	1,024	21.1	
	11 = $75,001-$100,000	905	18.7	
	12 = $100,001-$200,000	993	20.5	
	13 = $200,001+	372	7.7	

Mother's education	1 = Did not finish high school	235	4.8	5 = Attended college, no 4-year degree
	2 = Graduated high school or GED	866	17.9	
	3 = Attended 2-year school, no degree	454	9.4	
	4 = Graduated from 2-year school	500	10.3	
	5 = Attended college, no 4-year degree	515	10.6	
	6 = Graduated from college	1,432	29.5	
	7 = Completed Master's degree	679	14.0	
	8 = Completed PhD, MD, or other advanced degree	171	3.5	
Father's education	1 = Did not finish high school	240	5.0	6 = Graduated from college
	2 = Graduated high school or GED	808	16.7	
	3 = Attended 2-year school, no degree	383	7.9	
	4 = Graduated from 2-year school	338	7.0	
	5 = Attended college, no 4-year degree	439	9.1	
	6 = Graduated from college	1,347	27.8	
	7 = Completed Master's degree or equivalent	735	15.2	
	8 = Completed PhD, MD, or other advanced degree	562	11.6	
Mother's occupation	1 = Occupation level 1	3,591	74.0	1 = Occu. Level 1
	2 = Occupation level 2	966	19.9	
	3 = Occupation level 3	295	6.1	
Father's occupation	1 = Occupation level 1	3,482	71.8	1 = Occu. Level 1
	2 = Occupation level 2	805	16.6	
	3 = Occupation level 3	565	11.6	

Student Engagement and High-Impact Practices. Respondents had varied participation patterns in student engagement and HIP experiences (See Table 6). Respondents reported 23.1% never being involved, 38% sometimes, and 38.9% often involved in extracurricular activities. Respondents reported 11% never having interactions, 61.2% sometimes, and 27.8% often having interactions with faculty outside the classroom. HIP participation was reported as a binary "Yes" vs "No" response with the higher HIP experiences being internship (63.2%), senior culminating experience (45.4%), community project (27%), mentorship (23.4%), research with faculty (20.8%), and study abroad (19.1%).

Table 6

Descriptive Statistics of Student Engagement and HIPs for Early Career Earnings Sample

Variable	Values	Frequency	Percent
Extracurricular activities	1 = Never	1,066	23.1
	2 = Sometimes	1,750	38.0
	3 = Often	1,794	38.9
	1 = Never	508	11.0
Interactions with Faculty	2 = Sometimes	2,826	61.2
	3 = Often	1,284	27.8
Internship	0 = No	1,618	36.8
	1 = Yes	2,784	63.2
Research with faculty	0 = No	3,477	79.2
	1 = Yes	9,13	20.8
Study abroad	0 = No	3,546	80.9
	1 = Yes	836	19.1
Community-based project	0 = No	3,192	73.0
	1 = Yes	1,182	27.0
Senior culminating experience	0 = No	2,397	54.6
	1 = Yes	1,995	45.4
Mentorship	0 = No	3,360	76.6
	1 = Yes	1,029	23.4

Early Career Earnings. Respondents early career earnings ranges from $0 to $600,000 in January 2011 (See Table 7). The average early career earnings of respondents were $33,149.31 (SD = 28,660.94).

Table 7

Descriptive Statistics of Early Career Earnings

Variable	Values	Average	SD
Early career earnings	$0 – $600,000	$33,150.17	28,637.29

Correlation between SES indicators. A Spearman's correlation was run to evaluate the associations between SES indicators. Results show moderate positive relationships between the SES indicators ranging from r_s=.19 to r_s=.53 (p < .001) (See Table 8.). This supports selected SES indicators are interrelated to each other and provides evidence to use these within the construction of a latent variable measuring socioeconomic status.

Table 8

Correlation Between SES Indicators of Early Career Earnings Sample

Variable	1	2	3	4	5
1. Family Income	—				
2. Mother's Education Level	.42***	—			
3. Father's Education Level	.42***	.51***	—		
4. Mother's Occupation Level	.22***	.36***	.19***	—	
5. Father's Occupation Level	.28***	.30***	.53***	.19***	—

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

Inferential Statistics

Mediating Effects of Student Engagement and HIPs on Early-Career Earnings. GSEM was used to estimate parameters to evaluate the potential mediating effects of student engagement and HIP participation with respect to RQ1a. Results are reported by the three estimates that were predicted a) latent variable effects on SES indicators, b) SES effects on student engagement and HIP participation, and c) SES and student engagement and HIPs effects on early career earnings with controls.

The model was built using likelihood-ratio test with AIC and BIC to assess model performance and fit, resulting in Figure 1 (AIC:182,488.7, BIC:183,089.4). A total of 3,856 students were analyzed and robust clusters was utilized by high school (N=681). Ordinal regression techniques predict SES using five indicators (See Table 9). All indicators have significant and positive effects ranging from 1.36 to 2.72 odds ratios (p < .001).

Table 9

Latent Variable Socioeconomic Status for Early Career Earnings Model

Socioeconomic Status	OR	SE	95% CI		*p*-value
Father Ed.	2.72	-	-	-	-
Mother Ed.	1.79	0.09	1.61	1.98	<.001
Income	1.56	0.06	1.45	1.68	<.001
Father Occu	2.33	0.11	2.13	2.56	<.001
Mother Occu	1.36	0.05	1.27	1.47	<.001

Table 10 reports the effects of SES on early career earnings that are first transmitted through access to student engagement and HIP experiences. SES had a significant positive effect on all student engagement and HIPs. A one unit increase in SES results in an average 15 percent likelihood of an increased level of involvement in extracurricular activities (OR=1.15, $p < .001$). A slightly smaller effect was found for interactions with faculty members (OR=1.06, $p < .001$). The highest to lowest likelihood of HIP participation for every one unit increase of SES includes study abroad (OR=1.24, $p < .001$), research with faculty (OR=1.12, $p < .001$), senior culminating experience (OR=1.07, $p < .001$), mentorship (OR=1.07, $p < .001$), internship (OR=1.06, $p < .001$), community project (1.05, $p < .001$). These findings indicate SES is a significant factor when it comes to accessing student engagement and HIPs in one's undergraduate experience.

Table 10

Effects of SES on Student Engagement and HIPs (Career Earnings Sample)

SES →SE/HIPs	OR	SE	Normal-based 95% CI		*p*-value
Extracurric	1.15	0.02	1.11	1.19	<.001
Faculty Inter	1.06	0.02	1.03	1.10	<.001
Internship	1.06	0.02	1.03	1.10	<.001
Research w/ Faculty	1.12	0.02	1.07	1.17	<.001
Study Abroad	1.24	0.03	1.17	1.30	<.001
Community Project	1.05	0.02	1.02	1.09	<.001
Senior Culm Exp	1.07	0.02	1.04	1.11	<.001

Mentorship	1.07	0.02	1.03	1.11	<.001

Table 11 reports the effects of SES, student engagement, HIPs, and controls on early career earnings. There was a non-significant effect of SES on early career earnings (β = 271.71, p = .139). While holding controls constant, students who participated in an internship were found to have an increase of $1,732.63 in early career earnings (β = 1,732.63, *p* = .033). Students who conducted research with a faculty member outside the classroom had a decrease of $2,205.18 in early career earnings with other variables being held constant (β = -2,205.18, *p* = .034). The remaining HIPs and student engagement experiences did not have significant effects on earnings.

Table 11

Effects of SES, Student Engagement and HIPs on Early-Career Earnings

Early Career Earnings	*β*	SE	Normal-based 95% Conf. Interval		*p*-value
SES	275.71	186.46	-89.75	641.17	.139
Student Eng. (ref = Never)					
Extracurric Sometimes	-301.09	988.45	-2,238.42	1,636.24	.761
Extracurric Often	606.48	1,019.79	-1,392.27	2,605.23	.552
Faculty Inter Sometimes	331.28	1,217.28	-2,054.54	2,717.10	.786
Faculty Often Inter	838.92	1,342.22	-1,791.79	3,469.63	.532
HIPs (ref = No)					
Internship	1,732.63	811.36	142.40	3,332.86	.033
Research with Faculty	-2,205.18	1,041.99	-4,247.43	-162.92	.034
Study Abroad	-237.69	990.26	-2,178.57	1,703.20	.810
Community Project	-252.84	727.49	-1,678.70	1,173.02	.728
Senior Culminating Exp	-651.79	671.60	-1,968.10	664.53	.332
Mentorship	430.05	835.79	-1,208.06	2,068.16	.607
GPA	1,657.92	995.42	-293.07	3,608.89	.096
Race (ref=white)					
API	362.19	1,547.92	588.32	6,656.06	.019
Black	-1,956.35	1,295.48	-4495.45	582.74	.131
Hispanic	-949.06	1,147.26	-3,197.65	1,299.52	.408
Native American	-1,431.04	3,106.38	-7,519.44	4,657.36	.645
More than 1 race	797.05	1,958.28	-3,041.10	4,635.20	.684
Sex (ref=male)					
Female	-2,310.13	778.12	-38.35	-785.04	.003
Field (ref=Business)					
Arts	-13,449.67	1,499.76	-1,638.15	-10,510.20	<.001

Biological Sciences	-1,129.79	1,428.60	-14,099.78	-8,499.79	<.001
Comm, Journalism	-9,615.62	1,315.04	-12,193.06	-7,038.18	<.001
Education	-9,398.77	1,345.96	-12,086.81	-6,760.73	<.001
Eng, Computer Sci	8,820.83	1,642.09	5,602.39	12,039.27	<.001
Health Sciences	5,815.44	1,554.84	2,768.12	8,862.86	<.001
Humanities, Liberal arts	-11660.65	1,225.55	-1,4062.67	-9,258.62	<.001
Physical Sciences	-4814.33	3,018.97	-10,731.41	1,102.34	.111
Social Services	-2435.49	4,764.21	-11,773.16	1,902.18	.609
Social Sciences	-8702.60	1,143.52	-10,943.86	-6,461.34	<.001
Other Majors/Inter	-10069.80	1,265.43	-12,549.99	-7,589.61	<.001
Selective (ref=Most Competitive)					
Highly Competitive	2479.61	2,444.62	-2,311.76	7,270.98	.310
Very competitive	2525.87	2,267.82	-1,918.98	6,970.72	.265
Competitive	2623.67	2,189.69	-1,668.03	6,915.38	.321
Less competitive	4980.29	2,371.50	332.25	9,628.34	.036
Non-competitive	7670.70	2,663.03	2,451.25	12,890.15	.004
Special/Unclassified	2370.59	2,475.01	-2,480.34	7,221.53	.338
Control (ref=public)					
Private/for-profit	-641.86	802.31	-2,214.37	930.64	.424
Two-Year (ref=None)					
Attended two year	-1282.17	717.94	-2,689.31	124.97	.074
Hours worked per month	748.96	40.42	669.73	828.19	<.001
Months since last bachelors	325.89	38.99	249.47	402.31	<.001
Advanced degree (ref=Bac)					
Masters	-2068.46	935.60	-3,894.19	-226.72	.028
Doctorate/Prof	-7431.08	1,676.39	-10,716.74	-4,145.42	<.001
Constant	-5365.51	3,824.24	-12,860.89	2,129.87	.161

SES Quartile Multiple Group Effects on Early Career Earnings. To answer RQ1b, do student engagement and high impact practices have a different effect on early career earnings across socioeconomic status, a multiple-group approach was utilized in GSEM to observe moderating effects. Table 12 reports the previous GSEM model effects across SES quartiles. Results indicate that there are different effects dependent on one's SES status for internships. Internship experiences reported a positive effect on earnings among student participants in quartiles two and three with controls. These students have an increase of \$2,975.65 (β = 2,975.65, $p < .05$) and \$2,807.74 (β = 2,807.74, $p < .05$) with respect to quartile two and three on their early career earnings. Internship did not have a significant effect on quartile one and quartile four. Additionally, student engagement and HIPs also did not report significant effects on early career earnings across SES quartiles.

Table 12

SES Quartile Multi-Group Effects on Early Career Earnings

Early Career Earnings	β (SE)			
	Q1 (n=927)	Q2 (n=970)	Q3 (n=978)	Q4 (n=968)
Student Eng. (ref = Never)				
Extracurric Sometimes	3,730.25	-657.03	-2,929.88	-2,999.58
	(2,251.75)	(1,615.723)	(1,650.23)	(2,348.05)
Extracurric Often	2,572.06	-1,290.13	1,252.71	-1,467.45
	(2,502.79)	(1,733.38)	(1,706.19)	(2,393.68)
Faculty Inter Sometimes	498.94	-430.18	-260.11	1,519.80
	(2,754.13)	(1,959.89)	(2,050.24)	(2,802.83)
Faculty Often Inter	452.86	-406.19	690.57	3,477.76
	(3,173.69)	(2,184.16)	(2,319.07)	(3,056.39)
HIPs (ref = No)				
Internship	511.13	2,975.65*	2,807.74*	341.93
	(2,006.23)	(1,335.57)	(1,327.39)	(1,688.47)
Research with Faculty	-2,028.72	-2,445.07	-2,406.58	-321.53
	(2,689.34)	(1,582.49)	(1,664.38)	(1,919.30)
Study Abroad	3,254.59	-428.65	-2,538.79	599.14
	(3,029.22)	(1,754.52)	(1,548.45)	(1,793.62)
Community Project	-2,372.89	-574.42	-776.60	1,503.770
	(2,265.29)	(1,448.89)	(1,415.92)	(1,821.00)
Senior Culminating Exp	-991.20	1,179.53	68.31	-1,581.35
	(1,967.14)	(1,258.85)	(1,277.35)	(1,652.66)
Mentorship	328.47	-582.40	722.50	193.37
	(2,429.69)	(1,513.81)	(1,499.13)	(1,912.55)
GPA	-237.93	3,820.75**	1,411.90	208.81
	(2,175.98)	(1,411.33)	(1,488.64)	(2,018.88)
Race (ref=white)				
API	2,573.55	1,453.67	2,319.44	7,123.13**
	(2,728.49)	(1,957.02)	(1,892.21)	(2,312.86)
Black	-3,967.78	-470.58	-3,218.68	788.93
	(3,268.21)	(2,262.81)	(2,474.72)	(4,131.48)
Hispanic	-1,787.58	114.31	-1,161.73	930.31
	(2,818.68)	(2,148.27)	(2,550.03)	(3,602.69)
More than 1 race	2,266.45	1,371.04	3,152.11	-1,466.61
	(5,363.43)	(2,801.74)	(3,147.53)	(3,721.74)
Sex (ref=male)				

Female	-3,554.80	-2,774.48*	106.55	-3,239.42
	(2,036.73)	(1,313.36)	(1,295.04)	(1,658.90)
Field (ref=Business)				
Arts	-1,1867.97*	-14,548.41***	-14,615.99***	-13,525.33***
	(4,771.28)	(2,907.47)	(2,711.15)	(3,733.08)
Biological Sciences	-11,073.81*	-8,445.42**	-8,375.94**	-16,001.93***
	(4,382.29)	(3,139.32)	(2,705.04)	(3,443.71)
Comm/Journalism	-7,604.70	-10,151.47***	-12,482.62***	-8,477.53*
	(4,269.08)	(2,606.91)	(2,601.74)	(3,843.85)
Education	-5,787.75	-7,205.61**	-11,345.82***	-13,459.99**
	(4,396.40)	(2,734.93)	(2,694.72)	(4,427.92)
Eng, ComSci	5,530.66	9,287.23***	11,161.46***	4,809.21
	(4,173.93)	(2,622.76)	(2,570.31)	(3,383.47)
Health Sciences	4,988.90	9,899.43***	5,425.99	1,749.74
	(3,790.92)	(2,564.99)	(2,767.40)	(4,334.65)
Humanities; liberal arts	-11,611.96**	-9,882.51***	-12,572.92***	-14,089.49***
	(3,907.86)	(2431.43)	(2,418.78)	(2,884.09)
Physical Sciences	5,131.91	-6,327.01	-8,993.43*	-8,787.10
	(5,911.92)	(3,462.98)	(4,349.08)	(4,499.95)
Social Services	2,398.52	-4,966.48	-8,272.84*	3,636.55
	(4,253.68)	(3,245.23)	(3,592.83)	(6,401.97)
Social Sciences	-5,831.79*	-8,061.61***	-8,733.86***	-11,535.90***
	(2,929.64)	(2,064.49)	(1,940.22)	(2,616.92)
Other Majors/Inter.	-6,994.09	-9,415.96***	-8,514.85**	-15,724.90***
	(3,915.95)	(2,587.67)	(2,571.83)	(3,326.94)
Selective (ref=Most Competitive)				
Highly Competitive	9,180.28	-4,181.25	-223.65	-2,838.35
	(5,584.18)	(4,350.68)	(5,788.40)	(9,037.33)
Very competitive	6,610.07	-860.33	-4,439.02	963.58
	(4,796.54)	(3,703.25)	(5,119.29)	(8,041.44)
Competitive	8,032.95	-2,827.36	-4,339.11	1,640.80
	(4,981.98)	(3,773.89)	(5,127.17)	(7,984.26)
Less competitive	10,841.23*	3,584.21	-1,544.00	925.43
	(5,413.65)	(4,003.55)	(5,260.53)	(8,053.88)
Non-competitive	3,573.27	1,137.44	253.43	7,982.30
	(6,972.58)	(4,459.06)	(5,482.96)	(8,169.67)
Special/Unclassified	8,848.69	-3,381.03	-4,311.59	-519.16
	(6,085.57)	(4,517.82)	(5,755.40)	(9,190.17)
Control (ref=public)				
private/for-profit	-1,370.35	-904.45	-2,728.51*	1,939.08
	(2,276.34)	(1,430.43)	(1,371.66)	(1,722.96)
Two-Year (ref=None)				
attended two year	-1,928.57	-1,956.44	24.57	-2,555.77
	(2,031.01)	(1,395.21)	(1,439.37)	(2,087.70)

Hours worked	714.30***	697.32***	772.07***	748.96***
	(63.22)	(44.56)	(41.74)	(47.11)
Months since graduation	302.03**	313.71***	344.40***	375.94***
	(96.10)	(70.00)	(72.22)	(106.82)
Advanced degree (ref=Bac)				
Masters/Post-cert	795.00	-2,411.45	-3,049.65	-3,607.67
	(2,555.96)	(1,644.19)	(1,599.32)	(2,028.82)
Doctorate/Prof	-7,647.04	-2,590.20	-10,665.73***	-8,088.20*
	(5,403.16)	(3,000.61)	(2,798.75)	(2,779.90)
Constant	-4,397.01	-6,746.42	1,980.94	3,303.15
	(8,810.16)	(6,311.13)	(7,411.81)	(11,065.79)

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

Results: Graduate Degree Attainment

Descriptive Statistics

Demographics. The sample demographics are described in Table 13 and 14. There are 56.7% females and 43.4% males. Sample respondents race represents 65.9% White, 14.3% Asian/Pacific Islander, 7.7% Black, 7.8% Hispanic, 0.3% Native American, and 3.9% More than one race. Academic field makeup of the 12 categories represents Business (19.8%), Art (5.9%), Biological Sciences (6.4%), Communications and Journalism (6%), Education (5.8%), Engineering and Computer Science (7%), Health Sciences (7%), Humanities and Liberal Arts (9.5%), Physical Sciences (2.7%), Social Services (3.7%), and Social Sciences (17.2%), and Other majors or interdisciplinary degrees (9%).

Descriptive statistics also describe institutional attributes. Barron’s institutional selectivity of one’s first bachelor’s degree received includes 8.2% most competitive, 15.2% highly competitive, 26.2% very competitive, 36.1% competitive, 6.1% less competitive, 2.3% non-competitive, and 6% special or unclassified. Among the new sample, 32.5% attended a two-year institution with 67.5% only attending four-year universities. Almost thirty percent (29.9%)

graduated from a private or for-profit institution with 70.1% receiving their bachelor's degree at a public institution. The average GPA of the respondents is 3.14 (SD = .56).

Table 13

Descriptive Statistics of Demographics for Graduate Degree Attainment Sample

Variable	Values	Frequency	Percent
Sex	0 = Male	2,368	43.4
	1 = Female	3,095	56.7
Race	0 = White	3,602	65.9
	1 = Asian/Pacific Islander	779	14.3
	2 = Black	423	7.7
	3 = Hispanic	428	7.8
	4 = Native American	18	0.3
	5 = More than 1 race	213	3.9
Academic Field	0 = Business	1,072	19.8
	1 = Art	319	5.9
	2 = Biological Sciences	344	6.4
	3 = Communications/Journalism	322	6.0
	4 = Education	314	5.8
	5 = Engineering and Computer Science	379	7.0
	6 = Health Sciences	376	7.0
	7 = Humanities and Liberal Arts	513	9.5
	8 = Physical Sciences	148	2.7
	9 = Social Services	198	3.7
	10 = Social Sciences	931	17.2
	11 = Other Majors / Interdisciplinary	488	9.0
Barron's Institutional Selectivity	1 = Most Competitive	449	8.2
	2 = Highly Competitive	831	15.2
	3 = Very competitive	1,429	26.2
	4 = Competitive	1,971	36.1
	5 = Less competitive	333	6.1
	6 = Non-competitive	125	2.3
	7 = Special/Unclassified	325	6.0
Institutional level	0 = Did not attend two-year institution	3,689	67.5
	1 = Attended a two-year institution	1,774	32.5
Institutional Control	0 = Public	3,830	70.1
	1 = Private and private for-profit	1,633	29.9

Table 14

Descriptive Statistics of Demographics for Graduate Degree Attainment Sample (continued)

Variable	Values	Mean	SD
GPA	1.55 – 4.00	3.14	.56

Socioeconomic Status Indicators. The SES indicators includes similar descriptive statistics as the prior subsample (See Table 15). The median for income was $50,001 – $75,000. In the present sample 28.7% graduated from college with a bachelor's degree with 13.4% receiving a master's degree and an additional 3.5% completing an advanced degree. (Mdn = 5: Attended college, no 4-year degree). Father's education level represents 27.1% having a college degree, 14.8% receiving a master's degree, and an additional 11.2% having a Ph.D. MD, or other advanced degree (Mdn = 6: Graduated from college). The median for mother's occupation and father's occupation was occupation level 1. Mother's occupation level represents 74.1% level 1, 19.9% level 2, and 6% occupation level 3. Father's occupation level represents 72.6% level 1, 16.1% level 2, and 11.3% level 3.

Table 15

Descriptive Statistics of Socioeconomic Status Indicators for Graduate Degree Attainment Sample

Variable	Values	Freq	Per.	Median
Income	1 = $0	16	0.3	10 = $50,001-$75,000
	2 = 1$ - $1,000	20	0.4	
	3 = $1,001 – 5$,000	48	0.9	
	4 = $5,001-10,000	58	1.1	
	5 = $10,001 - $15,000	111	2.0	
	6 = $15,001 – $20,000	139	2.5	
	7 = $20,001 – $25,000	197	3.6	
	8 = $25,001-$35,000	402	7.4	
	9 = $35,001-$50,000	837	15.3	
	10 = $50,001-$75,000	1,157	21.2	
	11 = $75,001-$100,000	1,004	18.4	
	12 = $100,001-$200,000	1,073	19.6	
	13 = $200,001+	401	7.3	
Mother's Education	1 = Did not finish high school	284	5.2	

	2 = Graduated from high school or GED	1,005	18.4	5 = Attended college, no 4-year degree
	3 = Attended 2-year school, no degree	543	9.9	
	4 = Graduated from 2-year school	563	10.3	
	5 = Attended college, no 4-year degree	575	10.5	
	6 = Graduated from college	1,570	28.7	
	7 = Completed Master's degree	734	13.4	
	8 = Completed PhD, MD, or advanced degree	189	3.5	
Father's Education	1 = Did not finish high school	288	5.3	6 = Graduated from college
	2 = Graduated from high school or GED	949	17.4	
	3 = Attended 2-year school, no degree	436	8.0	
	4 = Graduated from 2-year school	391	7.2	
	5 = Attended college, no 4-year degree	504	9.2	
	6 = Graduated from college	1,478	27.1	
	7 = Completed Master's degree or equivalent	808	14.8	
	8 = Completed PhD, MD, or advanced degree	609	11.2	
Mother's Occupation	1 = Occupation level 1	4,050	74.1	1 = Occu Level 1
	2 = Occupation level 2	1,087	19.9	
	3 = Occupation level 3	326	6.0	
Father's Occupation	1 = Occupation level 1	3,965	72.6	1 = Occu Level 1
	2 = Occupation level 2	879	16.1	
	3 = Occupation level 3	619	11.3	

Student Engagement and High Impact Practices. Respondents reported being 37% often, 37.5% sometimes, and 25.6% never being involved (See Table 16). Faculty interactions outside the classroom included 12% never, 61% sometimes, and 27% often. Most frequent HIP participation included internship (61.9%), senior culminating experience (45.2%), community project (26.9%), Mentorship (22.9%), research with faculty (20.2%), and study abroad (17.7%).

Table 16

Descriptive Statistics of Student Engagement and HIPs for Graduate Degree Attainment Sample

Variable	Values	Frequency	Percent
Extracurricular activities Involvement	1 = Never	1,313	25.6
	2 = Sometimes	1,925	37.5
	3 = Often	1,899	37.0

Interactions with Faculty	1 = Never	617	12.0
	2 = Sometimes	3,140	61.0
	3 = Often	1,388	27.0
Internship	0 = No	1,893	38.1
	1 = Yes	3,079	61.9
Research with Faculty	0 = No	3,957	79.8
	1 = Yes	999	20.2
Study abroad	0 = No	4,072	82.3
	1 = Yes	875	17.7
Community Project	0 = No	3,609	73.1
	1 = Yes	1,329	26.9
Senior culminating experience	0 = No	2,722	54.9
	1 = Yes	2,240	45.1
Mentorship	0 = No	3,822	77.1
	1 = Yes	1,134	22.9

Graduate degree attainment. Graduate degree attainment was coded as binary to represent those who did not complete a post-bachelor's degree and those who did within the ELS 2002 study. Among respondents, 21.6% completed an advanced degree (See Table 17).

Table 17

Descriptive Statistics of Graduate Degree Attainment

Variable	Values	Frequency	Percent
Graduate Degree Attainment	0 = No	4,284	78.4
	1 = Yes	1,179	21.6

Correlation between SES Indicators. Results reflect within the graduate degree sample moderate positive relationships between the SES indicators ranging from r_s=.20 to r_s=.53 (p < .001) (See Table 18). Findings continue to support for SES indicators to be used as a latent variable measuring socioeconomic status in a model with the graduate degree sample.

Table 18

Correlation Between SES Indicators of Graduate Degree Attainment Sample

Variable	1	2	3	4	5
1. Family Income	—				
2. Mother's Education Level	.42***	—			
3. Father's Education Level	.44***	.52***	—		
4. Mother's Occupation Level	.23***	.36***	.20***	—	
5. Father's Occupation Level	.29***	.30***	.53***	.20***	—

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

Inferential Statistics

Mediating Effects of Student Engagement and HIPs on Early Career Earnings. The new model examining graduate degree attainment was used to evaluate the potential mediating effects of HIPs between SES and early career earrings. A total of 4,481 students were analyzed and robust clusters was used by high school (N=703) within the GSEM analysis (AIC: 113,968.6; BIC: 114,551.7). Table 19 reports ordinal regression results of SES as a latent variable using five indicators. Indicators were all statistically significant ($p < .001$).

Table 19

Latent Variable Socioeconomic Status for Graduate Degree Attainment Model

Socioeconomic Status	OR (SE)	SE	Normal-based 95% CI		p Value
Father Ed.	2.72	--	--	--	--
Mother Ed.	1.83	.09	1.67	2.01	<.001
Income	1.59	.06	1.49	1.71	<.001
Father Occu	2.35	.10	2.17	2.56	<.001
Mother Occu	1.38	.05	1.29	1.48	<.001

Table 20 reports the effects of SES on graduate degree attainment that are first transmitted through access to student engagement and HIP experiences. SES had a significant positive effect on all student engagement and HIPs. A one-unit increase in SES results in an average 17 percent likelihood of an increased level of involvement in extracurricular activities (OR=1.17 $p < .001$). A smaller effect was found for interactions with faculty members (OR=1.08, $p < .001$). The highest to lowest likelihood of HIP participation for every one unit increase of SES includes study abroad (OR=1.26, p < .001), research with faculty (OR=1.13, p < .001), senior culminating experience (OR=1.08, p < .001), mentorship (OR=1.07, p < .001), internship (OR=1.07 p < .001), community project (1.06, p < .001).

Table 20

Effects of SES on Student Engagement and HIPS (Graduate Degree Sample)

SES →SE/HIPs	OR	SE	Normal-based 95% CI		p -value
Extracurric	1.17	0.02	1.13	1.21	<.001
Faculty Inter	1.08	0.02	1.05	1.11	<.001
Internship	1.07	0.02	1.04	1.11	<.001
Research w/ Faculty	1.13	0.02	1.09	1.18	<.001
Study Abroad	1.26	0.03	1.20	1.32	<.001
Community Project	1.06	0.02	1.03	1.10	<.001
Senior Culm Exp	1.08	0.02	1.05	1.11	<.001
Mentorship	1.07	0.02	1.04	1.11	<.001

Table 21 reports the direct effects of SES and HIP participation on graduate degree attainment with controls. There is a 4% increase in the odds of obtaining a graduate degree for every one unit increase of SES (OR=1.04, p =.030) while other variables in the model are held constant. Both student engagement experiences were found to have positive effects on one's likelihood of obtaining a graduate degree. Students who reported being involved in extracurricular activities "sometimes" were 1.30 times (OR=1.30, p =.021) with "often" involvement 1.31 times (OR=1.31, p = .031) more likely to receive a graduate degree compared to students who reported "never", while holding for controls. Students who reported faculty interactions frequency of "sometimes" neared significance (OR = 1.31, p = .055) with "often" interactions with faculty having a significant positive effect on graduate degree attainment (OR = 1.41, p = .024). Results point to student engagement as a positive predictor of one's likelihood to complete a graduate degree.

In regards to HIPs, students who participated in research with a faculty member were found to have a 30 percent higher likelihood of a graduate degree compared to those who did not participate after holding for controls (OR=1.30, p =.012). Participation in a community project had an increase of odds of obtaining a graduate degree of 1.23 (OR = 1.23, p = .027) compared to those who did not participate while holding for controls. Remaining HIPs are found to not have a significant effect on graduate degree attainment. These results indicate participation in research with a faculty member outside the course and participation in community projects increases one's likelihood of obtaining a degree.

Table 21

Effects of SES, Student Engagement and HIPs on Graduate Degree Attainment

Graduate Degree Attainment	OR	SE	Normal-based 95% CI		*p* value
SES	1.04	0.02	1.00	1.09	.030
Student Eng. (ref = Never)					
Extracurric Sometimes	1.30	0.15	1.04	1.63	.021
Extracurric Often	1.31	0.16	1.02	1.67	.031
Faculty Inter Sometimes	1.31	0.18	0.99	1.72	.055
Faculty Inter Often	1.41	0.21	1.04	1.90	.025
HIPs (ref = No)					
Internship	1.00	0.09	0.83	1.21	.977
Research w/ Faculty	1.30	0.14	1.06	1.60	.012
Study Abroad	0.84	0.09	0.68	1.04	.116
Community Project	1.23	0.12	1.02	1.49	.027
Senior Culm. Exp.	1.05	0.09	0.89	1.24	.580
Mentorship	0.97	0.10	0.79	1.17	.731
GPA	3.76	0.34	3.14	4.50	<.001
Race (ref=white)					
API	0.98	0.12	0.77	1.25	.887
Black	1.56	0.26	1.12	2.18	.008
Hispanic	1.00	0.16	0.73	1.37	.991
Native American	1.31	1.08	0.26	6.61	.746
More than 1 race	0.86	0.18	0.57	1.30	.477
Sex (ref=male)					
Female	1.25	0.11	1.04	1.48	.015
Field (ref=Business)					
Arts	0.63	0.14	0.40	0.98	.042
Biological Sciences	2.62	0.45	1.87	3.67	<.001

Comm, Journalism	0.49	0.13	0.29	0.82	.006
Education	1.14	0.23	0.77	1.68	.505
Eng, ComSci	1.09	0.20	0.77	1.55	.624
Health Sciences	1.31	0.25	0.90	1.91	.158
Humanities; liberal arts	1.85	0.31	1.33	2.58	<.001
Physical Sciences	1.57	0.38	0.98	2.52	.059
Social Services	1.37	0.37	0.81	2.32	.243
Social Sciences	2.12	0.30	1.61	2.80	<.001
Other Majors/Inter.	2.54	0.39	1.87	3.45	<.001
Selective (ref=Most Competitive)					
Highly Competitive	0.58	0.18	0.31	1.07	.083
Very competitive	0.87	0.23	0.52	1.45	.589
Competitive	1.02	0.27	0.61	1.72	.935
Less competitive	1.15	0.32	0.67	1.97	.624
Non-competitive	0.93	0.28	0.52	1.67	.805
Special/Unclassified	0.34	0.13	0.17	0.70	.003
Control (ref=public)	0.92	0.09	0.76	1.12	.418
Two-Year (ref=None)	0.66	0.06	0.55	0.80	<.001
Constant	0.00	0.00	0.00	0.00	<.001

SES Quartile Multiple-Group Effects on Graduate degree Attainment. To answer RQ2b, a multiple-group approach was utilized in GSEM to estimate moderating effects of SES. Table 22 reports the previous GSEM model effects across SES quartiles. Results indicate that there are conditional effects on graduate degree attainment dependent on one's SES status for extracurricular activities, faculty interactions, research with faculty, and community project.

Students within the second quartile had a higher likelihood of graduate degree attainment the more involved in extracurricular activities. Students who reported involvement at sometimes had a 2.24 increase (OR = 2.24, $p < .01$) with often involvement equating to 2.41 increase (OR = 2.41, $p < .01$) odds of obtaining a graduate degree compared to never being involved, after holding for controls. Quartiles one, three, and four did not report significant effects for extracurricular involvement.

Faculty interactions was a significant factor predicting graduate degree attainment among quartile four. Students within the highest quartile that reported sometimes having faculty interactions had 1.77 (OR = 1.77, $p < .05$) and often interactions 2.10 (OR = 2.10, $p < .05$) times higher likelihood to have a graduate degree compared to never having interactions while holding controls constant.

Research with faculty was a significant factor for the lowest SES quartile of students. Holding for controls, among those who participated compared to not conducting research with a faculty member, students had 1.69 percent increased odds of obtaining a graduate degree (OR = 1.69, $p < .05$). Conducting research with a faculty member was not a significant factor predicting graduate degree attainment across upper quartiles.

Conducting a community-based project was found to positively predict graduate degree Attainment for quartile two. These students who participated in this HIP had 1.65 increased odds of a graduate degree, compared to not participating after holding for controls (OR = 1.65, $p < .05$).

Table 22

SES Quartile Multi-Group Effects on Graduate Degree Attainment

Graduate Degree Attainment	Odds Ratio (OR) (SE)			
	Q1 (n=1,098)	Q2 (n=1,124)	Q3 (n=1,109)	Q4 (n=1,133)
Student Eng. (ref = Never)				
Extracurric Sometimes	1.18 (0.27)	2.24** (0.59)	1.58 (0.38)	0.81 (0.19)
Extracurric Often	0.89 (0.23)	2.41** (0.66)	1.52 (0.37)	1.00 (0.23)
Faculty Inter Sometimes	1.64 (0.50)	0.85 (0.25)	1.09 (0.32)	1.77* (0.50)
Faculty Inter Often	1.30 (0.45)	0.91 (0.29)	1.39 (0.45)	2.10* (0.64)
HIPs (ref = No)				
Internship	1.28 (0.25)	0.93 (0.19)	1.15 (0.21)	0.85 (0.14)
Research w/ Faculty	1.69* (0.40)	1.06 (0.23)	1.11 (0.23)	1.37 (0.24)
Study Abroad	1.14	0.79	0.85	0.80

	(0.32)	(0.19)	(0.17)	(0.14)
Community Project	1.03	1.65*	1.12	1.22
	(0.22)	(0.33)	(0.21)	(0.20)
Senior Culm. Exp.	0.85	1.03	1.24	1.09
	(0.17)	(0.19)	(0.22)	(0.17)
Mentorship	1.30	0.93	0.77	1.04
	(0.29)	(0.20)	(0.15)	(0.19)
GPA	3.23***	5.02***	4.03***	3.34***
	(0.63)	(0.99)	(0.75)	(0.61)
Race (ref=white)				
API	0.76	0.66	1.34	1.08
	(0.21)	(0.20)	(0.33)	(0.23)
Black	1.82*	1.15	1.36	1.84
	(0.54)	(0.40)	(0.43)	(0.76)
Hispanic	0.80	0.99	0.87	1.40
	(0.23)	(0.34)	(0.30)	(0.46)
More than 1 race	0.95	0.83	0.38	1.30
	(0.49)	(0.40)	(0.22)	(0.45)
Sex (ref=male)				
Female	1.23	1.67**	1.29	1.10
	(0.25)	(0.32)	(0.23)	(0.17)
Field (ref=Business)				
Arts	0.24	0.64	0.85	0.56
	(0.19)	(0.36)	(0.33)	(0.24)
Biological Sciences	1.76	3.54**	3.27***	2.73***
	(0.71)	(1.52)	(1.11)	(0.80)
Comm/Journalism	0.71	0.74	0.50	0.21*
	(0.34)	(0.35)	(0.23)	(0.14)
Education	1.01	1.15	0.97	1.69
	(0.45)	(0.48)	(0.36)	(0.69)
Eng, ComSci	1.01	1.32	1.27	0.93
	(0.49)	(0.61)	(0.45)	(0.32)
Health Sciences	1.71	1.41	0.92	1.51
	(0.63)	(0.55)	(0.35)	(0.58)
Humanities; liberal arts	1.58 (0.61)	3.53*** (1.27)	1.60 (0.53)	1.55 (0.42)
Physical Sciences	2.60	2.30	0.84	1.24
	(1.39)	(1.13)	(0.53)	(0.53)
Social Services	1.19	1.39	2.21	0.89
	(0.53)	(0.74)	(1.00)	(0.63)
Social Sciences	2.70**	2.58**	2.25**	1.66*
	(0.79)	(0.83)	(0.61)	(0.41)
Other Majors/Inter.	2.45*	3.51**	2.53**	2.59**
	(0.85)	(1.29)	(0.83)	(0.74)
Selective (ref=Most Competitive)				

Highly Competitive	0.79	0.46	1.06	0.24
	(0.49)	(0.33)	(0.76)	(0.18)
Very competitive	1.44	0.92	0.67	0.46
	(0.75)	(0.49)	(0.42)	(0.26)
Competitive	1.42	1.48	0.71	0.59
	(0.76)	(0.79)	(0.45)	(0.33)
Less competitive	2.20	1.36	0.60	0.76
	(1.22)	(0.77)	(0.39)	(0.43)
Non-competitive	2.49	1.10	0.72	0.57
	(1.66)	(0.68)	(0.48)	(0.33)
Special/Unclassified	0.60	0.52	0.33	0.05*
	(0.42)	(0.36)	(0.26)	(0.05)
Control (ref=public)	1.34	0.83	1.16	0.66*
	(0.28)	(0.17)	(0.21)	(0.11)
Two-Year (ref=None)	0.65*	0.61*	0.78	0.60*
	(0.13)	(0.13)	(0.15)	(0.12)
Constant	0.00***	0.00***	0.00***	0.01***
	(0.00)	(0.00)	(0.00)	(0.01)

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

Chapter 5: Discussion

This section provides a summary of findings on the research questions and a discussion related to literature and theoretical frameworks. The findings illustrate the complex relationships between student SES, student engagement and HIPs, and early career earnings and graduate degree attainment. First, non-significant results in the analyses are summarized, followed by a discussion of two main findings: a) Student engagement and HIPs as pathways to social reproduction and b) Opportunities for pathways to social mobility. Lastly, implications for practice are described, followed by the study's limitations and concluding thoughts.

Study abroad, senior culminating experiences, and mentorship did not report significant effects when predicting early career earnings or graduate degree attainment or within SES quartiles through the multiple-group analysis. These may be due to broader experiences these HIPs entail. For example, study abroad can look quite different depending on the country, length of time, and quality of experience. The findings indicate that these experiences do not matter as much compared to other experiences when it comes to predicting post-graduation earnings and graduate degree outcomes. Non-significant results are briefly discussed as related to the literature.

Miller et al. (2018) did indicate that students who completed a senior capstone project had a positive association with one's employment outcomes within senior year nearing graduation. The present study provides a more longitudinal perspective following senior year plans for employment and shows when it comes to employment earnings capstone-projects may not have a direct influence. Miller et al. (2018) found study abroad increases one's likelihood of seeking employment compared to already having a job close to graduation time. The present study also did not find a positive association between study abroad participation and employment with regards to earnings. Mentorship is viewed as an opportunity to provide access to social and cultural capital, especially within an academic network (Crisp et al., 2017). The present work found contradictory evidence of this impact compared to most research detailing these outcomes from mentorship, especially among underserved students (Cole & Espinoza, 2008). It is likely the case the measure of "did you have a mentor" was too broad given the different ways this experience can reflect which limited the impact on earnings or graduate degree attainment. That is, the type of mentor (faculty, staff, graduate students, peers), purpose of mentorship (career, academic success, academic subject knowledge), and overall quality of the experience will facilitate opportunities which result in social and cultural capital (Crisp, et al., 2017).

Student Engagement and HIPs as Pathways for Social Reproduction

The first two research questions explored the ways student engagement and HIPs mediate between SES and post-graduation outcomes of earnings and graduate degree, which serve as trajectories to one's social mobility. Figures 9 and 10 describe the ways extracurricular involvement, interactions with faculty, internships, research with faculty, and community-based projects are mediating these relationships. Findings are summarized by early-career earnings and graduate degree attainment that describe student engagement and HIPs as pathways that reproduce social inequalities.

Early-Career Earnings

With respect to early-career earnings, internship experiences have a positive mediation effect. Students from higher SES backgrounds are more likely to access internship experiences which led to an increase of $1,732.63 earnings. The mediation model of earnings also does not indicate a significant direct effect between SES and early career earnings, further suggesting the effect may be explained through the mediating variables. Findings reflect prior research that details the ways higher-SES students, who bring with them more cultural, social, and economic capital, are able to obtain internships and use the new social connections and express cultural characteristics that elicit better employment (Armstrong & Hamilton, 2013; Stuber, 2011). Internships can signal desired cultural values and attitudes or social capital that more prestigious and well-paid jobs are seeking in applications and new hires (Rivera, 2015).

Opposite of the internship effects, conducting research with faculty was reported as a negative predictor of early career earnings. Higher SES students were more likely to conduct research with a faculty member and among those who did resulted in an average decrease of $2,205.18 in earnings. The negative impact on earnings reflects Miller et al. (2018) findings that research with faculty is more aligned with graduate degree plans than joining the workforce after graduation. In other words, students who conducted research with faculty may be more interested in pursuing further study before and after the experience than in earning a high salary immediately after graduation.

Graduate Degree Attainment

Results indicate extracurricular involvement, interactions with faculty, research with faculty, and community-based projects mediate the relationship between SES and graduate degree. Students from higher SES backgrounds were more likely to access these engagement and HIPs who then further received their positive effects on graduate degree. Students who were sometimes involved or often involved compared to never in extracurricular activities were about 1.30 times more likely to attain a graduate degree. Faculty interactions at the highest frequency of “often” was significant while “sometimes” interacting was not significant. These students were 1.41 times more likely to receive a graduate degree. The two HIPs that had positive effects on graduate degree were conducting research with a faculty member found a 1.30 increased likelihood of graduate degree attainment and participation in a community-based project who were 1.23 times more likely to attain a graduate degree.

The findings estimating graduate degree indicate more positive effects from mediating variables, suggesting that these experiences have a higher degree of influence on graduate degree outcomes than earnings. In the graduate degree attainment model, SES does have a direct effect on one’s likelihood to attain a graduate degree. This indicates that SES has a more prominent role influencing graduate degree compared to earnings. Participation in these experiences does impact your likelihood of achieving a degree, but they are favoring those from higher-SES backgrounds that already have advantages that will lead them to more advanced degrees. These findings reflect the ways student engagement, interactions with faculty, research with faculty, and community-based projects provide students access to cultivate cultural and social capital that can be used to explore, pursue, and obtain a graduate degree (Armstrong & Hamilton, 2013; Harper, 2008; Hurst, 2015, Ovink & Veazey, 2011; Yey, 2010). Graduate degree attainment provides direct access to more prestigious and better paid professions which provide for upward mobility. Engagement experiences and select HIPs appears to have social stratification leading to social reproduction among bachelor's degree recipients when it comes to graduate degree attainment preventing upward mobility through more prestigious professions.

Faculty Interactions

Research questions 1b and 2b sought how the effects of student engagement and HIPs on earnings and graduate degree attainment differ depending on one's SES background. These conditional effects further point to how student engagement and HIPs serve as pathways to social mobility or social reproduction through post-graduation outcomes. One student engagement experience, interactions with faculty outside the classroom, indicates student engagement further amplifies the pathway to social reproduction. Results show positive effects were found among those from the highest SES quartile with no effects reporting significance for lower SES backgrounds. Students from higher SES backgrounds not only have greater access to interactions with faculty members outside the classroom, but these experiences are conditional to SES. Higher SES students also experience the positive effects on graduate degree attainment when other quartiles do not.

Developing relationships with faculty is one clear avenue to gaining cultural and social capital which can be leveraged when it comes to pursuing graduate school. Those from the highest quartile of SES are experiencing benefits from faculty interactions while lower quartiles are not. This may be due to the class, race, and other cultural differences between students and faculty within college campuses. For example, among US college and universities, 24% are faculty of color compared to 45% of students being of color (NCES, 2018). Students who have different racial/ethnic identities may experience forms of discomfort and conflict (McGowan, 2000). Faculty may not always present an ethic of care which influences quality of out-of-class interactions (Hurtado et al, 2013). The quality and experiences of faculty interactions may not be as positive from those from lower-SES backgrounds due to cultural differences or a lack of care on behalf of the faculty's part. This, in turn, reduces any potential of attaining social and cultural capital which can be used to gain employment and graduate degree outcomes.

Summary

Conventional approaches to studying student engagement and HIPs seek to measure educational learning and development outcomes due to student engagement and HIP participation. The present study takes a social reproduction theory perspective, informed by prior research (Armstrong & Hamilton, 2013; Stuber, 2011; Bourdieu, 1984), through cultural and social capital to explain how student engagement and HIPs act as a sorting mechanism to support social reproduction. Findings provide support for Witteveen and Attewell's (2017) assertion that engagement experiences such as internships are what explains why class inequalities are reflected upon graduation across bachelor's degree graduates. Findings also provide quantitative support using a multi-institution sample to ethnographic research that originally described how student engagement experiences act as a sorting mechanism for social reproduction (Armstrong & Hamilton, 2013; Rivera, 2015; Hurst, 2015; Stuber, 2011). The research adds to this literature by identifying engagement experiences and HIPs as pathways for social reproduction. Additionally, interactions with faculty amplify existing sorting mechanism that privilege higher SES students.

Figure 9

GSEM Model of Student Engagement and HIP Mediation Between Socioeconomic Status and Early Career Earnings. Bold Pathways Indicate Significance (p < .05) with Respective Odds Ratios and Beta Coefficients, Controls are not Reported

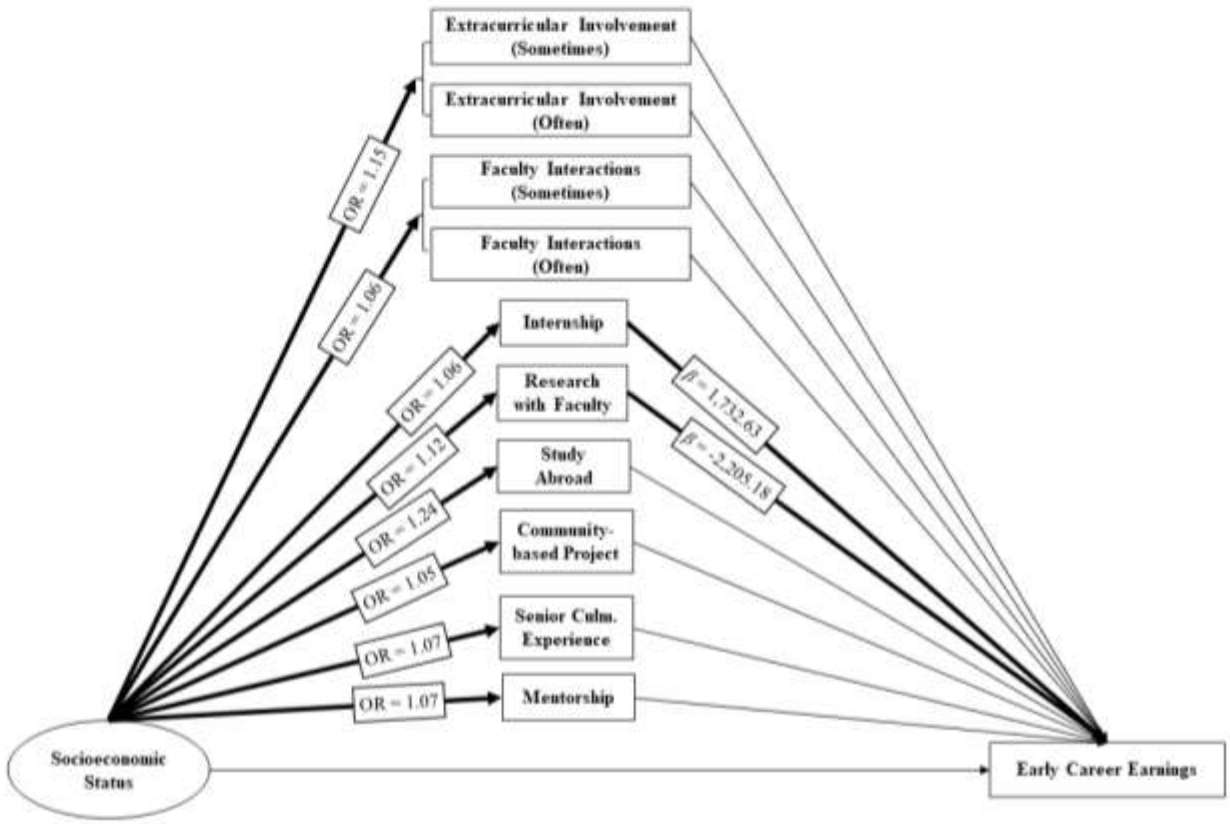
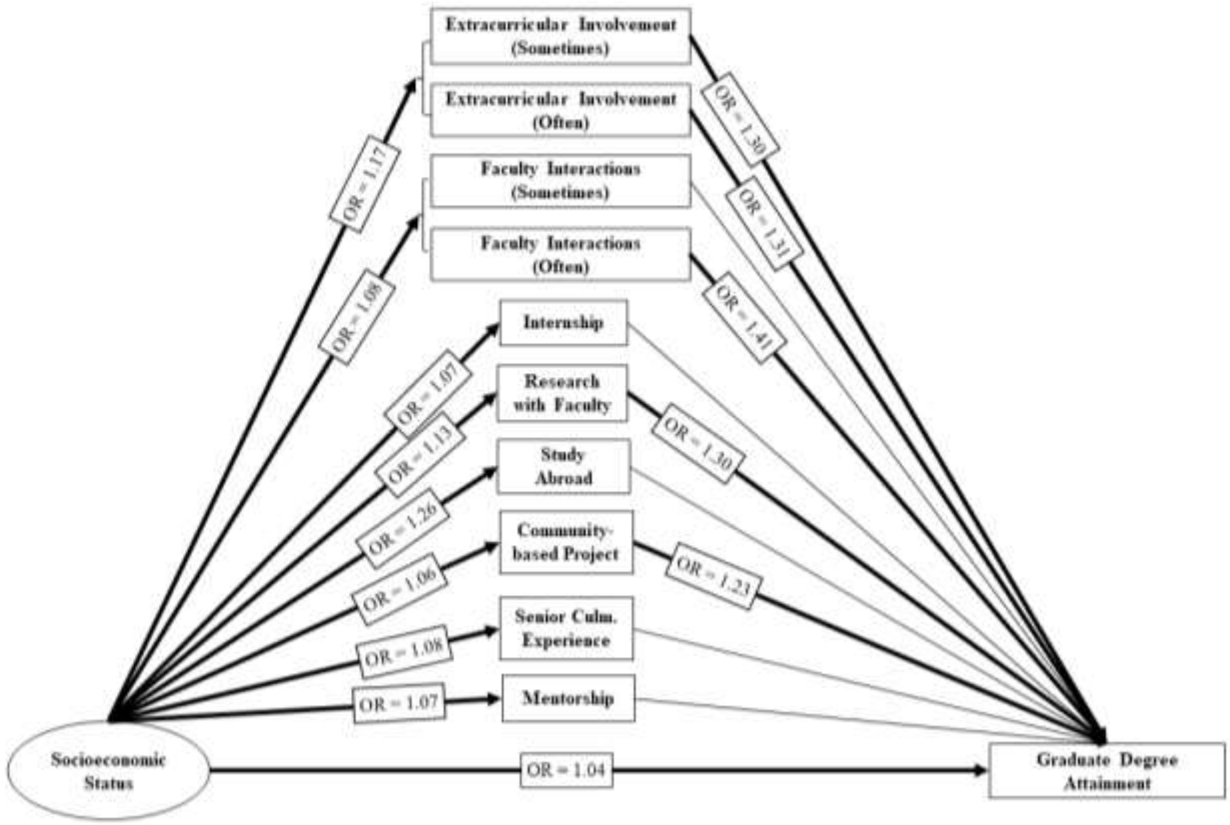


Figure 10

GSEM Model of Student Engagement and HIP Mediation Between Socioeconomic Status and Graduate Degree Attainment. Bold Pathways Indicate Significance (p < .05) with Respective Odds Ratios, Controls are not Reported



Opportunities for Pathways to Social Mobility

Findings from the multiple-group analysis evaluating moderation effects dependent on SES quartiles signal selective student engagement and HIPs may be pathways to upward mobility, particularly among those in the second quartile. Research with faculty was a strong predictor of graduate degree attainment among the lowest quartile, but no other engagement experience had a significant positive impact on earnings or graduate degree within the first quartile. Internships were conditional on SES quartiles and reported positive effects among the middle-SES quartiles when predicting earnings. Extracurricular activities and community-based projects were found to impact graduate degree attainment among the second SES quartile. These findings support the assertion that HIPs may be of particular benefit to those from underserved populations (Kuh, 2008; Finley & McNair, 2013). In the present study with robust controls, conditional positive effects on early career earnings or graduate degree attainment for lower-SES students, particularly the second quartile, are present. Higher quartile SES students did not report a significant effect other than interactions with faculty, indicating these experiences for upper quartiles are not strong contributing factors to post-graduation outcomes. The reported conditional effects support the idea that select student engagement and HIPs provide opportunities for lower-SES students to accumulate cultural and social capital. Qualitative research points to social and cultural capital gained by students and that is leveraged to obtain higher employment or graduate degree outcomes upon graduation (Armstrong & Hamilton, 2013; Harper, 2008).

Internships

Students from middle-SES backgrounds or those between quartiles two and three, experience a significant effect on their early career earnings. This indicates that internship experiences are predictive of earnings among middle quartiles with an average increase in earnings of $2,975.65 (quartile two) and $2,807.74 (quartile three). Little research directly explains why these results may be the case, however, findings broadly illustrate the ways this mediation effect may be present (Rivera, 2015, Armstrong & Hamilton, 2013; Stuber, 2011; Hamilton et al., 2018). From a social and cultural capital perspective that reflects existing societal inequities, students from the lowest quartile who do access internships may not be procuring additional capital that can be effectively used in the workforce for higher earnings. This may be the case due to the types of internships students participate in do not provide access to the capital necessary that will provide returns on post-graduation outcomes. Lower SES students might take local unpaid internships because they do not have the social connections or finance available to support more prestigious internships that are located further away that require money for travel or rent. Parental bridging may be possible for middle-class SES students connecting their children to internship opportunities within larger cities at corporations which can reproduce social connections leading to better paid jobs (Hamilton et al., 2018; Stuber, 2011). The results also suggest students from the highest SES quartile with the most privilege and associated social, culture, and economic capital do not experience benefits when it comes to earnings compared to the middle-SES quartiles through internships. This may be due to the ways one's already possessed capital can be used to result in strong employment positions that pay well. In these cases, internships are not a critical factor compared to those who acquire new cultural and social capital in the middle quartiles.

Research with Faculty

Students from the lowest SES quartile have greater odds of graduate degree attainment when conducting research with a faculty member. This result suggests the access to cultural and social capital through these experiences may be converted to access to graduate degree attainment for those who do not bring these forms of capital with them to college. Upper SES quartiles who participate in research with a faculty member may not elicit required capital that produces the social connections or cultural traits which in turn results in a graduate degree. Research with faculty is an equitable HIP given the demonstrated upward mobility opportunity for those from the lowest-SES background. It is also notable that research with faculty compared to interactions with faculty outside a classroom provided positive effects on the lowest-SES quartile compared to the highest-SES quartiles. This may be due to the more intentional and culturally relevant programs and experiences found in undergraduate research for those from underserved backgrounds (Craney et al., 2011). Ovink and Veazey (2011) found concerted efforts to expand one's cultural and social capital among underrepresented minority students in undergraduate research can be used to enhance their graduate degree outcomes. The authors' findings describe ways working with professors or graduate students in the labs, especially among shared marginalized identities, positioned them to see themselves in similar research careers and use social connections for getting into graduate degree.

Extracurricular Activities and Community-Based Project

Extracurricular activities and community-based projects were found to be a strong factor leading to graduate degree attainment for students who were within quartile two. This points to the ways involvement within extracurricular activities and community-based projects may elicit additional social and cultural capital that can in turn be used to attend and complete a graduate degree. Research describes the ways student organizations and club leadership, Greek life, and community-based projects can produce cultural and social capital (Armstrong & Hamilton, 2013; Harper, 2008; Yeh, 2010). These newly obtained forms of capital are activated to elicit graduate degree opportunities (Armstrong & Hamilton, 2013; Harper, 2008). Results suggest these experiences may be well equipped for those in a lower-middle quartile but not for those in the lowest or higher SES brackets. Reflecting the insights of conditional effects of internships, it may be the case students from the lowest quartile do not have access to extracurricular activities or community-based projects that produce opportunities for the procurement of the “right” capital which can be used to pursue a graduate degree. Upper-middle or the upper SES quartile may not be able to access additional capital on top of the already possessed sources which can support them in their transition to completing a graduate degree.

Summary

Conditional effects generally point to ways social mobility will be supported for lower-to-middle SES students who participate in internships, research with faculty, extracurricular activities, and community-based projects. The lowest quartile was found to particularly benefit their likelihood of attaining graduate school degrees when conducting research with faculty. They did not report conditional effects in other student engagement or HIPs. This finding indicates pathways for social mobility may be more available for those in the middle quartiles and not among those from the lowest. This difference may be due to the ways middle-class students possess some forms of cultural and social capital compared to their lower-class peers which can be used to access types of experiences that gains additional capital. Results also suggest those in the highest quartile in general may not receive the benefits from the experiences due to the already possessed cultural and social capital. As previously discussed, interactions with faculty was the exception. SES quartile four elicited greater odds in graduate degree attainment, without significant effects across lower quartiles.

Implications for Practice

Findings point to the fundamental issues of HIPs and student engagement given the ways they produce social reproduction instead of the desired social mobility outcomes students expect entering college and following graduation. Institutional leadership and educators charged with developing and implementing student engagement and HIPs should be critical to how engagement experiences are accessed, the types of experiences students have, and who benefits from participation. Higher education administrators must simultaneously assess whether their student engagement programs are accessible across student groups and that experiences support students from marginalized backgrounds. Based on this study’s findings, the National

Association of Systems Heads who aim to scale HIPs across 40 public university systems is also contradicting their other stated mission to advance social mobility (NASH, 2020b; 2014). Given public universities are more likely serving those from underrepresented backgrounds (Fry & Cilluffo, 2019), public universities especially need to have a critical lens in the ways HIPs policies are enacted. The notable emphasis by NASH on increasing equitable HIPs while scaling high-quality experience is promising given the findings (NASH, 2020a). However, professional organizations, system leaders, and institutional administrators need to be bold in their implementation of student engagement and HIPs to transform them into pathways that lead to upward mobility for lower-SES students.

Widening and Rerouting Engagement Pathways for Social Mobility

To counteract the results of perpetuating social inequalities, student engagement and HIPs should be widened and rerouted to build out pathways towards social mobility. Stuber (2015) and Armstrong and Hamilton (2013) describe the lack of resources and dedication towards student pathways that lead to upward mobility. Yet, there are clear known examples where these pathways work for students that come from lower SES and often diverse backgrounds (Stuber, 2015). Engagement experiences of internships, research with faculty, extracurricular involvement, and community-based projects were identified within the present study as opportunities that particularly benefit those in the lower or middle-quartiles. While these engagement experiences signal opportunities, access was limited based on SES and acts as a mechanism that reproduces social inequities. Results point to these experiences as opportunities which need to widen through increase resources to enhance access for those from lower SES backgrounds to widen the pathways to upward mobility.

Findings illustrate the need to reroute interactions with faculty experiences to better serve lower SES students. Interactions with faculty were found to mediate between SES and graduate school attainment as well indicated conditional effects for high SES students, further driving social reproduction outcomes. Universities have the responsibility to facilitate and support faculty interactions to ensure they are accessible, inclusive, and impactful for those form lower-SES backgrounds. Ardoin (2020) recommends connecting lower SES students with administration and faculty who may share poor and working-class backgrounds. One strategy universities can employ to widen and reroute engagement pathways is through the systematic continuous assessment of access and impact on post-graduation outcomes by student groups. Findings should be shared and used to inform policy and practices that reshape pathways to serve lower-SES students that lead to upward mobility.

Institutions should examine how policies and practices within their student engagement experiences enact classism that limits access and impact (Ardoin, 2020). First, this includes ensuring basic needs are met given the identified food and housing insecurities lower SES students are likely to experience, which are critical barriers to student engagement (Ardoin, 2020, Goldrick-Rab, 2016). Student organization reimbursement policies and requirements to pay fees in order to attend workshops or join clubs should be examined and removed when appropriate. These may be perceived as nominal amounts but create real financial barriers to extracurricular activities (Ardoin, 2020). Training that increases staff and faculty’s understanding of how first-generation and poor and working-class student identities and culture shapes an undergraduate experience will help reduce classism and support needed widening and rerouting of engagement experiences (Ardoin, 2020; Kouzoukas, 2020).

Recognizing the differences in cultural and social capital by SES student backgrounds, institutions should dedicate resources to counsel students and facilitate reflection that recognizes cultivated social and cultural capital (Ardoin, 2020). Students will be better positioned to see gained capital as a resource that can be used in ways to obtain desired, highly-paid careers or to access graduate school. Commonly performed campus resume workshops should help students tactfully write about and convey their engagement experiences which often signal cultural capital to prospective employers (Rivera, 2015). A final example, undergraduate research programs should include accessible workshops and guidance on ways faculty relationships can support graduate school opportunities through intentional conversations, utilizing social connections, and guidance through graduate school search and application.

Trickle Up Student Engagement

One framework offered that will widen and reroute pathways to support social mobility is through Trickle Up High Impact Practices (TUHIP) (Stewart & Nicolazzo, 2018). Stewart and Nicolazzo (2018) recommend working alongside students in order to recenter HIPs for those who come from the most marginalized backgrounds. The authors describe the framework as TUHIP to help higher education and student affairs administrators and educators develop programs that do not serve those who possess the most advantages but instead for students who come from less privileged backgrounds for social justice purposes. The TUHIP approach recommends students are seen as partners with meaningful co-development of practices within one’s institutional context. The present study’s findings provide further evidence for the need to resource and implement HIPs that support students from lower-SES backgrounds. Given the meaningful role extracurricular involvement and faculty interactions have as mediating and moderating effects that influence early career earnings and graduate degree attainment, this mindset and framework should be extended to student engagement more broadly as a whole. These actions echo Pendakur et al.'s (2020) argument to put the onus for engagement on institutions instead of putting the expectations on students.

An important element of Stewart and Nicolazzo's TUHIP and extension to trickle up student engagement is the recognition of intersectionality and the need to center students who are the most marginalized. A mono-identity class-based approach of student engagement will likely end up benefiting white students from lower-SES backgrounds who are able to utilize their whitneess to access and benefits. A trickle up student engagement approach aims to provide engagement experiences that lead to social mobility who may be from lower SES backgrounds but also inhabit other identities that student engagement and HIPs are not serving, such as trans* students of color. Lower SES students who are cisgender and white may find ways to navigate engagement experiences and the transition into the workforce or graduate degree due to their privileges which their peers who are of color and/or trans* will not possess and find barriers or harm in engagement experiences that facilitate post-graduation outcomes.

Limitations

The research has limitations. One of the limitations of the present study was a lack of attention to intersectionality in the analysis, which Stewart and Nicolazzo (2018) emphasize in TUHIP and application of HIPs research and practice. The study's research questions centered SES and positioned other variables such as academic field, race, and gender as controls. A second limitation of this study is the data collected on student engagement and HIPs are numeric values and unable to provide the qualitative nuance that interviews and participant observation can provide. Without knowing the detailed experiences participants had with an engagement experience or HIP, this data assumes that that participation was positive. The effects are based on averaged effects which do not extrapolate on access and the demonstrated outcomes due to participation. Additionally, the questions asked students to recall if they participated in student engagement and HIPs which may have been up to five or more years for HIPs depending on when graduation occurred. Therefore, there may be recall bias or misinterpretation of the question when responding (Althubaiti, 2016). Measures of career earnings and graduate degree are only within eight years since one's graduation from high school. Students likely change jobs and pursue graduate degree opportunities after this timeframe. These longer-term outcomes and therefore understanding of social mobility are not available within the study.

The study followed students who graduated from high school and transitioned through post-secondary experiences into the workforce. The ELS 2002 therefore does not account for students who are older or those who predominantly are taking courses online. Although the sample used consists of over 1,000 universities, the findings are limited in generalizability to higher education in the United States.

Future Research

Future research through a critical lens is needed as student engagement and HIPs continue to be a central component to the undergraduate experience. Critical perspectives have been well documented (Harper, 2009; Patton et al, 2015; Lange & Stewart, 2019; Stewart & Nicolazzo, 2018), but additional empirical research that applies these and other critical perspectives is needed. There is not one pathway for all students to access and benefit from engagement experiences. Research should instead examine the multitude of different pathways to and from engagement experiences across student identities, which may include academic field, gender, race/ethnicity, rurality background, and sexual orientation that are underserved within higher education. Future research should look to more methods that aim to understand mediation and moderation effects to accomplish this goal. Without empirical support reform is unlikely to see student engagement policy and practice change.

Additional research should further explore the relationships between undergraduate experiences, including student engagement and HIPs, with post-graduation outcomes that link to social mobility. The undergraduate experience itself is understudied when it comes to social stratification. Little is still known given this lack of research about the ways engagement experiences support or inhibit upward mobility. More longitudinal studies are required to trace the ways pre-college SES backgrounds influence one’s journey through the undergraduate experience and how these impact post-graduation outcomes. The present research indicated student engagement and HIPs have conditional effects on post-graduation outcomes based on one’s SES quartile. Students from the lowest quartile may access experiences but not the types of internships or extracurricular activities that produce additional cultural and social capital which benefits middle-SES students in their obtaining of better paying jobs and graduate degree opportunities. More research is needed to evaluate not only how social and cultural capital is transmitted through these experiences but why do middle-class students find success when lower-class students do not in the same experiences. In what ways does social and cultural capital provide access to the types of engagement experiences which elicit favorable outcomes. An appreciative inquiry would also be helpful to understand what about the experience through in-depth qualitative approaches elicit cultural and social capital so those practices can be shared and expanded on.

Conclusion

Social mobility through the attainment of a college degree continues to be the narrative that families as well those within universities embrace. Student engagement and HIPs reflect these public good ideals and are viewed as the idealized undergraduate experience for students contributing to desired outcomes after graduation. The present research counters this narrative with results showing the ways student engagement and HIPs serve as pathways not to mobility but instead social reproduction. Students' socioeconomic classes upon entering college are perpetuated at graduation as they enter the workforce and continue their education in graduate school. Opportunities may exist through student engagement and HIPs with select experiences benefiting those from lower-to-middle SES backgrounds. To transform these undergraduate experiences into pathways towards social mobility outcomes, policymakers, institutional leaders, and educators must widen and reroute the experience to primarily serving those from lower-SES backgrounds who also hold other marginalized identities. A trickle up student engagement approach will help to uphold the promise of upward mobility a bachelor's degree grants within higher education.

Appendix

Education Longitudinal Study 2012 Instrument Questions

Socioeconomic Status Measures

Variable	ELS Variable Name (Wave Year)	Description	Survey Question or Source	Response Options
Family Income	BYINCOME (2002/2004)	Total family income	*What was your total family income from all sources in 2001? (If you are not sure about the amount, please estimate)(MARK ONE RESPONSE)*	• None • $1,000 or less • $1,001 - $5,000 • $5,001 – $10,000 • $10,001 – $15,000 • $15,001-$20,000 • $20,001-$25,000 • $25,001-$35,000 • $35,001-$50,000 • $50,001-$75,000 • $75,001-$100,000 • $100,001-$200,000 • $200,001 or more
Father’s Education	F1FATHED (2002/2004)	Father’s highest level of education	*What is the <u>highest level</u> of education you and your spouse/partner have reached?*	• Did not finish high school • Graduated from high school or GED • Attended 2-year school, no degree • Graduated from 2-year school • Attended college, no 4-year degree • Graduated from college • Completed Master’s degree or equivalent • Completed PhD, MD, or other advanced Degree

Mother's Education	F1MOTHED (2002/2004)	Mother's highest level of education	*What is the highest level of education you and your spouse/partner have reached?*	• Did not finish high school • Graduated from high school or GED • Attended 2-year school, no degree • Graduated from 2-year school • Attended college, no 4-year degree • Graduated from college • Completed Master's degree or equivalent • Completed PhD, MD, or other advanced Degree
Mother's Occupation	F1OCCUM (2002/2004)	Mother or female guardian's occupation composite Open-ended response coded to 16 categories	*Which of the categories below comes closest to describing this job?* *(MARK ONE RESPONSE)* If no category was selected, below input text was coded. *Please describe your present or most recent job for pay in the United States. If you hold more than one job, describe only one job, that which you consider to be your main job.*	• No job for pay • Clerical • Craftsperson • Farmer, farm manager • Homemaker • Laborer • Manager, administrator • Military • Operative • Professional A • Professional B • Proprietor, owner • Protective service • Sales • School teacher • Service • Technical

			What is/was your present and most recent job called? *What are/were your main duties?*	
Father's Occupation	F1OCCUM (2002/2004)	Father or male guardian's occupation composite Open-ended response coded to 16 categories	*Which of the categories below comes closest to describing this job?* *(MARK ONE RESPONSE)* If no category was selected, below input text was coded. *Please describe your present or most recent job for pay in the United States. If you hold more than one job, describe only one job, that which you consider to be your main job.*	• No job for pay • Clerical • Craftsperson • Farmer, farm manager • Homemaker • Laborer • Manager, administrator • Military • Operative • Professional A • Professional B • Proprietor, owner • Protective service • Sales • School teacher • Service • Technical

			What is/was your present and most recent job called? *What are/were your main duties?*	

Dependent Variables

Variable	ELS Variable Name (Wave Year)	Description	Survey Question or Source	Response Options
Early Career Earnings	F3D20 (2012)	Career earrings in a one year	*About how much did you earn from employment in 2011 before taxes and all other deductions? Please include all wages, salaries, income from a business or farm, commissions, and tips you earned in 2011. [Please include your earnings only; we will ask about your [spouse's / partner's] earnings in a separate question.]*	• Open-ended

Graduate Degree Attained	F3TZHIGHDEG (2013)	Highest known degree obtained as of June 2013	NCES Transcript: Highest known degree attained as of June 2013	• Certificate or diploma • Associate's degree • Bachelor's degree • Post-bachelor's certificate • Master's degree • Post-master's certificate • Doctoral degree for professional practice • Doctoral degree for research/scholarship

Student Engagement and High-Impact Practice Mediating Variables

Variable	ELS Variable Name (Wave Year)	Description	Survey Question or Source	Response Options
Student engagement: Extracurricular activities	F2B18G (2006)	Participate in other extracurricular activities	*During the time that you have been enrolled at [first attended postsecondary institution (F2PS1)], how often have you participated in the following activities? Choose never, sometimes, or often. How often have you... [participated/participate] in other extracurricular activities?*	• Never • Sometimes • Often

Student engagement: Faculty interactions	F2B18A (2006)	Talk with faculty about academic matters outside of class	*During the time that you have been enrolled at [first attended postsecondary institution (F2PS1)], how often have you participated in the following activities? Choose never, sometimes, or often. How often have you... [talked/talk] with faculty about academic matters outside of class time?*	• Never • Sometimes • Often
HIP: Research with faculty member	F3A14B (2012)	Research with a faculty member outside of course or program requirements	*[Have you participated/Did you participate] in any of the following as a part of your [undergraduate/college] education?(Please answer 'Yes' or 'No' for each row below.) Research project with a faculty member outside of course or program requirements*	• Yes • No
HIP: Mentorship program	F3A14F (2012)	Program in which you were mentored	*Have you participated/Did you participate] in any of the following as a part of your [undergraduate/college] education? (Please answer 'Yes' or 'No' for each row below.)* *Program in which you were mentored:* *Yes* *No*	• Yes • No

HIP: Internship	F3A14A (2012)	Internship/co-op/field experience/student teaching/clinical assignment	*[Have you participated/Did you participate] in any of the following as a part of your [undergraduate/college] education? (Please answer 'Yes' or 'No' for each row below.)* *Internship, co-op, field experience, student teaching, or clinical assignment:* *Yes* *No*	• Yes • No
HIP: Study Abroad	F3A14C (2012)	Study abroad	*[Have you participated/Did you participate] in any of the following as a part of your [undergraduate/college] education? (Please answer 'Yes' or 'No' for each row below.)* *Study abroad:* *Yes* *No*	• Yes • No
HIP: Community-based project	F3A14D (2012)	Community-based project	*[Have you participated/Did you participate] in any of the following as a part of your [undergraduate/college] education? (Please answer 'Yes' or 'No' for each row below.)* *Community-based project (for example, service learning) as part of a regular course:* *Yes* *No*	• Yes • No

HIP: Culminating senior experience	F3A14E (2012)	Culminating senior experience: capstone course, senior project or thesis, or comprehensive exam	*[Have you participated/Did you participate] in any of the following as a part of your [undergraduate/college] education? (Please answer 'Yes' or 'No' for each row below.)* *Culminating senior experience, such as a capstone course, senior project or thesis, or comprehensive exam:* *Yes* *No*	• Yes • No

Control Variables

Variable	ELS Variable Name (Wave Year)	Description	Survey Question or Source	Response Options
Level	F2ILEVEL (2013)	Level of institution	NCES Integrated Postsecondary Education Data System (IPEDS)	• 4-year college or university • 2-year college • Less than 2-years

Control	F3ICNTRL (2013)	Control of institution	NCES Integrated Postsecondary Education Data System (IPEDS)	• 4-year college or university • 2-year college • Less than 2-years
Competitiveness	BARRONS14	Barron’s competitiveness index in 2014; Used to create measure indicating GPA for first bachelor’s degree	NCES Barron’s Admissions Competitiveness Index Data files	• Most competitive • Highly competitive • Very competitive • Competitive • Less competitive • Non-Competitive • Special
Major/Field of Study	F3TZBCH1CIP2 (2013)	Major/Field of Study for first known bachelor’s degree	NCES Transcript: First known bachelor's degree major/field of study: 2-digit CIP	• Agriculture and Natural Resources • Arts • Biological Sciences • Business • Communications and Journalism • Education • Engineering and Computer Science • Health Sciences • Humanities • Social Sciences • Physical Sciences • Other Majors, Interdisciplinary

GPA	F3TSHIGHAWD (2013)	Normalized GPA for undergraduate coursework; Used to create measure indicating GPA for first bachelor's degree	NCES Transcript: GPA for undergraduate coursework	• 0.00 - 4.00
Race/Ethnicity	F1RACE (2002/2004)	Race/ethnicity composite informed by two questions	*Are you are Hispanic or Latino/Latina, which one of the following are you?* *Please select one or more of the following choices to best describe your race?*	• Yes • No • White • Asian/Pacific • Black/African-American • Multiracial • Native American
Sex	F1SEX (2002/2004)	Sex as of respondent	*What is your sex?*	• Male • Female

Hours worked	F3C02 (2012)	Number of hours worked per week during 2011	*[Earlier you told us how many hours you are currently working per week. Now, how / How] many hours did you work for pay at all jobs during a typical working week in 2011?*	• 1 - 90 hours
Months since bachelor's degree	F3TZBACHLTDT (2013)	Date of most recent known bachelor's degree	NCES Transcript: Indicates the date of the student's most recent known bachelor's degree	• 0 – 55 months
Advanced degree	F3TZHIGHDEG (2013)	Highest known degree attained as of June 2013	NCES Transcript: Highest known degree attained as of June 2013	• Certificate or Diploma • Associate's degree • Bachelor's degree • Post-bachelor's certificate • Master's degree • Post-master's certificate • Doctoral degree for professional practice • Doctoral degree for research/scholarship

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