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Class and Race in The College Classroom: Faculty interactions and student learning among racially diverse poor and working-class collegians

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Class and Race in The College Classroom:

Faculty interactions and student learning among racially diverse poor and working-class

collegians

A dissertation submitted in partial satisfaction of the degree requirements required for the degree

Doctor of Philosophy in Education

by

Kaitlin N. S. Newhouse

2021

ABSTRACT OF THE DISSERTATION

Class and Race in The Classroom:

Faculty interactions and student learning among racially diverse poor and working-class

collegians

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Kaitlin N. S. Newhouse

Doctor of Philosophy in Education

University of California, Los Angeles, 2018

Professor Linda J. Sax, Chair

Over the last four decades, access to higher education for poor and working-class students has increased though social class disparities remain across many key higher education outcomes. To identify strategies and interventions that might support poor and working-class students, it is necessary to better understand the nature of poor and working-class college students' experiences. The purpose of this study was to explore the role of student-faculty interaction—a practice that has been linked to positive social and academic outcomes in the literature for more than half a century—in the cognitive skills development of poor and working-class college students. Further, as existing literature commonly treats all poor and working-class

students as a monolith, this study also sought to explore how the relationship between student-faculty interaction and students' cognitive skills development was moderated by race.

Using responses of poor and working-class students who participated in the 2018 administration of the Student Experience in the Research University (SERU) survey distributed to 19 large public research institutions in the United States (N=30,689), this study first examined rates of different types of student-faculty interaction and how these frequencies differed by race/ethnicity, gender, and academic major. Then, drawing from college impact theories, Bourdieu's forms of capital, and informed by critical race theories of education, this study used structural equation modeling to test the relationships between student background characteristics, student-faculty interaction, and students' self-rated cognitive skills.

Results indicated that there were gender, racial/ethnic, and academic major differences in the rates of interacting with faculty, but that interacting with faculty was positively associated with poor and working-class students' self-rated cognitive skills regardless of race/ethnicity. Overall, these findings suggest the benefits and importance of interacting with faculty for poor and working-class students. However, the variation in the salient variables associated with more frequent student-faculty interaction points to key student populations (e.g., poor and working-class Women of Color, first-generation students, first and second-year students, first-time students) that student affairs practitioners and faculty might focus on as they seek to develop programs, initiatives, and opportunities for students to build relationships and networks of faculty.

The dissertation of Kaitlin N. S. Newhouse is approved.

Patricia M. McDonough

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Young K. Kim

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University of California, Los Angeles

2021

Dedication

For my parents, who lit the spark…

For Jordon, who kindles the flame each day with love and care…

For Charlotte, who saw how bright I could glow.

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I owe an immense debt of gratitude to Dr. Mike Rose, whose convocation lecture inspired me on the first day of my first year and whose thoughtful mentorship I have so enjoyed over the

To my fellow Sax advisees, thank you for helping me and this project along over the last five years. I have loved learning from each of you in casual conversation and in RAC and am proud to call each of you friends and colleagues. A very special thanks to Annie Wofford for being a dear friend, sounding board, and cheerleader of mine since she arrived; I am so lucky our paths crossed and I look forward to years and years of friendship and collaboration. Further, I thank my lucky stars that I was admitted to the program the year after Dr. Kari George. Kari helped me mindmap this study in its earliest stages, read every word of this dissertation, and believed in this project and me on my best and worst days. I am so grateful for your friendship and mentorship and that you answer panicked texts and phone calls at odd hours. I'm certain we will be close friends and colleagues forever.

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The journey to completing this degree began long before I arrived at UCLA. I developed my writing and reading skills in public school classrooms and so many teachers, especially Beth Mortiz, set me on a path to pursue college and beyond. At Tulane University, I was lucky to have

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unique challenges of pursuing a doctorate and shared in my joys and frustrations. My friends that are my chosen family also made life sweet even while in graduate school. Melissa Sykes is my twin soul and let me celebrate and complain as needed. Love and support from Nicky Ross has been a constant in my life since I was 12 and I remain lucky and blessed to have her in my corner. Over the past five years, Briana Frieda has sent her love with the best gifts and came to see me in LA when I didn't even know how much I needed her. Athena, Izzy, Jen, Kaiti, Ericka, I love you all and appreciate your patience as grad school made me a less-than-stellar friend; I'll make up for it, I promise!

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Sax, L.J. & **Newhouse, K.N.S**. (2019). Disciplinary field specificity and variation in the STEM gender gap. In J. Gaston-Gayles & L. Perez-Felkner (Eds.), *Advancing higher education research on undergraduate women in STEM*. New Directions for Institutional Research (pp. 43-69). Malden, MA: Wiley.

Newhouse, K.N.S., Wofford, A.M., Sendowski, M., Ramirez, D., (2019, July). *BRAID surveys in action: Tools for making use of your institution's survey data*. Presented at the 2019 BRAID Summit at Harvey Mudd College, Claremont, CA.

Newhouse, K.N.S. (2019, November). *Low-income, high-tech: Predictors of low-income students' interest in tech careers* [Paper presentation]. Association for the Study of Higher Education (ASHE) Conference 2019, Portland, OR.

Lehman, K.J., **Newhouse, K.N.S.,** & Sax, L.J. (2020). Gaps in participation in the computer science major: A review and agenda for research. *The International Handbook of Gender Equity in Higher Education. https://doi.org/10.1002/9781119257639.ch15*

Lehman, K. J., Wofford, A. M., Sendowski, M., **Newhouse, K. N. S.**, & Sax, L. J. (2020). Better late than never: Exploring students' pathways to computing in later stages of college. In *Proceedings of the 51st ACM SIGCSE Technical Symposium on Computer Science Education*, 1075-1081. https://doi.org/10.1145/3328778.3366814

Sax, L.J., Blaney, J., Zavala, C., **Newhouse K.** (2020). Who takes intro computing? Examining the degree plans of introductory computing students in light of booming enrollments. In *2020 Proceedings of the IEEE Conference on Research in Equity and Sustained Participation in Engineering, Computing, and Technology (RESPECT)*.

Sax, L. J., **Newhouse, K. N. S.**, Goode, J., Skorodinsky, M., Nakajima, T. M., & Sendowski, M. (2020). Does AP CS Principles Broaden Participation in Computing? An Analysis of APCSA and APCSP Participants. *Proceedings of the 51st ACM Technical Symposium on Computer Science Education*, 542–548. https://doi.org/10.1145/3328778.3366826.

CHAPTER ONE: INTRODUCTION

It took roughly ten weeks into the first semester of my first year of college to muster the courage to ask a professor for help. I had known I was out of my depth in Univariate Statistics by the second week of classes, but to be fair, at the time I was feeling out of my depth everywhere. Neither of my parents attended college, and when they left me on campus on a sweltering hot August afternoon, I felt the pressure of achieving a dream that belonged to all of us. And I also felt, at times, that the campus of the elite private southern research university was not really just 700 miles from the working-class midwestern suburb where I grew up, but lightyears away; a different planet, with a rarefied, humid atmosphere and populated by shockingly colorful flora and so many blond beings with perfect, blindingly white teeth and expensive clothes. So the paralyzing mixture of anxiety and bewilderment I experienced twice a week in statistics class was not a new sensation, though it mounted as more and more Greek letters were strewn across the massive chalkboards like inscrutable graffiti. Perhaps this was just a language unique to this planet? At some point I gleaned that that these unfamiliar letters within unfamiliar equations sometimes (but not always) represented whole other equations. Never, I thought, had I taken a math course with so few numbers.

After an abysmal performance on the midterm I began to really panic. This course was required for my planned major in psychology, and more importantly my scholarships had GPA requirements, and my college attendance hinged on these scholarships. I had to pass. Feeling desperate I emailed Dr. Kyle, my middle-aged Psychology professor—whose strikingly casual uniform of Hawaiian shirts and faded old jeans was more approachable than his aloof demeanor—and asked if I might trouble him to come to his office for some clarification before

the final exam. Days later, he responded with a single sentence. He didn't really meet with undergrads, so I should ask a TA. My face burned with embarrassment. Should I have known this policy? And to how many more people would I need confess my incompetence? I had written and revised my email to Dr. Kyle dozens of times, trying to get it just right, trying to match this planet's parlance. It took weeks for me to finally send, and several days to get a response. I could not start the whole process over. Thus, this correspondence with Dr. Kyle would be my last, and the shame I felt—around emailing him when I was apparently not supposed to, around my challenges with the course material, around feeling out-of-place all the time—prevented me from asking for help from anyone else. I quietly muscled through the semester on my own, eking by with a C- and swearing I'd never take a statistics class again.

Statement of the Problem

My own experience described above illustrates what much of the research shows: low-income and first-generation college students often experience a disorienting culture shock when they arrive to campus that has a host of causes and consequences worth addressing. To be sure, low-income and working-class college students have experienced extraordinary increases in their ability to access postsecondary education over the last three decades. From 1990 to 2017, the college participation rates among high school completers from families in the lowest income quintile increased from 32% to 48%, with almost no growth in college attendance observed during that time span in the proportions of students from wealthier family income quintiles (Cahalan et al., 2019). Yet, as access to post-secondary education has improved among low-income students, it remains important to consider what kinds of experiences to which these students are gaining access.

Indeed, once enrolled, evidence suggests that poor and working-class students continue to face a variety of challenges navigating college that are typically not shared by their wealthier peers, including juggling family responsibilities, grappling with persistent concerns about finances and debt, and adjusting to the academic demands of college (Covarrubias et al., 2019; Jack, 2019; Moreau & Leathwood, 2006; Soria et al., 2013; Walpole, 2003a). Further, students' college experiences are moderated not just by their social class, but also by their racial/ethnic and gender identities, among others. Prior research suggests that low-income Students of Color may feel especially alienated when forces of racism and classism coalesce to impede their academic and social integration (Jack, 2019). However, there is evidence to suggest that interactions with institutional agents, such as faculty, may mediate the relationship between students' demographic and academic background characteristics and their academic performance (Cole & Griffin, 2013; Kim et al., 2009; Kim & Lundberg, 2016; Kolluri, 2020; Pascarella, 1980). In other words, regardless of students' academic or demographic backgrounds, faculty have been shown to play a pivotal role in bolstering students' academic success.

In fact, positive and supportive faculty interactions are particularly salient in the development of students' cognitive skills (e.g., quantitative reasoning, literacy, critical thinking, and problem solving) (Cole, 2008; Kim & Lundberg, 2016; Lundberg, 2014; Mayhew, et al., 2016; Terenzini et al., 1996; Umbach & Wawrzynski, 2005), even when controlling for a variety of pre-college characteristics. Such skills are critically important in that they serve students in college and beyond (Billing, 2007; Kirschner et al., 2004; Pascarella & Terenzini, 2005). The present study raises the question of whether the positive mediating role of faculty on students' self-reported cognitive skills is observed among poor and working-class students in particular,

and further explores the extent to which this relationship holds for different racial/ethnic subgroups of working-class Students of Color.

Building relationships with faculty may be key to poor and working-class students' success as such relationships provide access to key forms of capital, integral to navigating college. Sociologist Pierre Bourdieu defined social capital as "the sum of the resources, actual or virtual, that accrue to an individual or a group by virtue of possessing a durable network of more or less institutionalized relationships…" (Bourdieu & Wacquant, 1992, p. 119). Relatedly, cultural capital is often described as the practices, tastes, credentials, and competencies of the dominant social classes (Bourdieu, 1986), including the material—like books and art—and the immaterial, such as standardized test-taking ability or active parental involvement in education (Lareau & Weininger, 2003). Further, middle-class and elite norms determine what counts as social and cultural capital, and these norms are then reified and reproduced by middle-class and elite people and institutions, such as colleges and universities (Bourdieu, 1986). Thus, low-income and working-class students—who frequently enter post-secondary education with less money, fewer material resources, and also less social and cultural capital than their wealthier peers (Ardoin, 2017; Collier & Morgan, 2008; Jack, 2016; Kolluri, 2020; Soria & Stebleton, 2013)—may have trouble successfully navigating the middle-class and elite milieux of colleges and universities.

Given that elite and middle-class practices are forms of cultural capital, I suggest that the *practice* of interacting with faculty is one type of cultural capital in which disparities can be seen between poor/working-class students and their wealthier counterparts. Developing relationships with faculty is understood to be an extremely important practice that the most academically successful students employ to great benefit. Quality time spent engaging with faculty is

commonly cited as a positive predictor of a variety of favorable student outcomes, including increased GPA, greater sense of belonging on campus, college persistence, and degree attainment (Astin, 1999; Cole & Griffin, 2013; Kim & Sax, 2009; Kuh & Hu, 2001; Mayhew, et al., 2016; Sax et al., 2005; Soria, 2013). Further, time spent with faculty results in the accrual of important social capital as well, as students are able to build networks through which they can access letters of recommendation, internship and research opportunities, and more. Yet, the extent to which students interact with faculty is moderated by a variety of factors including socioeconomic/class status and race (Calarco, 2018; Jack, 2019; Kim & Sax, 2009). In fact, low-income and working-class students have been found to engage with faculty less often than their wealthier peers (Kim & Sax, 2009; Soria, 2013). Making things more challenging, over the last four decades, research universities (like those attended by the students in this study) have outsourced more teaching and mentorship to graduate assistants, contingent faculty, and staff so that faculty may devote more time to resource-generating research (Altbach, 2016). Thus, low-income students, and particularly low-income Students of Color, who attend large research-intensive institutions possibly face both intrinsic and extrinsic barriers in their ability to meaningfully interact with faculty, and therefore, may miss out on any resultant benefits.

Objectives

Using student survey data collected from 18 research institutions that administered the Student Experience in the Research University (SERU) survey in 2018, this study used descriptive statistics and structural equation modeling to explore the relationships between poor and working-class students' background characteristics and college experiences, their reported engagement in student-faculty interactions, and their self-reported cognitive skills. Further, by running multiple structural equation models on racial/ethnic subsamples, this study sought to

investigate differences in these relationships based on race/ethnicity in order to better understand

potential variation *among* poor and working-class students. Guided by theories of social and

cultural capital (Bourdieu, 1986), critical race theory (Delgado, Stefancic, & Harris, 2017;

Ladonson-Billings, 2016) college impact (Astin, 1999; Pascarella, 1985), and prior research on

poor and working-class college students, this study was guided by the following research

questions:

1. How frequently do poor and working-class respondents report engaging with faculty (e.g.
   participating with faculty in-class, communicating with an instructor outside of class,
   working with faculty outside of class on research, accessing letters of recommendation)?

   a. Are there gender, racial/ethnic, or academic differences in the frequencies with
      which poor and working-class students report different types of academic
      interaction with faculty?

2. Among poor and working-class college students, what are the social identities and
   characteristics that portend to student-faculty interaction and to what extent does student-
   faculty interaction mediate the relationship between (a) student background characteristics
   and academic experiences and (b) self-rated cognitive skills?

3. To what extent and how does race/ethnicity moderate the relationships between other
   demographic characteristics, student-faculty interaction, campus climate, and self-reported
   cognitive gains among working-class college students?

Study Significance

This study aimed to address several important gaps that exist in the prior research on poor

and working-class college students and student faculty interaction. First, while it has been well

documented that various types of student-faculty interaction play an important role in student

outcomes, much of this literature is quite dated. Further, a preponderance of the foundational literature on the positive effects of student-faculty interaction uses large institutional datasets to explore the effects among all students, failing to account for the conditional effects of student faculty-interaction that may be experienced by students with particular identities. In fact, in higher education research more broadly, literature that focuses *only* on poor and working-class students and their experiences is limited. Accordingly, in considering the dynamic interplay of students' social class *and* racial/ethnic identities, this study seeks to deepen what we know about student-faculty interaction and the possible nuances in its effects on students.

Relatedly, existing literature on poor and working-class students often focuses on students attending community colleges or elite private four-year institutions. Yet, community colleges and institutions in the Ivy League are not the only institutions that serve low-income students. In fact, "many American research universities were established with a civic mission to prepare students for active participation in a diverse democracy and to develop knowledge for the improvement of communities" (Checkoway, 2001, p. 125). These goals cannot be achieved without engaging an economically and social-class-diverse student body, though less is known about the specific experiences of low-income students within the particular context of the research university, where they have been historically underrepresented.

Overview

As this chapter describes, the proceeding study seeks to address gaps in literature and theory related to the college experiences of racially and ethnically diverse poor and working-class college students. In chapter two, I review the relevant literature on the precursors and benefits of student-faculty interactions and what is known about poor and working-class college students in higher education, namely those who attend four-year colleges and universities. I also

describe the conceptual and theoretical frameworks that guided this inquiry. In chapter three, I discuss the study design and methods, survey data used, and describe the sample, and chapter four describes the results. Finally, in chapter five I conclude by placing the results in the context of existing literature and discuss the implications of this study's findings.

CHAPTER TWO: REVIEW OF THE LITERATURE AND THEORETICAL FRAMEWORKS

The purpose of this chapter is to provide a framework for understanding the role of student-faculty interaction in the academic success of poor and working-class students, and how this role may be moderated by race and/or ethnicity. While student-faculty interaction has been widely touted as an important and beneficial experience for students, much less is known about how engaging with faculty in academic and social contexts impacts *specific* subgroups of students. In fact, the literature describing the experiences of poor and working-class students in higher education is scant in general, and even more so is the literature specifically addressing poor and working-class Students of Color.

Thus, the following chapter aims to synthesize the large body of work on college student-faculty interaction, including a description of the types of interactions, the well-documented benefits, and the *conditional* effects of student-faculty interactions based mainly on gender, race/ethnicity, and class. I will also present an overview of the existing literature on poor and working-class students in higher education, including a review of how social class is commonly operationalized in the literature, as well as what is known about how these students experience higher education. Finally, I will introduce the three theoretical frameworks I used to understand the experiences and outcomes of racially/ethnically diverse poor and working-class college students in higher education. College impact theories, such as Astin's theory of involvement (Astin, 1970, 1999) and Pascarella's model of assessing student change (Pascarella, 1980) are frequently used to explain the role of students' individual characteristics and experiences in their development and outcomes. Relatedly, use of Bourdieu's theories of social and cultural capital (Bourdieu, 1986; Bourdieu & Wacquant, 1992) in the educational context and beyond inform

what is known about which students have access to the resources deemed important by the college impact theorists and why. Finally, it is important to emphasize that, along with the rest of American society, colleges and universities reproduce and uphold racialized power dynamics that are rooted in white supremacy, and this impacts how Students of Color exist on campus and experience college. Thus, this study draws on the work of educational critical race theorists (Baber, 2016; Cabrera, 2018; Delgado et al., 2017; Dixson et al., 2016; Ladson-Billings & Tate, 2016) in order to understand how race and the experience of racism may moderate the extent to which poor and working-class students engage with faculty, as well as the magnitude of the resultant benefits.

Student-Faculty Interaction in Higher Education

In 1957 Phillip E. Jacob published a multi-institution study that sought to explore the non-academic effects of college, specifically how college-going influenced the development of liberal ideals and other values among undergraduate students (Jacob, 1957). While not exclusively a study of student-faculty interaction, Jacob's research did explore the role of faculty in students' character development; he noted that most students did not seem to have meaningful interactions or relationships with their instructors, but those who did reported benefits. He wrote, "…faculty influence appears more pronounced at institutions where associations between faculty and students are normal and frequent and students find teachers receptive to unhurried and relaxed conversations out of class" (Jacob, 1957, p.8). Over the last seven decades, scholars from a variety of disciplines, but especially those in higher education, have built upon Jacob's findings to contribute to an expansive body of literature on college-student faculty interaction. In the following sections, I define and describe common forms of interaction, the student characteristics and experiences that tend to facilitate this interaction, and the resultant benefits. The general

thrust of this corpus of work is that students' engagement with faculty results in generally positive outcomes. However, more recent scholarship has sought to address the specifics of *why* this activity is beneficial, the *magnitude* of the benefits, for *whom* exactly. In fact, there are a variety of challenges present in ascertaining the extent to which interacting with faculty is causally related to student outcomes. Specifically, if data is collected at a single time point, it is difficult to determine whether faculty interactions occurred before the outcomes being measured, especially in the absence of a meaningful pretest. Accordingly, the literature reviewed here falls across the spectrum of causality, with a few studies able to make causal inferences due to their data and design, while most are more limited in the assertions they are able to make. In discussing this literature, I use some causal language for ease of understanding but wish to acknowledge at the outset that causality in this body of literature exists on a continuum.

Types of Student-Faculty Interaction

In-Class Interactions

A large proportion of the research on student-faculty interaction has emphasized two main types of contact between students and faculty: in-class interactions and out of class interactions, sometimes referred to as "formal" and "informal" contact, respectively (Cole & Griffin, 2013; Mayhew et al., 2016; Pascarella, 1980; Pascarella & Terenzini, 1978, 2005). In-class or formal interactions occur, as the name suggests, within the confines of class time, occurring in the classroom, laboratory, studio spaces, or more recently the online portals in which students are completing coursework.

Students and faculty may interact more or less in class depending on largely on the pedagogical techniques used by the instructor, which often vary by academic discipline or medium of instruction. For example, using Holland's typology (see Smart et al., 2000), Umbach

(2006) found that faculty in investigative fields (e.g., biology, chemistry, physics), conventional fields (e.g., computer science, accounting), and enterprising fields (e.g., business, journalism) were much less likely than those in realistic (e.g., engineering), artistic (e.g., fine arts, philosophy, literature), and social (e.g., education, psychology) fields to report engaging in active and collaborative teaching techniques, including course discussions and seminars. In general, pedagogical choices have been shown to be important determinants of whether students engage with the faculty, the material, and each other (Chickering & Gamson, 1987; Ewell, 1997; Fassinger, 1995; Umbach & Wawrzynski, 2005).

However, small seminars are not the only way students and instructors interact in class. Even lecturing, sometimes understood to be a unidirectional transfer of information, can be interactive. Faculty can make an effort to call on students to engage them throughout the lecture and what faculty say and do during lectures sends students important "accessibility cues" (Cox et al., 2010; R. C. Wilson et al., 1974). These cues—which can include faculty's tone of voice, use of complex jargon, willingness to engage student's perspectives, the nature of faculty criticism— send students implicit and explicit messages about faculty's willingness and interest in interacting with students, and positive accessibility cues have been shown to portend further interaction between students and faculty (Cole & Griffin, 2013; Cox et al., 2010; Pascarella, 1980).

While in-class interactions between students and faculty are studied less frequently than interactions outside of class, they are no less important. Frequent course-related interactions have been shown to predict both social, academic, and practical skills gains among college students, as well as student persistence (Cole, 2008, 2010; Mayhew et al., 2008; Mayhew et al., 2016; Seifert et al., 2008; Umbach & Wawrzynski, 2005). Further, beyond the *frequency* of

interactions, the *quality* of in-class interactions is also important. That is, the extent to which students perceive instructors as effective, stimulating teachers in the classroom is linked to outcomes in academic skills, cognitive gains, and satisfaction (Cole, 2008; Cole & Griffin, 2013; Mayhew et al., 2008; Mayhew, et al., 2016). In-class interactions may be especially crucial for poor and working-class students (and poor and working-class Students of Color specifically) who have been shown to engage less with faculty than their wealthier peers in office hours, lab work, or elsewhere (Cole & Griffin, 2013; Collier & Morgan, 2008; Jack, 2019; Kim & Sax, 2009). Thus, as class time is *mandatory* for all students to attend, it remains an important environment that can be leveraged to build connections between students and faculty (Kuh et al., 2008). Additionally, more high-quality interactions *in-class* may also make students feel more comfortable engaging with faculty outside of class (Cotton & Wilson, 2005).

Out of Class Interactions

Early college impact research focused quite extensively on the special impact of interaction between students and faculty outside of lecture, lab, and discussion sections, often called "informal interaction" (Cole & Griffin, 2013; Kim & Sax, 2017; Pascarella, 1980; Pascarella et al., 1978; Pascarella & Terenzini, 1978). This research commonly explores the frequency and quality of students' interactions with faculty in office hours or informal discussions (academic and otherwise), special extra-curricular research projects, creative projects, and volunteer work. While the research from the 1970s and 1980s was especially focused on outcomes like GPA or persistence, contemporary scholars have explored how informal interactions may predict other outcomes like confidence, sense of belonging, civic engagement, and career goals (Cole & Griffin, 2013; Kim & Sax, 2017).

The expansion of the research exploring the effects of different kinds of informal interactions among students and faculty has produced a huge variety of studies on experiences ranging from office hours and informal chats, to undergraduate research experiences, to all kinds of mentoring, living-learning communities, and even conducting art or community service projects with faculty. Among the out-of-class interactions listed here, when students do engage with faculty outside of class, they most often attend office hours or strike up informal conversations with faculty (Chang, 2005; Fusani, 1994; Guerrero & Rod, 2013; Sax et al., 2005). These interactions may take a variety of tones and directions, but are often most impactful when they focus on students' coursework, academic skills, or career aspirations (Mayhew, et al., 2016; Pascarella et al., 1978; Pascarella, 1980). In fact, Guerrero and Rod (2013) found that even when controlling for GPA, major, and racial and class identities, every visit to office hours increased students' course grade .72%, a small effect but a potentially meaningful one if students visit office hours frequently.

Research experiences are another commonly-studied and especially meaningful form of out-of-class interaction. These experiences, largely in the bench sciences but in other fields as well, have been shown to be particularly important for the development of students' academic integration and confidence, as well as their educational and career aspirations (Cole & Griffin, 2013; Flowers, 2004; Hurtado et al., 2009, 2011; Kim & Sax, 2009; Kinkead, 2003; Lopatto, 2004; Sax et al., 2005). Given the generally positive effects of students working with faculty on research, this type of interaction is considered one of ten "high impact practices," or specific types of student engagement that consistently promote learning and development among students across backgrounds and contexts (Kuh, 2003; Mayhew, et al., 2016). Further, the benefits of this particular form of interaction have led researchers and organizations to invest in Research

Experiences for Undergraduate students (REUs), especially for Students of Color, low-income students, and others who have been historically underrepresented in the professoriate generally, or in certain fields like science, technology, engineering, and math (STEM) (Chang et al., 2014; Peifer, 2019).

Given the wide variety of interactions between students and faculty, scholars continue to explore the differences and distinctions between different kinds of in-class and out-of-class contact, and to do so in new ways. It is notable that the majority of early research on interactions between students and faculty, both in and out-of-class, were largely quantitative in nature and examined student experiences in the aggregate, rather than exploring differential rates of involvement among certain types of students or conditional effects based on gender, race, or other identities (Cole & Griffin, 2013; Kim & Sax, 2017). More recently, scholars have used more sophisticated quantitative methods and a variety of qualitative methods to better understand the climates and characteristics that induce students to interact with faculty formally and informally, and how the impact of this interaction differs by interaction type, quality, and across student characteristics. This more nuanced understanding has painted a less uniformly positive picture of student faculty interaction, but also a clearer one from which more specific implications for research, policy, and practice can be drawn (Mayhew, et al., 2016). In the following sections, I synthesize what is known about the variety of outcomes that have been associated with different kinds of student-faculty interaction, how these outcomes differ based on students' identities, and the individual characteristics, climates, and experiences that make students more or less likely to engage with faculty.

Documented Effects of Interacting with Faculty

While the above section established the various ways students and faculty interact in and out of the classroom, scholars have also been concerned with understanding the academic and social benefits associated with doing so. For example, over the past four decades, there is fairly ample evidence that suggests that the more time students spend with faculty, especially in their first year, the more likely they are to return to the institution the following year (Braxton et al., 2000; DeAngelo, 2014; Lillis, 2011; Mayhew, et al., 2016; Milem & Berger, 1997; Nora & Cabrera, 1996; Pascarella, 1980; Pascarella & Terenzini, 2005; Pike et al., 1997; Tinto, 2012). In addition to college persistence, researchers have also explored the impact of student-faculty interaction in predicting a variety of other important outcomes, including satisfaction with courses, majors, and the college experience more generally (Astin, 1999; Cotten & Wilson, 2006; Fusani, 1994), as well as belonging and integration on campus (Sax et al., 2005; Umbach, 2006; Umbach & Wawrzynski, 2005). Student-faculty interaction has also been linked to the development of students' values and goals (Chen & Chan, 2020; Kim & Sax, 2017; Riggers-Piehl & Sax, 2018; Sax et al., 2005), as well as degree and career aspirations (Anderson et al., 1995; Arredondo, 1995; Bjorklund et al., 2004; Flowers, 2004; Kim & Sax, 2009; Kuh & Hu, 2001; Lundberg, 2014; Sax et al., 2005). Yet, while the demonstrated effects of student-faculty interaction are wide-ranging, this study is focused on the extent to which engaging with faculty confers academic benefits to students, namely how such interactions predict cognitive skills. Given the important role of faculty in the academic domains of colleges and universities, a large body of evidence indicates interactions with faculty are particularly impactful when it comes to such academic outcomes.

Academic Benefits to Student-Faculty Interaction

Prior research has explored the role of faculty engagement on a host of academic outcomes. For example, there is evidence to suggest that frequent and meaningful interactions with faculty may play a role in college grades (Anderson et al., 1995; Cole, 2010a; Guerrero & Rod, 2013; Kim & Sax, 2009; Komarraju et al., 2010; Pascarella et al., 1978; Sax et al., 2005). Beyond modest increases to GPA, engaging with faculty has also been shown to influence more affective aspects, including students' academic self-concept, self-confidence, or motivation (Kim & Sax, 2014; Komarraju et al., 2010; Trolian et al., 2016). However, frequent interactions with faculty may also aid in the development of key academic skills that serve students throughout college and beyond.

Student-Faculty Interaction and Cognitive skills. Cognitive skills are some of the most important proficiencies developed and applied in both curricular and extra-curricular contexts (Billing, 2007; Kirschner et al., 2004). This study uses the term cognitive skills, but such skills go by a variety of names in the literature including "core skills", "transferrable skills", and "cognitive development" (Billing, 2007; Kim & Lundberg, 2016; Kim & Sax, 2009; Kirschner et al., 2004; Lundberg, 2014; Mayhew, et al., 2016). While the nomenclature for cognitive skills may differ by field or study, it is understood that this is a broader category that includes skills in critical thinking, writing, public speaking, teamwork, problem-solving, literacy, leadership skills (Billing, 2003; Billing, 2007; Kim & Lundberg, 2016; Kirschner et al., 2004; Lundberg, 2014). Pascarella and Terenzini (2005) highlighted the importance of developing critical thinking skills specifically while in college, noting (somewhat presciently in 2005) that processing information and ideas, analyzing and applying a wide variety of data and evidence effectively, and questioning arguments and assumptions thoughtfully are "…particularly important resource[s]

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for the individual in a society and world where factual knowledge is becoming obsolete at an accelerated rate" (p.114-115).

Undoubtably, students' development of cognitive skills is an important goal and expectation of colleges and universities. Given this importance, it is not surprising that much of the college experience is designed around improving students' critical thinking, problem-solving, and communication skills. Accordingly, prior research suggests there are a variety of personal characteristics, college environments, and experiences that positively predict the development of one or more cognitive skills while students are in college, including institution type and size, choice of major and extra-curricular activities, time spent reading and studying, undergraduate research, a variety of personal identities (e.g., race/ethnicity, class, transfer status, etc.), and of course students' cognitive skills when they arrive to college (see Pascarella & Terenzini, 2005 and Mayhew et al., 2016 for extensive reviews). However, for decades scholars have investigated the relationship between student-faculty interaction and the development of cognitive skills among undergraduates. The earliest work explored the out-of-class interactions between students and faculty and found that students who more frequently engaged with faculty informally did in fact score higher on assessments of their critical thinking skills (Chickering, 1972; Chickering & McCormick, 1973; Feldman & Newcomb, 1969). However, in his 1980 review of the then-contemporary research on informal interactions between students and faculty, Pascarella (1980) noted that many of these early studies did not account or control for students' traits and predispositions before college or upon starting, thus the impacts of faculty interaction (or any other independent variable for that matter) in these early studies may be overstated. Over the last 40 years, scholars have continued to investigate this relationship using more

sophisticated methods, representative samples, and differentiating between types of student-faculty interactions.

In-Class Interactions and Cognitive Skills. Generally, it has been found that even when controlling for incoming characteristics, in-classroom interactions with faculty have a salient impact on students' cognitive skills development (Cole, 2008; Kim & Lundberg, 2016; Lundberg, 2014; Mayhew, et al., 2016; Terenzini et al., 1996; Umbach & Wawrzynski, 2005). Namely, when faculty employ pedagogical strategies that allow for active learning and engagement in the classroom—such as stimulating discussion, hands-on projects, and giving meaningful feedback on assignments and ideas—students demonstrate greater development in problem-solving, critical thinking, and discipline-specific skills (Mayhew et al., 2016). Indeed, Umbach and Wawryzynski (2006) found similar patterns when they combined faculty reports of pedagogical practices and interactions with student data; when faculty reported using more active and collaborative learning techniques (e.g., group projects, class discussions/questions, seminars, etc.), students reported greater gains in social, academic, and practical development, including critical and analytic thinking (Umbach & Wawryzynski, 2006). Additionally, given the importance of interactive pedagogical practices, it is not surprising that students' academic major has been found to moderate the relationship between student-faculty interaction and students' self-reported cognitive gains; students in certain fields—likely those where departmental norms or even certain individual faculty members promote the use of engaging pedagogy—appear to experience more cognitive gains than others (Kim & Sax, 2011; Nelson Laird & Cruce, 2009).

Out-of-Class Interactions and Cognitive Skills. The role of experiences with faculty outside of class is less straightforward. Engaging with faculty in meaningful out-of-class activities like research projects has been shown to increase students' cognitive skills, critical thinking, and disciplinary

knowledge (Kim & Sax, 2009; Kim & Sax, 2011). However, interacting with faculty outside of class in office hours or other meetings has more mixed effects. Nelson Laird and Cruce (2006) found that the frequency of out-of-class conversations with faculty was so salient in the development of cognitive skills among both part-time and full-time college students, that increasing student-faculty interactions among part-time students may all but eliminate any observed differences in cognitive skills based on enrollment status. Yet, confoundingly, more engagement with faculty outside of class has also been found to be a *negative* predictor in cognitive skills development (Mayhew et al., 2016; Pike et al., 2012), while others have found that out-of-class interactions are not significant predictors in the development of students' cognitive skills at all (Terenzini et al., 1995; Umbach & Wawryzynski, 2006). Finally, it is worth noting that beyond the impact of the *frequency* with which students engage with faculty, satisfaction seems to be particularly impactful in predicting gains in students' self-reported cognitive skills, problem-solving, scientific reasoning, and career development (Lundberg & Schreiner, 2004; Eimers, 2001).

Thus, the weight of the literature suggests a generally significant and positive relationship between the frequency and quality of students' interactions with faculty and the development of their cognitive skills, however not without exception. It is likely that the apparently confounding findings are the result of qualitative differences in specific interactions (e.g., student-centered pedagogy, research with faculty, attending office hours) as well as the variety of ways scholars measure cognitive skills (e.g., different instruments, student self-reports, or emphasis on a specific skill like quantitative reasoning versus a more global construct of cognitive skills).

Conditional effects of Student-Faculty Interaction

Thus far the scholarship described here has focused on the *general* effects of student-faculty interaction; in other words, holding other independent variables constant among those in the sample, the effect of the impact of student-faculty interaction on the dependent variable (e.g., GPA, cognitive skills) in the aggregate. Understanding these general effects is critically important, as they provide insights about the general relationship between student-faculty interaction and a variety of outcomes. However, given that students' social identities (e.g., race/ethnicity, gender identity, social class, dis/ability, etc.) shape how they experience the world around them, and that there are broader social and cultural forces that privilege and marginalize certain identities (e.g., racism, sexism, classism) both on and off campus, it is not surprising that such identities have also been shown to *moderate* the effects of college experiences, leading to different outcomes based on student characteristics.

Further, while the earlier literature on college-impact was based on and suggested implications about a relatively homogenous college student population, the last several decades have seen an expansion of access to higher education that has resulted in a more diverse college-going population. Between 2000 and 2018 alone, enrollment rates for all 18- to 24-year-olds increased six percentage points from 35% to 41%. However, growth in the enrollment rates of all eligible Black students, Hispanic students, and American Indian/Alaska Native students outpaced that of white students, and women's enrollment continues to outpace men's across racial ethnic groups (Hussar et al., 2020). Thus, more recently scholars have called for and conducted more research that explores the *conditional* effects of college experiences (Cole & Griffin, 2013; Kim & Sax, 2017; Sax, 2008; Sax et al., 2005). In fact, student-faculty interaction is one example of a college experience that does seem to have differential effects on student outcomes based on students' identities. While scholars have looked at a variety of identity differences, this section

focuses on conditional effects of student-faculty interaction by race/ethnicity and social class, as this study aims to explore racial/ethnic variation in engaging with faculty among poor and working-class students.

Raced Effects of Faculty Interactions

In recent decades higher education scholars have placed more emphasis on understanding the college experiences of Students of Color and have used more sophisticated quantitative methods as well as qualitative methods to better understand how college impacts racially minoritized college students in ways that may be different from white students (Allen et al., 1991; Cole & Griffin, 2013; Hurtado et al., 1999; Museus et al., 2008; Perna, 2005; Turner et al., 1996). Accordingly, this body of research often compares the experiences of students in racial/ethnic subgroups or focuses specifically on a single racial/ethnic group. As a result the findings about the extent to which Students of Color the benefit from wide variety of college outcomes, including different kinds of student-faculty interactions, are uneven and at times confounding.

First, frequent in-class or course-related interactions seem to be most beneficial to the GPAs and cognitive skills among white, Asian, and Latinx students, but are often non-significant or even *negative* predictors of the academic achievement among Black/African American students (Anaya & Cole, 2001; Anderson et al., 1995; Cole, 2008, 2010a; Cole & Griffin, 2013; Kim & Lundberg, 2016; Kim & Sax, 2009; Lundberg & Schreiner, 2004). Notably, of the students who do see positive academic outcomes from their interactions with faculty, Asian American students seem to benefit the *least* from course-related student-faculty interaction, while white students often see the most benefit (Kim, 2010).

Some of these findings are likely explained by differences in the ways faculty—more than 70% of whom are white (U.S. Department of Education, 2019)—interact with Students of Color. For example, Students of Color are more likely than white students to report experiences of racism and other oppression on campus, both from peers and faculty (Allen et al., 1991; Brackett et al., 2006; Museus et al., 2008; Reynolds et al., 2010; Solorzano et al., 2000; Suarez-Balcazar et al., 2003). Accordingly, when Students of Color perceive that faculty seemed ambivalent about interacting with them or that their faculty were explicitly racist in their interactions, they reported lower levels of academic achievement (Anaya & Cole, 2001; Cole, 2007, 2008, 2010; Nora & Cabrera, 1996). For this reason, there is often a negative association between receiving feedback from faculty and academic achievement, especially among Black and Latinx students, despite having the opposite effect on their white peers (Anderson et al., 1995; Cole, 2010).

Yet more frequent *positive* interactions with faculty in and out of classes does seem to have a positive association with the academic outcomes of Students of Color. For example, using a nationwide sample of Black and Latinx students, Cole (2008) found that faculty support and encouragement were positive predictors of GPA even when controlling for a host of pre-college characteristics. Similarly, *satisfaction* with faculty interactions was the strongest predictor of Native American students' cognitive skills development, accounting for twice the amount of variance in cognitive skills as it did among white students (Lundberg & Schreiner, 2004).

Beyond just general encouragement and satisfying interactions, positive mentoring relationships are also frequently found to be strong positive predictors of academic achievement among Students of Color—especially Black students (Cole, 2010a, 2010b; Flowers, 2004). Such mentorship may occur in a variety of contexts, but research experiences with faculty have

frequently been found to be beneficial to the GPAs and critical thinking skills of Students of Color (Kim & Sax, 2009; Mayhew et al., 2016; Hurtado et al., 2011). However, a recent study by Park and colleagues (2020) suggests that Black students in STEM fields who interacted with faculty in research settings also reported more frequent experiences with racial discrimination with faculty. This finding adds to a body of work that highlights how the quotidian racism collegians of color encounter can be addressed in some ways by culturally responsive and anti-racist faculty and pedagogy (Charbeneau, 2015; Colbert, 2010; Kishimoto, 2018; Solorzano et al., 2000).

Classed Effects of Faculty Interactions

In addition to explorations of conditional effects based on race/ethnicity, also central to this study is understanding how social class and first-generation status moderate the benefits students enjoy from interacting with faculty. Notably, compared to studies of gender or racial/ethnic differences, research that explores class or generation differences is relatively limited. In fact, research on the benefits of student-faculty interaction among poor and working-class students in general is scant. Sax and Kim's (2009) analyses of almost 59,000 students in the University of California system revealed that poor and working-class students interacted with faculty significantly less than middle-class and wealthy students. Further, the relationship between course-related interactions on GPA was strongest for upper-class students (Kim & Sax, 2009). Additionally, doing research with faculty predicted GPA among students of all social classes, but most strongly for the wealthiest students in the sample; notably, research experiences were not a significant predictor of cognitive skills among lower-class students (Kim & Sax, 2009).

More recently, qualitative research has revealed additional insights. Among a sample of poor and working-class students attending an elite liberal arts college, many of whom were Black and Latinx, Jack (2019) found that poor and working-class students who attended private and college preparatory high schools interacted with faculty at rates and in ways that were more similar to wealthier and continuing-generation students than to poor and working-class students who attended public high schools. Conversely, poor and working-class students who attended public high schools described experiencing substantial anxiety around interacting with faculty, and often were unclear about how or why one should engage with their instructors (Jack, 2019). Thus, working-class students *do* develop beneficial relationships with faculty to the extent that someone (e.g., high school teachers and staff or college administrators and faculty) make clear the expectations and norms around interacting with their college instructors (Collier & Morgan, 2008; Jack, 2019; Longwell-Grice & Longwell-Grice, 2008; Soria, 2015).

Scholarship that uses first-generation status as a proxy for social class is somewhat more prevalent and provides additional insights. Notably, the role of faculty support in predicting academic outcomes among first-generation students is a bit confounding. Interacting with faculty more frequently in courses has been found to be a non-significant predictor of GPA among first-generation students, despite being a significant positive predictor of GPA among continuing generation students (Kim & Sax, 2009; Moschetti & Hudley, 2008). However, other evidence suggests that the *quality* of relationships may be particularly important, as supportive relationships are usually a positive predictor of GPA for both first-generation and continuing generation students, but significantly more so for first-generation students (Dika, 2012; Smith & Zhang, 2010).

Some of these confounding findings may be the result of the fact that many first-generation students are more likely than continuing-generation students to rely on faculty as "agents of socialization," who can facilitate the acculturation of students to the challenges and rhythms of collegiate academic life (Austin Smith, 2016; Collier & Morgan, 2008; Glass et al., 2017; Jack, 2019; Soria, 2015). This acculturation requires that faculty not only convey the course material, but also communicate insights about *how* to be a student in their course and in the college more generally. Additionally, this socialization to academic life via student-faculty interaction may the reason that more frequent and meaningful interactions with faculty often predict higher degree aspirations among first-generation students (Kuh et al., 2008; Moschetti & Hudley, 2008; Pike & Kuh, 2005; Smith & Zhang, 2010).

The present study seeks to build on these scholarly contributions to provide more nuance and clarity in the current understanding of poor and working-class students by using a nationwide sample of poor and working-class students who attend research universities. Further, while this chapter reviewed the racial/ethnic and classed conditional effects of student faculty interaction, scholarship on the extent of the benefits of student-faculty interaction based on other student characteristics exists. However, more needs to be done to better grasp the role of engaging with faculty based on disability (Hedrick et al., 2010; Patrick & Wessel, 2013), international student status (Glass et al., 2017; Wang & BrckaLorenz, 2018; Zhou & Cole, 2017), veteran's status (Alschuler & Yarab, 2018; Durdella & Kim, 2012; Kirchner, 2015), and other identities. In so doing, researchers may provide faculty, students, and administrators with important insights about students who have been and continue to be marginalized in higher education and society more broadly.

Predictors of Student-Faculty Interaction

Thus far, I have reviewed the effects and outcomes of interacting with faculty, however as the third research question of this study is concerned with the extent to which student-faculty interactions *mediate* the relationship between students' background characteristics and their self-rated cognitive skills, it is important to consider the types of conditions and characteristics that facilitate student interaction with faculty in and out of the classroom. The following section surveys what is known about what facilitates student-faculty interaction, beginning with more ecological factors (e.g., institution type, climate, major environments), and then explores what is known about the individual identities and student characteristics that predict students' engagement with faculty.

Institutional Variables & Campus Climate

Higher education scholars have investigated the ways in which different institution types affect the student experience and, thus, impact student outcomes. While it's generally understood that more proximal environments and experiences have a greater impact students and outcomes (Astin & antonio, 2012), there is evidence to suggest that institutional variables play a role in fostering student-faculty interactions. For example, in his review of the literature form 1960-1980, Pascarella (1980) noted that numerous studies suggested that as institutional size increased, informal interactions between students and faculty decreased. This finding has also been substantiated more recently as well (Cole, 2007; Umbach & Wawrzynski, 2005; Wang et al., 2015), which suggests that as the student-to-faculty ratio increases, students are less likely to meaningfully interact with faculty outside of class.

These findings on institutional size may explain, in part, why students at private institutions, and especially liberal arts colleges (both of which are typically smaller than research universities) are more likely than students who attend research universities or other institutional

types to engage with faculty in and out of class (Kuh, 2003; Pascarella et al., 2004; Umbach & Wawrzynski, 2005). More recently scholars have begun to purport that rates of student-faculty interactions are less a direct function of institution size or type, but rather that smaller institutions and liberal arts colleges prioritize student learning and development and thus do more to create a climate that promotes learning and development (Seifert et al., 2008). Such an explanation bodes well for other institution types, such as the research universities students in this study attend. If these institutions, or even schools and departments within them, work to create a "supportive psychological context" (as small liberal arts colleges do), they may not only see more frequent and meaningful student-faculty interactions, but all of the resultant benefits to students (Seifert et al., 2008). Minority serving institutions (MSIs) are an excellent example of the extent a positive campus context matters to student engagement with faculty and student outcomes more generally. MSIs range in size and type, but generally, students attending them experience more frequent and supportive interactions with faculty than students do at predominantly white institutions (Allen, 1992; Cole, 2007; Cole & Griffin, 2013; Flowers, 2004; Nelson Laird et al., 2007; Umbach, 2006). Further, MSI's may provide a more inclusive and less racist campus climate for Students of Color, which has also been shown to encourage faculty engagement and to result in academic benefits (Cole & Griffin, 2013; Cress, 2008; Lundberg, 2012; Saelua et al., 2017; Seifert et al., 2006).

In fact across institution types, *how* faculty communicate with students and how they are perceived by students is an important factor that affects the frequency and quality of their interactions with students. In 1974, Wilson and colleagues noted that students reported interacting more frequently out-of-class with faculty who seemed to communicate—in implicit or explicit ways while *in-class*—that they were interested in engaging with students. The most

salient of these "accessibility cues" in predicting out-of-class interactions with faculty centered around pedagogical choices that demonstrated an interest in the students—encouraging and participating in class discussion, or allowing students to draw from their own opinions and experiences in papers and other assignments (Wilson et al., 1974). Since then, scholars have repeatedly found that the way faculty engage with students in the classroom—both in terms of pedagogy, but also having an approachable and supportive disposition and simply learning students names—also makes it more likely that students will seek out faculty outside of class time (Cotten & Wilson, 2006; Cox et al., 2010; Eagan et al., 2012; Einarson & Clarkberg, 2004; Jack, 2019; Neville & Parker, 2019). Conversely, feeling bored in class, or feeling dismissed or patronized by faculty in class has been shown to decrease the likelihood that students interact with faculty (Cole, 2008; Collier & Morgan, 2008). Notably, poor and working-class students, especially those who are the first in their families to attend college, may be especially sensitive to faculty encouragement as well as faculty criticism. Given that these students are more likely than their wealthier peers to rely on faculty to both convey course material and serve as agents of socialization to the college context, faculty accessibility cues can be critical in initiating supportive relationships between faculty and poor and working-class students (Collier & Morgan, 2008; Jack, 2019; Soria, 2015).

Social Identities and Other Individual Characteristics

Beyond the broader contextual forces that have been found to induce or preclude student-faculty interaction, research has also explored the identities and personal characteristics of students that might make them more or less likely to engage with faculty. Rather than resulting in a singular uniform profile of the kind of student that interacts most with faculty, these findings

provide a nuanced understanding of how different identities and backgrounds may portend to more or less faculty interaction.

   Academic Background. First, and perhaps unsurprisingly, students with high GPAs and more frequent interactions or more supportive relationships with faculty *in high school* are often found to be more likely to cultivate relationships with faculty in college (Astin, 1997; Cole, 2007; Fuentes et al., 2014; Jack, 2019; Kim, 2010). However, it is important to understand this finding is not race or class neutral. Kim's (2010) research suggests that the relationship between GPA and faculty interaction is moderated by race/ethnicity, with this relationship being strongest among Black and Latinx students and weakest among Asian students. Further, students who attend persistently underfunded public K-12 schools—many of whom are Black, Latinx, Indigenous, and poor or working class due to the relationship between school demographics and racial and economic stratification of neighborhoods in the US—may not have positive relationships with teachers at school, if they have any relationships at all (Cherng, 2017; Jack, 2019; Longwell-Grice & Longwell-Grice, 2008). Accordingly, these students often arrive to college viewing faculty the same way they saw teachers throughout primary and secondary school: splenetic authority figures concerned with rule-enforcement and gatekeeping (Jack, 2019; Longwell-Grice & Longwell-Grice, 2008; Mullen, 2010; Soria, 2015) (Jack, 2019; Longwell-Grice & Longwell-Grice, 2008; Mullen, 2010; Soria, 2015). Relatedly, Jack's (2016, 2019) recent scholarship shows the importance of high school socialization. In his study of mostly Black and Latinx first-generation college students at a liberal arts college, he found that those who attended expensive preparatory schools through fellowship and scholarship programs interacted with faculty at similar rates and for similar reasons as their wealthier peers, while those who attended local public schools viewed faculty as "authority figures who should be

treated with deference and left unburdened by their questions and needs" (Jack, 2019, p. 82). Thus, how students understand the role of instructors throughout secondary school often affects how they will understand the role of faculty once in college. Further, these perceptions are often classed and raced, which suggests social identities may also portend to more or less frequent interaction with faculty.

Social Class Identity. Most relevant to this study is understanding what we know about how social class predicts engagement in interactions with faculty. Generally, most of the literature suggests that poor and working-class students do not interact as frequently with faculty as their wealthier peers, whether in or outside of class (Kim & Sax, 2009; Longwell-Grice & Longwell-Grice, 2008; Terenzini et al., 1996; Walpole, 2003, 2008). Some studies suggest that middle-class and wealthy students may be more comfortable interacting with faculty, both in-class and out, because they already have a higher baseline sense of belonging than poor and working-class students and because they understand the myriad ways faculty can facilitate their academic and social success (Jack, 2016, 2019; Soria, 2015; Stuber, 2011).

Further, poor and working-class students are more likely than their peers to work for pay at all, and often work more hours per week than wealthier peers, and they are more likely to have additional family responsibilities (Ardoin, 2018; Mullen, 2010; Soria, 2015; Walpole, 2003b). Thus, their more limited time and generally less awareness of the benefits of interacting with faculty may explain the reason why the existing literature suggests poor and working-class students do not frequently engage with faculty. Conversely, scholarship regarding students' interactions with faculty via research experiences suggests that poor and working-class students engage in research at similar rates as their wealthier peers and are actually more likely than students from other social classes to engage in research for pay (Kim & Sax, 2009; Walpole,

2003, 2008). Some of these findings may be explained by the prevalence of specialized programs like the McNair Scholars and other campus-based and national honors and fellowship programs aimed at preparing low-income and first-generation college students for graduate school and other high-status research careers.

Gender Identity. Research on the role of gender in predicting student faculty interaction indicates some key differences in both the extent and nature of how students interact with faculty across the gender identity spectrum. First, women-identified students generally report slightly more interactions with faculty than do students who identify as men and are often more satisfied with these interactions (Sax et al., 2005; Sax, 2008), but there are caveats. First, research suggests women more frequently interact with faculty via email or in office hours than do men, and that the bulk of these interactions center around the course at hand or are centered on emotional support (Cohen, 2018; Cole, 2007; Kim & Sax, 2009; Sax et al., 2005). Men, on the other hand, are more likely than women to interact with faculty in-class and are significantly more likely to challenge professors ideas or publicly push back on their instructors than women (Cole, 2007; Kim et al., 2009; Kim & Sax, 2009; Sax et al., 2005). Outside of class, men have been found to be significantly more likely than women to casually discuss ideas and projects, and men also more frequently engage in research with faculty than women (Kim & Sax, 2009). Beyond the gender binary, less is known about the frequency of interactions among gender queer, non-binary, transgender, and other students. Recent studies indicate that trans* and non-binary students engage with faculty at similar rates as their cisgender peers (BrckaLorenz et al., 2017; Greathouse et al., 2018). However, literature on these populations is scant and much of what exists aggregates students by gender identities and sexual orientations (e.g., all Lesbian,

Gay, Bisexual, Transgender+ (LGBT+) students), making more nuanced conclusions about students' with minoritized gender identities difficult to draw.

Racial/Ethnic Identity. The bulk of the literature suggests there are also racial/ethnic differences in the frequency of faculty interactions. First, as noted by Cole & Griffin (2013), with few exceptions, much of the scholarship on Students of Color and their engagement with faculty aggregates all students who did not identify as white together (Nora & Cabrera, 1996) or is focused on exploring/comparing rates of Black students' interactions with faculty specifically. Thus, from scholarship on Black students specifically, scholars have widely documented that Black students report some of highest rates of course-related student-faculty interaction, however they also report low levels of satisfaction with these interactions and frequent instances of racism and microaggressions from faculty (Cole & Griffin, 2013; Kim & Sax, 2011; Lundberg & Schreiner, 2004). Conversely, Asian American students report some of the lowest rates of interacting with faculty in class and informally, while they are more likely than students from other racial/ethnic subgroups to do volunteer or course-credited research activities (Kim et al., 2009; Kim & Sax, 2009). When compared to other racial/ethnic subgroups, Latinx students tend to fall somewhere in the middle, however a majority of their interactions are centered around discussing or asking questions about coursework or assignments (Kim & Sax, 2009; Anaya & Cole, 2001). However, while Cole (2007) found Latinx students were more likely than Black or Asian students to indicate experiencing academic mentorship from faculty, some studies have shown Latinx students participate specifically in research activities with faculty very infrequently and are significantly less likely than either white or Asian students to do so (Kim & Sax, 2009; Anaya & Cole, 2001). Further, it is important to note Stebleton and Aleixo's (2015) study that explored how Latinx students who were also undocumented built relationships with

faculty. Ultimately, they found that the fear of disclosing their status to faculty often precluded the development of meaningful relationships, and that anxiety about their lack of documentation also prevented them from getting involved in high impact practices with faculty including research experiences with faculty, study abroad, and others (Stebleton & Aleixo, 2015)

Finally, exploring interactions between race *and* gender has revealed some interesting patterns, both affirming and disconfirming the findings on gender and race separately. For example, Strayhorn and Saddler (2008) found that in a nationwide sample, Black men reported more frequent interpersonal and professional mentorship than did Black women. However, evidence suggests that Black women's were more likely to report positive relationships with faculty when they experienced positive in-class interactions (Williams & Johnson, 2019). Namely, receiving constructive written feedback on assignments and drafts and earning a high course grade were the strongest positive predictors of how Black women perceived the quality of their relationships with the faculty at their institution (Williams & Johnson, 2019). Beyond the fact that Women of Color on campus appear to benefit from supportive faculty interactions and mentorship that affirm their gender and racial identities (Carlone & Johnson, 2007; Gloria et al., 2005; Villaseñor et al., 2013), less is known about gender differences in engaging with faculty among Asian and Asian American, Pacific Islander, Latinx, Indigenous, and multiracial students.

Poor and Working-Class Students in U.S. Colleges and Universities

While the prior section reviewed the ample evidence that suggests faculty interactions play an important role in a variety of student outcomes and that poor and working-class students interact less frequently faculty than their wealthier peers, the next section seeks to discuss what is known more generally about poor and working-class college students, the population of interest for this study. Per the most recent available data, in the fall of 2018 almost 41% of all eligible

18-24-year-olds in the United States were enrolled in a degree-granting college or university (U.S. Department of Education, 2019a). Just 100 years ago this figure hung around 5%, as colleges and universities were still both few in number and accessible mostly to wealthy white men and some white women (Thelin, 2013). Thus, access to college for more than a very narrow sliver of the American public (especially access to the oldest and most elite private institutions) is a relatively new development, and broader access to college for poor and working-class students in particular is even more recent. Accordingly, how researchers, policymakers, faculty, and administrators talk about and operationalize social class has changed and evolved over time and across fields. The following section summarizes several ways that social class has been operationalized in higher education research.

Income-Based measures

One way that higher education researchers operationalize social class is by looking at self-reports or administrative data on student or family income, which often rely on students to report their total income on a survey instrument. Given that a majority of students attending public and private four-year colleges and universities are considered financially dependent upon parent(s) or guardians (Reichlin Cruse et al., 2018), most self-reported survey measures ask students about their family or household income. For example, The Freshman Survey, administered nationwide by the Higher Education Research Institute (HERI) asks, "What is your best estimate of your parents'/guardians' total income last year? Consider income from all sources before taxes," and provides 12 income brackets ranging from "Less than $15,000" to "$500,000 or higher" (Higher Education Research Institute [HERI], 2019).

While asking undergraduate students specifically about family income is a straightforward approach to assessing economic background, there is reason to question the

validity of student responses, as some researchers have found that a majority of undergraduate students do not know their family or household income and may misreport or skip such items all together (Jetten et al., 2008; Olivas, 1986; Rubin et al., 2014). In order to avoid non-response bias or other validity concerns in asking students to report income, it is also common to use self-reports or institutional registrar data on students' eligibility or receipt of a federal Pell Grant. Established in 1972, the federal Pell Grant is a need-based aid program that uses data on Expected Family Contribution, cost of attendance, and students' full/part-time student status collected from the Free Application for Federal Student Aid (FAFSA) to determine the amount of grant funding awarded, not to exceed $6,195 in 2019-2020 (US Department of Education, 2019). Receipt of a Pell Grant is a widely used proxy for low-income status since the most recent data (AY 2011-2012) suggests 65.7% of Pell Grant recipients at four-year institutions came from households earning $30,000 or less (Delisle, 2017). However, there are some well-documented limitations of using only Pell eligibility or receipt as a proxy for income as well. First, not all college-bound students apply for aid or fill out the FAFSA, and low-income students may be even less likely than wealthier students to do so. Data from a longitudinal federal study of a 2009 cohort of ninth-graders found that one-third of students from the lowest income quintile never completed the FAFSA, compared to about one-quarter of students from wealthier quintiles (Bahr et al., 2018). While students in the study reported a variety of reasons for not completing the FAFSA, one reason worth additional consideration is that students without social security numbers are not eligible for any federal student aid. Thus, studies that use only Pell Grant eligibility as a proxy for income may be missing low-income international, immigrant and undocumented students, among others who cannot or do not complete the FAFSA.

Parental Education and First-generation Status

Another way scholars have operationalized class identity is using parents' educational attainment as a proxy for both family income, as well as students' access to social and cultural capital around college-going. Unlike the income measures described above, students do tend to accurately know their parents' educational histories which leads to more reliable data (Soria, 2018), however determining who counts as "first-generation" is still contested (Bettencourt et al., 2020; Longwell-Grice & Longwell-Grice, 2008; Soria, 2018; Toutkoushian et al., 2019). Studies frequently use definitions of first-generation that require that neither parent attended any post-secondary schooling or that one or both parents may have attended *some* college but did not earn a credential (Bettencourt et al., 2020; Soria, 2018; Toutkoushian et al., 2019). However, the definitional variations in the research on first-generation status are such that it can be difficult to precisely interpret the salience of this category. Recent scholarship that explored differences among students who met a variety of definitions of first-generation found that regardless of definition, first-generation students were less likely than continuing generation students to graduate from both two- and four-year colleges (Toutkoushian et al., 2019). However, as parent education increased incrementally (e.g., in the number of parents completing or the amount of college completed), so too did the likelihood that students would graduate from a four-year college (Toutkoushian et al., 2019).

Yet, further challenges determining who is first-generation arise for both student participants and researchers when considering students who are older or are independents, students who live with guardians other than their parents, students whose parents were college educated outside of the United States, students whose parents/guardians may not have attended college but who have siblings who have, and so on. Additionally, Bettencourt and colleagues' (2020) recent qualitative work suggests that students whose parents did not complete college do

not conceptualize their "first-generation" status as an aspect of their personal identity at all. Rather, it was a category only applicable when on campus, and was most salient in spaces where students were reminded of their deficits (e.g., the financial aid office, attending summer bridge programs, etc.) (Bettencourt et al., 2020). Therefore, as a category, first-generation status highlights the liminality of social mobility via education; students are being defined by family histories that they have disrupted ostensibly through personal resilience, merit, and community support. And while more campuses are designing programming and initiatives to celebrate or address first-generation status, when taken alone as an index of social capital, the category ultimately fails to address the persistent social forces and policy failures that led to those family histories (e.g., racism, poverty, immigration, etc.) (Bettencourt et al., 2020; Goward, 2018).

Socioeconomic Status

The construct of socioeconomic status (SES) in social science research is also used to measure social class and is commonly operationalized as a combination of the two preceding measures described above (parent income, parent education) and an additional measure of occupational prestige (Rubin et al., 2014; Soria, 2018). Occupational prestige is measured through a variety of indices (see Soria, 2018 for review), that use scoring and classification schemas to rank the relative social status of position titles/responsibilities. Taken together, these three measures create a purportedly "objective" construct of socioeconomic status, but limitations remain. In addition to the validity concerns discussed around income and parental education levels above, Rubin and colleagues (2014) have noted that socioeconomic is largely determined by the characteristics of students' parents and guardians, and less about how students themselves experience and understand their reality. Further, and particularly salient amidst the ongoing global economic crisis in the wake of the COVID-19 pandemic, students'

socioeconomic status is often treated as a static fact, despite being subject to significant sudden

external shocks (Bettencourt et al., 2020; Nicola et al., 2020). Thus, while the whole of these

measures may be greater than the sum of each of its parts, there remain numerous aspects of

students' social realities that measures of socioeconomic status may miss. For this reason, this

study uses a measure of students' social class identity, described below.

Social Class Identity

While income, parental education, and socioeconomic status as described above are

generally understood to be objective and simple to measure, these discrete measures fail to fully

capture the multiplicity of social class and its far-reaching implications (Ardoin & martinez,

2019; Martin et al., 2018; Soria, 2018). Alternatively, measures of *social class identity* can be

used, which capture more than one's access to capital but also the social and cultural practices

around capital. While there is no set definition of social class identity, it is generally understood

to be the dynamic and relational personal identity category shaped by access to "…income,

wealth, power, educational attainment, social capital, and cultural capital" (Lathe, 2017, p. 3).

These various domains interact in meaningful ways that inform individuals' values, beliefs,

perceptions, as well as how they relate to other people, organizations, and institutions within the

broader capitalist system (Bettencourt, 2019, 2020; Lathe, 2017; Liu et al., 2004; Martin et al.,

2018; Soria, 2015, 2018). Thus, social class—like other socially-constructed identities (e.g., race,

gender)— is manifested through interactions with other individuals and with society, and these

interactions animate how one walks and talks, one's relationships with family, friends and

authority figures, how one dresses, one's goals and aspirations, and all kinds of other behaviors,

beliefs, and interactions.

Because of its more subjective nature, social class identity has found more frequent use among qualitative scholars working with participants who self-identify their social class categories, such as poor, working class, middle-class, and wealthy or other more nuanced categories (see as examples: Ardoin & martinez, 2019; Stuber, 2011; Jack, 2019). However, quantitative scholars have also begun to embrace measures of social class identity, sometimes creating composite measures from a wide variety of economic, identity, and experiential variables to estimate the multidimensions of class, or using student self-reports of class identities (Rubin et al., 2014, 2019; Soria, 2018).

This study is concerned with students who indicated they were poor or working-class on a self-reported measure of social class identity on a multi-institutional survey. In the aforementioned class hierarchy, poor and working-class students fall nearer to the bottom and thus have comparatively less access to material resources, as well as other forms of social and cultural capital valued by the middle- and upper-classes. They themselves and/or their parents may work in jobs that don't require a post-secondary credential, whether in lower-wage jobs in the service and care economies (sometimes called "pink collar" due to the preponderance of women in such jobs (Lips-Wiersma et al., 2016) or in traditionally "blue collar jobs" in labor or the skilled trades (Bettencourt, 2020; Hurst, 2012; Lips-Wiersma et al., 2016; Soria, 2015). However, as class identity informs so much of one's social reality, there are myriad other social and cultural markers of working-class identity beyond economic and vocational characteristics (Ardoin & martinez, 2019; Lubrano, 2003; Soria, 2018). Both the cultural and economic features of working-class identity become particularly salient on campus, as poor and working-class students are in the numeric and cultural minority in higher education, especially at non-profit four-year colleges and universities which were designed to be and remain soundly elite milieux

organized around the norms, preferences, and needs of wealthier students and their families (Barratt, 2012; Martin et al., 2018; Ostrove & Long, 2007; Soria, 2015; Thelin, 2013)

Yet social class is not the only important facet of identity that moderates students access to college and their experiences and outcomes once they arrive. To that end, it is necessary to recognize and investigate the diversity and variation *among* poor and working-class students. Often when scholars study students' social class identity, social class and any findings about it are treated as fixed across race/ethnicity, gender, immigration-status, and other important aspects of student identity. Yet, there is clear evidence that these domains of identity inform and reconstitute each other under broader systems of domination (e.g., white supremacy, sexism, xenophobia, etc.) (Collins, 2015; Crenshaw, 1991; Eidlin & McCarthy, 2020; Soria, 2015)—particularly when considering how social class, race/ethnicity, immigration status and citizenship, and other categories interact to inform patterns of access to quality K-12 education—the gateway to post-secondary education in the United States (Carnevale et al., 2019).

The following sections review what is known about the college experiences of poor and working-class college students, placing emphasis on the moderating role of other social identities when possible. While this study's focus is on self-identified poor and working-class students, given the wide variety of definitions and terms in use to operationalize social class in education research discussed above, I include scholarship that defines social class in multiple ways.

Higher Education Access and Outcomes of Poor and Working-Class College Students

Over the last several decades the bulk of the research on poor and working-class college students explores either their access to higher education or their achievement of outcomes of interest, most frequently college retention, completion, and their performance in the workforce. Scholars have likely focused on pathways to college and these important outcomes because

inequalities between poor and working-class students and their wealthier peers in these areas have been dramatic and persistent. While access to college has expanded over the last century, in 2017, 63% of high school graduates from the lowest income quartile enrolled in college compared to 87% of high school completers from the highest family income quartile (Cahalan et al., 2019). Yet, despite the fact that the gap in college enrollment has narrowed between the poorest and wealthiest students over the last five decades, inequities in access to college stubbornly remain (Cahalan et al., 2019; Oseguera & Hwang, 2014). Scholars have attributed these disparities to poor high school preparation (Berg, 2016; Cataldi et al., 2018; DeAngelo & Franke, 2016; Pratt et al., 2019) lack of family knowledge or value on pursuing postsecondary education (Covarrubias et al., 2019; Lightweis, 2014; McDonough, 1997; Stieha, 2010), poor and working-class students' comparatively modest career aspirations (Ardoin, 2017; Armstrong & Hamilton, 2013; Mullen, 2010; Raque-Bogdan & Lucas, 2016; Silver, 2020; Stuber, 2011), and challenges navigating the logistical and administrative hurdles to apply and ultimately enroll in colleges (Armstrong & Hamilton, 2013; Covarrubias et al., 2019; Kolluri, 2020; Soria, 2015; Spencer, 2020). Accordingly, when they do enroll, poor and working-class students are more likely to enroll in less selective institutions, and thus institutions serving more students with fewer resources. In 2016, 50% of students enrolled in public 2-year colleges and 61% of students enrolled in for-profit colleges were considered "in or near poverty" based on federal poverty thresholds, comparatively higher than the proportion of students in or near poverty enrolled in public four-year colleges (35%) or private four-year colleges (27%) (Pew Research Center, May 2019).

Concerningly, even when poor and working-class students *do* successfully access higher education, they are significantly more likely than wealthier students to leave college without a

credential, especially after their first or second year (Muraskin & Lee, 2004). Recent data from the 2012-2017 Beginning Post-secondary cohort suggests that just 25% of respondents in the 25th percentile of family income had completed a bachelor's degree, compared to 68.4% of those in the 75th percentile (U.S. Department of education, 2019). Notably, completion rates are even more dismal among low-income African Americans, Latinx students, and American Indian and Alaska Natives. Among Black students in the 25th percentile of family income, just 17% had earned a bachelor's degree in five years, while 21% of Latinx students and just 9.1% of American Indian/Alaska Native students did so (NCES, 2019). These poor completion rates are most frequently attributed to inadequate academic preparation, as well as to unmanageable costs and debt accumulation (Destin & Svoboda, 2018; Herzog, 2018; Jetten et al., 2008; Paulsen & John, 2002), and competing work and family responsibilities that consume students' time and energy that could otherwise be spent on schoolwork and campus activities (Covarrubias et al., 2019; Kolluri, 2020; Pascarella et al., 2004; Terenzini et al., 1996). To be sure, many studies have documented that poor and working-class students work more hours per week than their wealthier peers (Terenzini et al., 1996; Pascarella et al., 2004), and that they often have a wide array of family obligations to attend to in addition to their school and work responsibilities (Corrigan, 2003; Covarrubias et al., 2019; Kezar et al., 2014; Matus-Grossman & Gooden, 2002; Roksa & Kinsley, 2018; Wilson, 2016). In their study of first-generation Asian American and Latinx college students, Covarrubias and colleagues (2019) noted that 27 of the 34 participants noted one or more family roles their families relied upon them for, whether they lived at home or not, including providing emotional support, serving as a language translator, acting as a financial broker, caretaking for siblings, and providing financial support and advice. Further, given their many responsibilities on campus and off, it is not surprising that working-class students often

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report being overwhelmed as well as higher rates of depression, anxiety, and low sense of belonging, and lower sense of control when compared to middle-class and wealthy college students (Collier & Morgan, 2008; Spencer, 2020; Wilbur & Roscigno, 2016).

Poor and Working-Class Students on Campus

In addition to the more obvious familial and economic stressors, poor and working-class students face myriad barriers to their full participation and academic success on campus that also contribute to the longstanding inequitable outcomes. In fact, the nuances of *how* these students experience college are less well understood and may shed light on how institutions can actionably address the dismal rates of college completion among these students, in addition to other outcomes of higher education. Some scholars have suggested that poor and working-class college students experience a "culture clash" or "cultural mismatch" when they arrive to college campuses that are populated by middle-class and wealthy students and are thus built around norms, preferences, tastes favored by these students (Covarrubias et al., 2019; Lowery-Hart & Pacheco, 2011; Nguyen & Nguyen, 2020; Soria, 2015; Stephens et al., 2012; Stuber, 2011). This mismatch may be particularly stark for Students of Color attending predominantly white institutions (PWIs), and among poor and working-class students who did not attend elite college preparatory high schools (Jack, 2019; Mullen, 2010; Richardson & Skinner, 1992; Stephens et al., 2012; Stuber, 2011).

As summarized recently by Nguyen and Nguyen (2020), the crux of this mismatch often centers around working-class values of interdependence versus middle-class and elite values of independence. Thus, students who "…practice independent behaviors, such as speaking up to signal their opinions, demonstrating comfort with influencing their social settings, and acting based primarily on their personal motivations, as opposed to the consideration of others' desires"

(Nguyen & Nguyen, 2020, p. 226) are often more successful socially and academically (Stuber, 2011; Mullen, 2010). Thus, this mismatch combined with working-class students' lack of access to middle-class and elite cultural capital (i.e., the preferences, norms, values, practices, knowledge gleaned from family and other relationships (Bourdieu, 1977)), explains some of why poor and working-class students often spend less time engaging in activities favored by middle-class and elite students—and activities that are well-documented in research as being particularly beneficial—such as sorority and fraternity life, unpaid research experiences or internships, holding leadership positions in student organizations, or frequently engaging with faculty (Jack, 2019; Longwell-Grice & Longwell-Grice, 2008; Richardson & Skinner, 1992; Stephens et al., 2012; Stuber, 2011).

Conversely, poor and working-class students' value of interdependence and access to cultural capital may, to some extent, also explain choices poor and working-class students *do* make on campus. For example, there are well-documented patterns in the majors that working-class and first-generation students typically select, when compared to wealthier peers with college-educated parents. These differences may be explained both by the fact that "…students with greater levels of cultural capital will have a more extensive knowledge of the various offerings in the higher educational system and the range of possible occupational starting points," (Mullen, 2010, p. 159), and that poor and working-class students may need or desire to support their families and communities financially or otherwise (Boucher et al., 2017). Thus, while all students aim to be employable after college, working-class students tend to choose more applied and career-focused disciplines that will lead to stable employment upon graduation (in many cases, in helping professions like education and healthcare), while wealthier students often choose majors less tied to specific occupations and also show more interest in graduate

school (Armstrong & Hamilton, 2013; Bettencourt, 2019; Mullen, 2010; Pascarella et al., 2004; Walpole, 2008; Williams et al., 2005).

Further, cultural mismatch and variation in access to cultural capital may also affect poor and working-class students' comportment and performance in their courses and majors. Specifically, if such students are the first in their family to go to college and have not had the norms and organization of college courses made clear to them in high school, they may find navigating their coursework particularly puzzling (Collier & Morgan, 2008; Jack, 2019; Kolluri, 2020; McKay & Devlin, 2014; Scherer, 2018; Soria, 2015). For example, Kolluri's (2020) recent study of low-income first-generation Latinx college students in the University of California system found that these students struggled to adjust to the independent critical thinking and writing required in their college courses. In fact, a broad body of research suggests that participants in Kolluri's study were not alone. Low-income and first-generation college students often struggle with specific skills—such as knowing how to structure papers, what to focus on in readings, how to conduct research and find sources—as well as with broader issues like how to read syllabuses, the purpose of office hours, and the navigating other campus resources focused on academic support (Ardoin, 2018; Collier & Morgan, 2008; Jack, 2016, 2019; Kolluri, 2020; McKay & Devlin, 2014; Soria, 2015). Thus, the fact that poor and working-class students are unfamiliar with the content and structure of college courses, as well as what scholars call the "hidden curriculum" or "…the unstated norms, values and beliefs that are transmitted to students through the underlying structure of meaning in both the formal content as well as the social relations of school and classroom life," (Giroux & Penna, 1979, p. 22) explain some of the well-documented disparities between poor and working-class students and middle-class and wealthy students in GPA, academic engagement, and cognitive skills (Kolluri, 2020; Pike & Kuh, 2005;

Soria, 2015; Soria & Stebleton, 2013). Further, when they are struggling, poor and working-class students are often reticent to reach out to faculty or teaching assistants, less likely to negotiate grades or expectations (or to know that doing so is an option), and more likely to blame to themselves for academic challenges and struggles (Covarrubias et al., 2019; Jack, 2019; Longwell-Grice & Longwell-Grice, 2008; Scherer, 2018; Spencer, 2020).

The Role of Faculty in Poor and Working-Class Students' Success

Given poor and working-class students' relative unfamiliarity with the culture, norms, and expectations of college, faculty can play a particularly important role in clarifying the academic culture and making the hidden curriculum legible to these students. For example, poor and working-class students often feel empowered when faculty make an effort to carefully explain course syllabuses, walk students through how to structure an essay or exam response, provide clear rubrics or evaluation criteria for assignments, and explain new terms and abbreviations for campus offices and services (Ardoin, 2017, 2018; Austin Smith, 2016; Collier & Morgan, 2008; Jack, 2019; McKay & Devlin, 2014; Soria, 2015). Further, being thoughtful about using student-centered and culturally responsive pedagogy that allows students to explore and incorporate their personal histories social identities not only fosters student belonging and confidence, but has also been shown to positively impact course grades among students whose identities have been historically marginalized on campus, such as Students of Color and poor and working-class students (Ardoin, 2018; Colbert, 2010; Glass et al., 2017; Saelua et al., 2017). Finally, there is even evidence to suggest that the more first-generation students interact with faculty in class, the more likely they are to participate in other campus activities, demonstrating how faculty can serve as social connectors, helping students navigate campus and build networks (Glass et al., 2017). Outside the confines of the classroom, poor and working-class students may

especially benefit from faculty mentorship, as faculty can help with course-related questions or concerns, but can also normalize academic struggle, and connect students with campus and local resources (Ardoin, 2018; Bettencourt, 2019; Jack, 2019; Kezar et al., 2014; Scherer, 2018; Soria, 2015; Wang, 2012).

Theoretical Approaches to Understanding Poor and Working-Class College Students'
Interactions with College and University Faculty

The following section describes the three theoretical perspectives used in this study to understand what may induce poor and working-class students to interact with faculty and how that interaction may lead to academic benefits. I begin by summarizing the role of the college impact theories in explaining how college affects students, with an emphasis on Pascarella's (1985) general model of assessing change, which suggests that there are specific aspects of the campus environment that portend the academic, social, and emotional development that students experience while in college. Secondly, I rely on Bourdieu's (1977, 1986) forms of capital, which are frequently used to explain the social class inequities in access, experiences, and outcomes in society more broadly, but specifically in the college context. Finally, this study employs several of the tenets of critical race theory (CRT) in order to conceptualize the ways in which race/ethnicity overlap and inform how social class is experienced in campus and beyond. Namely, CRT underscores the prevalence and durability of racism in American society more generally and makes legible the ways colleges and universities themselves are racialized organizations and play an important role in perpetuating and normalizing racism and racial projects (Cabrera, 2018; Delgado et al., 2017; Ladson-Billings & Tate, 2016). Taken together, these theoretical perspectives inform the selection of variables and the relationships among them

in the hypothesized structural equation model I tested in this study and aided in the interpretation of results and subsequent implications.

Pascarella's General Model of Assessing Change

For the better part of the last century psychologists, sociologists, economists, and other social science researchers have studied college students in an effort to understand whether and how students change and evolve in beneficial ways while in college, and what kinds of identities, activities, and relationships portend such positive development. Notably, Astin's (1970) Input-Environment-Outcome framework provided a simple way in which scholars could conduct *longitudinal* analyses of change and development. By accounting for how students show up to campus ("Inputs"), a clearer understanding emerges of how the experiences students have in college ("Environments") affect various outcomes of interest. It is based on this framework, and the work of other psychologists and sociologists looking particularly at college drop-out (Spady, 1971; Tinto, (1975)) that Pascarella (1980) developed what he referred to as the "Conceptual Model for Research on Student-Faculty Informal Contact," which later evolved into the broader "General Model of Assessing Change" (Pascarella, 1980, 1985). In his longitudinal causal model, Pascarella aimed to expand on Astin's framework and provide the more specific categories of inputs and college experiences that research indicates matter most to cognitive outcomes of higher education. He also organized these categories to demonstrate the temporality of when they occur, and how certain characteristics and experiences inform and are related to each other both directly and indirectly. In doing so, his model is "…concerned with understanding the actual dynamics of college impact, rather than merely predicting what happens…" (Pascarella, 1985, p. 49).

In the model, students' background characteristics have a direct impact on cognitive development, and indirectly affect this development by way of almost every other domain. That is, Pascarella (1985) suggests that these identities and pre-college experiences shape the structural characteristics of institutions, as well as predict the extent of students' interactions with important "agents of socialization" on campus (e.g., faculty, peers, staff), determine other institutional environments and experiences in which students engage, and portend the effort students dedicate to their studies and activities. The only other blocks that directly impact cognitive development are interactions with faculty and peers and student effort.

In addition to predicting cognitive outcomes directly, Pascarella's (1985) model also suggests interactions with faculty predict the quality of student effort—a relationship hypothesized by Pascarella here and supported in the literature over the last several decades (Astin, 1999; Kim & Lundberg, 2016; Kuh & Hu, 2001; Trolian et al., 2016). The extent of students' effort also depends on other environmental variables and experiences. For example, students who work more than 20 hours per week off campus may not be able to dedicate as much effort in the academic and social responsibilities on campus, which may also explain why those who work many hours per week may also demonstrate less cognitive and learning development (Flowers, 2010; Terenzini et al., 1996).

Figure 2.1

Pascarella's (1985) General Causal Model for Assessing Change

Structural/ Organizational Characteristics of Institutions
- Enrollment
- Faculty-Student Ratio
- Selectivity
- Residential

Interactions with Agents of Socialization
- Faculty
- Peers

Learning and Cognitive Development

Student Background/ Pre-College Traits
- Aptitude
- Achievement
- Personality
- Aspiration
- Ethnicity

Institutional Environment

Quality of Student Effort

Note. Reproduced from Pascarella, E. T. (1985). College environmental influences on learning and cognitive development: A critical review and synthesis. *Higher Education: Handbook of Theory and Research*, *1*(1), 1–61.

Finally, while Pascarella included broader institutional characteristics and other institutional environments and experiences in the model, these blocks do not have a direct impact on cognitive development, and rather influence cognitive outcomes by way of the other variables in the model. This indicates that while these more contextual factors do have some effect on students, it is the characteristics and experience most proximal to students and the outcome at hand that likely have the greatest impact (Astin & antonio, 2012; Franklin, 1995; Weidman, 2006). Taken together, Pascarella's model provides a useful framework for understanding how various student characteristics and experiences relate to each other over time and within the specific context of colleges and universities to explain cognitive skills development—the

outcome of interest for this study. However, other theoretical contributions described below may be useful for understanding the specific experiences among poor and working-class students prior to college and on campus.

Bourdieu's Theory of Capital

Given the longstanding educational disparities observed between poor and working-class students and their wealthier peers, scholars have spent considerable time exploring the sources of inequalities in order to assist teachers, high schools, colleges and universities, policymakers, and others in narrowing the gaps in educational access, experiences, and attainment. Often, education and sociology researchers studying poor and working-class college students (as well as low-income college students or first-generation college students) have attributed the gaps in educational access, experiences, and attainment to differences in these students' access to capital, particularly social and cultural capital in addition to financial capital (Beattie & Thiele, 2016; Dika, 2012; Jack, 2019; Kolluri, 2020; McDonough, 1997; Moschetti & Hudley, 2008; Scherer, 2018; Soria & Stebleton, 2013; Stuber, 2011). To be sure, poor and working-class students and their families have relatively less access to money and material goods, which certainly explains part of their challenges in accessing high-quality K-12 education, engaging in college resume-building activities, paying to apply to colleges, consistently paying tuition and fees over several years, travelling back and forth to campus, and so on (Ardoin, 2017; Jack, 2019; Lillis & Tian, 2008; Paulsen & John, 2002; Soria, 2015). Yet Bourdieu's (1986) broader conceptualization of capital suggests that beyond having material assets and cash (economic capital), it is access to and accumulation of durable and persistent "embodied" and "objectified" forms of capital valued by social elites that also imbues an individual with social power and status. These other forms of capital—dubbed by Bourdieu as "cultural capital" and "social capital"—have a social value in

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their own right (despite being objectively "priceless") and can also be transformed or converted to economic capital when necessary (Bourdieu, 1986). Thus, based on Bourdieu's theory, poor and working-class students access to, experiences in, and outcomes from college are shaped by their access to economic capital, as well as their access to cultural and social capital valued by elite institutions.

According to Bourdieu (1986), there are three forms of cultural capital: embodied, objectified, and institutionalized, though embodied cultural capital is most germane to this study. Embodied cultural capital consists of the durable dispositions, practices, knowledge, vocabulary, skills and tastes of the dominant (often wealthier) classes (Bourdieu, 1986; Lareau & Weininger, 2003; McDonough, 1997). Like economic capital, embodied cultural capital can be transmitted, often passed from parents/guardians to their children, but it is also inculcated through "pedagogic action" (social and academic learning) that occurs in the formal educational system as well as in other institutions (e.g., churches, clubs, teams) (Bourdieu, 1986; Bourdieu & Passeron, 1990). Successfully navigating the college environment requires an incredible amount of cultural capital, from knowing about which residence halls to live in, to what kind of majors portend certain careers, to which social activities are the best "resumé builders", to the roll of one's academic advisor, and more (Armstrong & Hamilton, 2013; Jack, 2019; Mullen, 2010; Stuber, 2011; Williams et al., 2005). Yet as poor and working-class students are often the first in their families to attend college and may attend schools that do not coach them about the practical and cultural ins-and-outs of college life beyond academic preparation, much of this important information is unknown to them, despite being incredibly valuable (Jack, 2019; Soria, 2015; Stuber, 2011).

In this study I suggest that the act of interacting with faculty is itself a middle-class and elite practice that is rewarded by the institution, and thus is an important form of cultural capital (Stuber, 2011). Evidence suggests that middle-class and wealthy children as young as eight or nine years-old are encouraged implicitly and explicitly by their families to view teachers as resources to their learning, and thus it is expected that these children should be vocal and insistent about getting their needs met; conversely, poor and working-class children are more likely to be encouraged by their families to respect teachers as authority figures and to complete tasks independently (Calarco, 2018). Yet teachers (and the educational system more broadly) commonly reward the practices and preferences of these wealthier children with the time, attention, and resources they demand, further incentivizing this behavior throughout the educational pipeline, while their poor and working-class peers are more likely to struggle in isolation (Calarco, 2018; Jack, 2019; Longwell-Grice & Longwell-Grice, 2008).

Thus, once in college, poor and working-class children—especially those raised and schooled in predominantly poor and working-class communities—are less likely to interact with faculty and are more resistant to doing so, while their wealthier peers (or poor and working-class students who have been coached and trained by teachers and schools to self-advocate) have less concern doing so (Jack, 2019; Longwell-Grice & Longwell-Grice, 2008; Mullen, 2010). Accordingly, poor and working-class students are more likely to grapple with the academic and professional consequences of not interacting with faculty—losing out on mentorship, research positions, and professional references, which underscores the immense value of relationships with faculty.

Bourdieu referred to the inherent value of relationships like those students cultivate wuth faculty as "social capital," or "…the sum of the resources, actual or virtual, that accrue to an

individual or a group by virtue of possessing a durable network of more or less institutionalized relationships…" (Bourdieu & Wacquant, 1992, p. 119). That is, according to Bourdieu, building a network of relationships with a wide variety of individuals is not only an end in and of itself, but a means to accessing the power and resources those relationships afford (Bourdieu, 1986; Bourdieu & Wacquant, 1992). Therefore, students who develop relationships with faculty (especially full-time, tenure-track faculty), not only glean the psychosocial benefit of having a source of support, but have also forged connections with powerful social actors that can be leveraged for a wide array of academic and professional benefits from earning a better course grade, to research positions, to letters of recommendation, to knowledge of open positions. Faculty may be especially beneficial agents of socialization to poor and working-class college students, who may require more clarification of academic norms and expectations and who may be less aware of valuable opportunities and programs, such as research experiences or fellowships (Ardoin, 2018; Austin Smith, 2016; Collier & Morgan, 2008; Kezar et al., 2014; McKay & Devlin, 2014).

Yet, while Bourdieu's primary focus was on elucidating the ways class stratification determines inequitable access to social and cultural capital, his theory about the role of capital in social reproduction—developed in the context of twentieth century France—fails to account for the specific ways that other identities, specifically race and ethnicity, also impact the distribution of resources in the United States (McKnight & Chandler, 2012; Tichavakunda, 2019). Thus, this study also relies on critical race theory (CRT) discussed below, to clarify how race and racism interact with and reconstitute class and classism in ways that affect students' experiences with faculty and elsewhere on campus.

Critical Race Theory

The seeds of critical race theory were planted by legal scholars—among them Derrick Bell, Alan Freeman, Kimberlé Crenshaw, Mari Matsuda, and others—who were concerned about the slow pace with which civil rights statutes were being adopted, as well as the ways that civl rights legislation aimed at addressing racial inequality was being thwarted or overturned even when enacted (Delgado et al., 2017). Building on critical legal studies and critical social theories, these scholars sought to develop a new framework to understand and resist the persistence of racial inequality under the law. This framework, critical race theory (CRT), centers on several key tenets—racism is ordinary, interest convergence, race is socially constructed, racialization is differential and not fixed, intersectionality, centering the unique voices of color, racism as permanent, and whiteness functions as property (Delgado & Stefancic, 2017; Cabrera, 2018). In 1995, Ladson-Billings and Tate proposed a critical race theory of education, in an effort to explain that longstanding racial inequalities are "…a logical and predictable result of a racialized society in which discussions of race and racism continue to be muted and marginalized" (p. 11). In so doing, they encouraged an epistemological shift among education researchers, urging them to reexamine students' experiences and racialized patterns of inequality and outcomes, as well as to critically assess proposed educational reforms that fail to address systemic racism within schools, laws, funding structures, and more.

Solórzano and colleagues (2000; 1998; 1998) adapted five tenets of critical race theory in education, to which Cabrera (2018) recently added. These tenets are "The intercentricity of race and racism; the challenge to the dominant ideology; the commitment to social justice; the centrality of experiential knowledge; the interdisciplinary perspective; hegemony of Whiteness" (Cabrera, 2018, p. 224). Several of these tenets provide particularly useful framing of this study. First, the intercentricity of race and racism suggests that race and racism, along with other

intersecting forms of oppression such as classism, sexism xenophobia, ableism, and others are significant features in American social life. Accordingly, colleges and universities are not only classed settings, but racialized and ableist organizations, dating back to most institutions' establishment as elite finishing schools for clergy or land-owning white men (Wilder, 2014). Thus poor and working-class black women, for example, will experience multiple the interlocking oppressions that fundamentally reconstitute each other and result in a different set of social conditions than are experienced by poor and working-class white women or men on campus and elsewhere in the social world. In fact, scholars have explored the consequences of interlocking oppressions on campus (Duran et al., 2020; Gillborn, 2015; Hernández-Saca et al., 2018; Jack, 2019; Jang, 2018; Núñez, 2014). Kolluri's (2020) recent study of low-income, first-generation Latinx students attending a predominantly White university (PWI) found that students not only suffered the consequences of limited economic and cultural capital needed to navigate the campus and support themselves financially, but the added psychosocial effects of experiencing racism, racial microaggressions, and studying predominantly white/European curricula that erased or reduced the contributions of People of Color were particularly deleterious to these students as well.

Further—given that roughly three-fourths of college faculty are white—poor and working-class Students of Color must also negotiate classed and racialized power dynamics (at a minimum) in order to engage with faculty, often resulting in racist and classist interactions. This complex reality may explain the persistent findings in the higher education research that suggest Black students in particular interact with faculty more often that students in any other racial group, but confoundingly do not experience the academic and social benefits seen when students

from other races frequently interact with faculty (Cole, 2007, 2010b; Cole & Griffin, 2013; Kim & Lundberg, 2016).

Additionally, this study seeks to challenge the dominant race-neutral and meritocratic ideologies that permeate throughout higher education. Informed by Bourdieu and CRT, I understand colleges and universities as inherently classist and racist organizations that exist to reproduce and legitimate existing raced and classed power dynamics (Baber, 2016; Chang et al., 2003; Harper & Hurtado, 2007; McCoy & Rodricks, 2015; Nora & Cabrera, 1996; Patton, 2016; Solorzano et al., 2000). Thus, who is given access to college and who succeeds there is less a function of color-evasive meritocracy, and is instead, deeply linked to one's access to wealth and whiteness (Chang et al., 2003; McCoy & Rodricks, 2015; Patton, 2016). Therefore, this study sought to move beyond simply reporting unidimensional racial and class differences in educational outcomes, and instead focuses on how we can better understand variation among poor and working-class students in ways that can mobilize scholars, administrators, and policymakers to improve these students' lives.

Finally, I conceptualized this study based on the premise that college campuses and other social institutions are also situated in a broader system of Hegemonic Whiteness that obfuscates the racialized power structure, while giving social meaning to racial categories, and necessitating racial inequalities (Cabrera, 2018). Specifically, "Within the superstructure of White supremacy, Whiteness is attributed value as a privileged, dominant, and frequently invisible social identity. Cultural and discursive practices (hegemonic Whiteness) serve to naturalize unequal social relations along the color line" (Cabrera, 2018, 223). The features of hegemonic whiteness explain, in part, why much of the existing research on class in higher education that seeks to "control for" race, is limited to research on white students (Longwell-Grice & Longwell-Grice,

2008; Mullen, 2010; Stuber, 2011). In these studies whiteness is taken-for-granted as a neutral category, and when held constant, the "true essence" of the role of class is presupposed to emerge. This study seeks to address the unique effects of racial variation among poor and working-class students, and how this variation may alter the relationships between students' identities, pre-college characteristics, interactions with faculty, and the benefits thereof.

Summary of The Literature and Theory

This chapter reviewed the literature on student-faculty interaction and poor and working-class college students in an effort to highlight what is known about poor and working-class students' experiences with faculty and what remains unknown. While the scholarship suggests that student-faculty interaction has a generally positive impact on college students, the majority of this work is conducted on national samples that may obfuscate the ways in which students with identities that have been historically marginalized on campus (e.g. identifying as Asian or Asian American, Black, Indigenous, Latinx, Pacific Islander, poor and working-class, having disabilities, etc.) experience faculty interactions. Further, even the scholarship that does explore how identity moderates the experience of interacting with faculty often considers a single domain of identity (race/ethnicity, gender, class), despite the fact that students' multiple identities coalesce to shape their interactions and experiences on campus. This is particularly common in the research that focuses on poor and working-class students, which is frequently limited to the experiences of white students or flattens racial/ethnic variation and looks at poor and working-class students with no mention or reference to race/ethnicity or other social identities.

This study sought to address these gaps in the literature by using structural equation modeling to explore what types of identities and experiences make poor and working-class

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students more or less likely to interact with faculty, as well as the relationship between student-faculty interaction and the cognitive skills of poor and working-class college students. Lastly, I aimed to explore how racial/ethnic identities moderate the relationships between these variables in an effort to better understand the influence of students' social class, racial/ethnic, gender, and other identities on their academic achievement. To do so, I have brought together three different theories, Pascarella's (1980) general model for assessing change, Bourdieu's (1986) forms of capital, and critical race theory to understand how college affects students and how student identities affect the college experience. This theoretical framework guides several aspects of the study's methodology, described in the following chapter, including the hypothesized model which will be tested using structural equation modeling on a multi-institutional sample of poor and working-class students attending research universities.

CHAPTER THREE: METHODOLOGY

The purpose of this study was to explore the social identities and experiences that lead poor and working-class college students to interact with faculty, whether and how these interactions play a role in academic achievement, and if the relationships between these variables differ among poor and working-class students by race and ethnicity. Therefore, I employed descriptive analyses and structural equation modeling (SEM) to test a model of variables based on the theoretical framework described in the previous chapter using the Student Experience in the Research University (SERU) Survey. Specifically, this study was guided by three research questions:

1. How frequently do poor and working-class respondents report engaging with faculty (e.g. participating with faculty in-class, communicating with an instructor outside of class, working with faculty outside of class on research, accessing letters of recommendation)?

   a. Are there gender, racial/ethnic, or academic differences in the frequencies with which poor and working-class students report different types of academic interaction with faculty?

2. Among poor and working-class college students, what are the social identities and characteristics that portend to student-faculty interaction and to what extent does student-faculty interaction mediate the relationship between (a) student background characteristics and academic experiences and (b) self-rated cognitive skills?

3. To what extent and how does race/ethnicity moderate the relationships between other demographic characteristics, student-faculty interaction, campus climate, and self-reported cognitive gains among working-class college students?

Data Source and Sample

2018 Student Experience in the Research University Survey

In order to address the three research questions above, this study used the 2018 Student Experience in the Research University (SERU) survey. The SERU Project is housed at the University of California-Berkeley's Center for Studies in Higher Education, the organization that, in 200,1 developed University of California Undergraduate Experience Survey (UCUES) to collect information from students in the UC system (Center for Studies in Higher Education, n.d.). In 2008, UC researchers invited additional research universities to form a consortium and distribute a similar instrument to their students in an effort to increase sample size and foster cross-institutional learning and policy development (Center for Studies in Higher Education, n.d.). Since then, the number of participating research institutions has grown to include nearly 30 research-intensive universities nationwide. Some administer the SERU survey annually, while other institutions do so bi-annually or every three years. Among the schools participating in a given year, the instrument is distributed online to all enrolled undergraduates at the institution and is designed to measure a wide variety of student demographic characteristics, academic experiences, involvement in extra-curricular activities, and skill development, as well as new special interest modules each year.

This study used the 2018 administration of the survey, which was distributed to all enrolled undergraduates at 19 research universities in the United States, which are listed below in Table 3.1. Institutional researchers at each campus coordinated their own survey administrations, which occurred in the early spring 2018 and remained open throughout the spring semester. At each participating institution, students were not required to complete the survey, but most institutions incentivized participation with gift cards, cash transfers, coupons to campus services,

giveaways for technology and other items. Across the 19 SERU institutions, the average

response rate was 27.4% (ranging from 9.7% to 39%),[1] resulting in 118,552 respondents. Where

specific respondents attended college was anonymized in the dataset, however analyses indicated

that no single institution represented more than 13% of the overall sample, with a range of 1.3%

to 13%.

Table 3.1. Institutions Participating in the 2018 SERU Survey

Institutions	2018 Undergraduate Enrollment
Michigan State University	39,423
Purdue University	33,735
Rutgers University	36,039
University of California, Berkeley	30,853
University of California, Davis	30,718
University of California, Irvine	29,736
University of California, Los Angeles	31,577
University of California, Merced	7,881
University of California, Riverside	20,581
University of California, San Diego	30,285
University of California, Santa Barbara	23,070
University of California, Santa Cruz	17,792
University of Iowa	23,989
University of Michigan	30,318
University of Minnesota	34,437
University of Oregon	19,101
University of Pittsburgh	19,330
University of Texas at Austin	40,804
University of Virginia	16,777

Note. Enrollment data from the National Center for Education Statistics: https://nces.ed.gov/globallocator/

Participants

As this study was concerned with the role of student-faculty interaction in the academic

achievement of poor and working-class students, specifically, I narrowed the sample of 2018

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[1]Ideally, I would report institutional response rates and proportions of institutional representation across the sample, however the Center for Studies in Higher Education's data use policy prevents the distribution of data linked to specific institutions

SERU Survey respondents based on self-reported social class identity. The survey asked students "Which best describes your social class growing up?" and allowed them to select from five choices: "Low-income or poor", "Working-class", "Middle class", "Upper-middle or professional-middle class", or "Wealthy." For the purposes of this study, I used responses from students who indicated they were "Low-income or poor" (n=11,915) or "Working-class" (n=18,774). Given the salience of race/ethnicity to this analysis, I also further restricted the sample to include only poor and working-class respondents who reported a race or ethnicity. Based on these criteria, I had an analytic sample of N=30,689 for descriptive analyses.

I further reduced the analytic sample for the structural equation models by removing participants who did not indicate a gender or who indicated they were "non-binary or gender queer," as small sample sizes precluded inferential analyses on this population. I also removed students who did not report their class-standing and *Mplus* removed 3 cases who did not respond to any of the items included in the analysis. To avoid further reduction in sample size, I used multiple imputation procedures in SPSS 26 to impute missing values on the exogenous variables that had any missing data: academic major (17% missing), distance lived from campus (.5% missing), and hours per week spent working (3.6 % missing)[2]. This resulted in a final inferential analytic sample size of N=29,816.

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[2] Multiple imputation is understood to be the most robust means to address missing data. The procedure uses complete responses in the dataset as predictors to estimate a value for each missing cell multiple times and then averages across these imputations, resulting in a "pooled" estimate of each value. This pooling across imputations corrects for biased estimates in the missing values (Azur et al., 2011; Carpenter & Kenwood, 2012). Thus, to conduct multiple imputation, I used every other variable in the model as predictor variables for each missing value and ran 20 imputations which were then pooled. These pooled estimates were used in analysis.

Additional information about the poor and working-class respondents of the SERU

survey can be found below in Table 3.2. As shown, a majority of the analytic sample for this

study identified as women or transwomen. Approximately 39% of the sample indicated a

Hispanic or Latinx ethnicity, while another 28.9% were Asian American, and 25.7% were white.

Black students comprised 4.9% of the sample, while 0.2% of the sample were Native

American/Native Alaskan students, 0.3% are Pacific Islander, and 1.2% were multiracial.

Regarding parent education, 47.3% of poor and working-class respondents indicated that neither

parent attended any college, and 77% reported having received a Pell grant at some point during

college. Respondents were most commonly science, technology, engineering, math and health

(STEM-H) majors (47.5%) or social science majors (33.3%).

Table 3.2. Selected Characteristics of Poor and Working-Class Students (N = 30,689)

	Percent
Gender Identity	
Man/Transman	33.4
Woman/Transwoman	64.1
Genderqueer/Non-Binary	0.2
Race/Ethnicity	
Asian American	28.9
Black/African American	4.9
Hispanic/Latinx, all races	38.7
Native American or Alaska Native	0.2
Pacific Islander	0.3
White	25.7
Multiracial (two or more races, non-Hispanic)	1.3
Parent Education	
Neither parent attended any college	47.3
One or more parent(s) attended some college	25.6
One or more parent(s) earned a four-year degree	19.5
One or more parent(s) earned an advanced degree	7.6
Students in the U.S. on a visa or temporary basis	0.8

Students who have ever received a Pell grant	77.1
Mean Hours Per Week Spent Working for Pay	10.5
Major	
Arts or Humanities Major	12.0
Business or Professional Major	7.2
Science, Technology, Engineering, Math, or Health field Major	47.5
Social Science Major	33.3

Hypothesized Model

The following section describes the hypothesized model I developed based on the literature and theoretical frameworks described in the previous chapter. The hypothesized model is shown below in Figure 3.1. Based on the existing literature, this model suggests that poor and working-class students' identities, academic backgrounds, and other characteristics are related to the frequency with which students interact with faculty, and that this faculty interaction mediates the relationship between student characteristics and their cognitive skills.

As shown in Figure 3.1, the model indicates that students' gender identity, racial/ethnic identity, citizenship, and first-generation status are associated with the extent with which students interact with faculty, and these interactions with faculty are linked to higher self-evaluations of their cognitive skills (Kim & Lundberg, 2016; Nelson Laird & Cruce, 2009; Umbach & Wawrzynski, 2005). Specifically, prior research has suggested women interact with faculty slightly more frequently than do men, especially informally (Sax et al., 2005; Sax, 2008). Racial/ethnic differences found in prior research would suggest that Black students interact with faculty more frequently than students from any other racial/ethnic group, while Asian American students often report the lowest rates of student-faculty (Cole & Griffin, 2013; Kim et al., 2009;

Kim & Sax, 2011; Lundberg & Schreiner, 2004). The model also hypothesized that class standing is associated with student faculty interaction, as prior work suggests students who are more advanced in college (i.e. third-year students and beyond) may be more likely to interact with faculty (Kuh & Hu, 2001). I also included direct paths from gender, race/ethnicity, and class standing variables to students' self-rated cognitive skills. These direct paths serve two functions: first, they allow be to control for any significant associations between student identities and their self-rated cognitive skills, while also making it possible to interpret the mediating effect of student faculty interaction on the relationship between these social identities and students' cognitive skills.

Figure 3.1. Hypothesized Conceptual Model
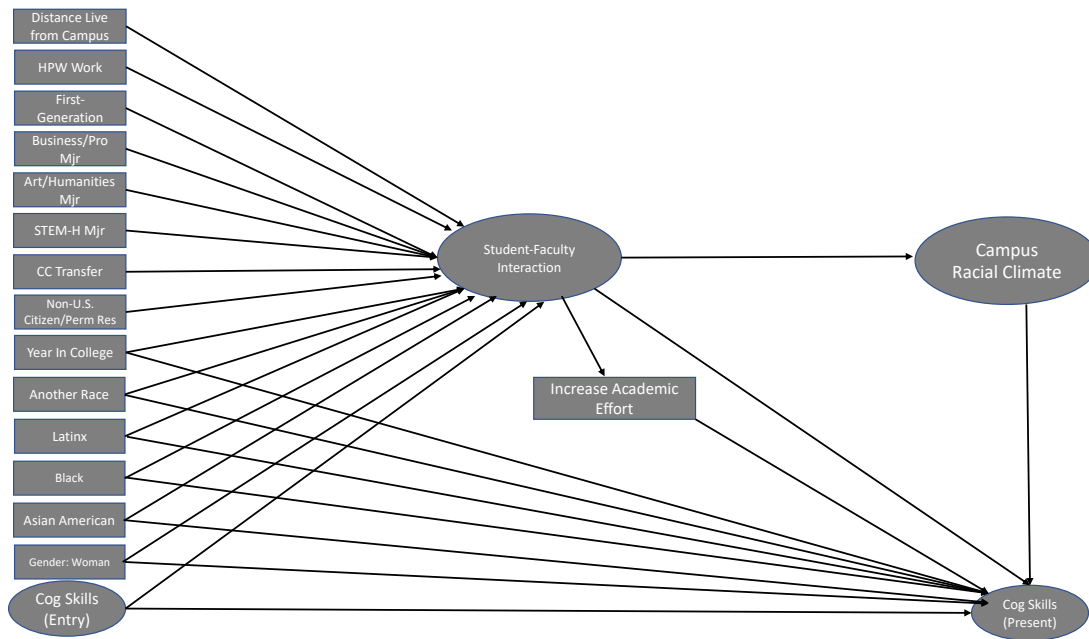
In terms of other characteristics, prior research also suggests that first-generation students interact with faculty less frequently than continuing generation peers, a relationship often

explained by disparities in cultural capital among these students (Kim & Sax, 2009; Pike & Kuh, 2005). Similarly, international students also interact with faculty less often than their domestic peers due to a host of language and cultural barriers (Glass et al., 2017; Wang & BrckaLorenz, 2018; Zhou & Cole, 2017). Conversely, evidence on transfer students' interactions with faculty is mixed, as some have found transfer students may interact with faculty more frequently due to their awareness and experience interacting with faculty and staff in order to facilitate transferring from college to college (Moser, 2013), while others have found transfer students interact with faculty less frequently than first-time students (Zilvinskis & Dumford, 2018).

Further, this conceptual model proposes that the hours per week working or distance students live from campus may also be associated with how frequently they are able to interact with faculty (Graham et al., 2018; Pike et al., 2008; Wood & Ireland, 2014). Additionally, I hypothesized that a proxy pre-test measure of students' cognitive skills when they arrived at college, which is based on their retrospective self-assessment, is related to their current self-assessed cognitive skills directly and indirectly via student-faculty interaction. Lastly, given that there is some evidence that students in different major fields interact with faculty at different rates and in different ways (Fusani, 1994; Kim & Sax, 2011; Umbach, 2006), this model suggests a direct relationship between academic major and student-faculty interaction.

While the model suggests a variety of characteristics portend to more or less student-faculty interaction, it also hypothesized that student-faculty interaction has direct relationships with three variables, as well as two mediated relationships with the final dependent variable, self-rated cognitive skills. First, the model hypothesizes that more frequent student-faculty interaction has a direct relationship with self-rated cognitive skills, as, generally, more frequent student-faculty interaction has been linked to greater academic achievement in the literature (though not

without exception) (Billing, 2007; Kim & Lundberg, 2016; Kirschner et al., 2004; Lundberg, 2014; Mayhew et al., 2016; Pascarella & Terenzini, 2005). However, student-faculty interaction may also affect students' self-rated cognitive skills by way of increased student effort. That is, as Pascarella (1980) and others suggest, more frequent student-faculty interactions are correlated with students' dedicating an increased amount of academic effort (e.g., time, energy, and focus), which college impact scholars emphasize as a critical component to academic success (Astin, 1999; Kim & Lundberg, 2016; Kuh & Hu, 2001; Trolian et al., 2016). Secondly, many scholars have found a relationship between more frequent student-faculty interaction and a more positive assessment of the campus climate for diversity (Cress, 2008; Kim et al., 2018; Parker & Trolian, 2019), and that more positive evaluations of the campus climate are linked to more positive academic and social outcomes for all students, but especially students who have been historically minoritized due to their race/ethnicity (Harper & Hurtado, 2007; Hurtado et al., 1999; Kim et al., 2018; Milem, 2001; Museus et al., 2008).

Thus, the hypothesized model seeks to explore the *mediating role* of student-faculty interactions between students' experiences, perceptions, and identities and the development of their self-rated cognitive skills, while considering the role of other outcomes of student-faculty interaction and predictors of cognitive gains, such as campus racial climate and academic effort. The following section describes the specific observed and latent from the 2018 SERU Survey that I used to operationalize the hypothesized model.

Measures

This study used a variety of variables that captured different aspects of student-faculty interaction to understand rates of participation among poor and working-class students, as well as other latent and observed variables to test the hypothesized structural model. The following

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sections describe these measures in further detail. Note that as confirmatory factor analysis is the first step in structural equation modeling with latent variables, Cronbach's alpha and factor loadings are reported for each sample with the rest of the results in Chapter Four. Also, a complete listing of all measures and their coding schemes can be found in Table 3.3.

Cognitive Skills

Pascarella's (1985) model hypothesizes the various background characteristics and environmental aspects that are directly and indirectly related to students learning and cognitive development. As such, the final dependent variable the structural equation model tested in this study is a latent measure representing students' self-reported cognitive skills. This measure of students' learning and achievement has been used previously in studies that used the SERU or UCUES data (Kim & Lundberg, 2016; Kim & Sax, 2011), and is based on three items that capture students' self-assessed *current* abilities around critical thinking, reading, and writing. In addition, students were also asked to rate themselves in these areas *when they started* at their current institution. Thus, I was able to develop a proxy pre-test of students' self-rated cognitive skills based on this retrospective assessment, which I used as an exogenous variable in the model along with other control variables.

On the survey, students were asked, "Please rate your level of proficiency in the following areas when you started at this campus and now." Respondents evaluated themselves across several areas, though the items included in the cognitive skills latent measures used in this study were: "Analytical and critical thinking skills," "Ability to be clear and effective when writing;" and "Ability to read and comprehend academic material."

Social Identities and Background Characteristics

Pascarella's (1985) general model of change suggests that student background and pre-college traits are both directly and indirectly linked to their interactions with agents of socialization (e.g., faculty) and their learning and cognitive development. Thus, I used several measures of students' social identities and background characteristics in the descriptive and inferential portions of the study. First, student gender was based on self-reports, with respondents able to indicate whether they identified as men, women, transmen, transwomen, or nonbinary/genderqueer. I aggregated men and transmen into a broader "men" category and women and transwomen into an inclusive "woman" category and included students who indicated another gender identity in the third nonbinary/genderqueer category.

The race/ethnicity data in the SERU dataset was provided by institutions and used the federal racial/ethnic categories required by the Integrated Postsecondary Data Systems (IPEDS) wherein Hispanic/Latinx is an ethnicity separate from the other five main race groups. Per federal guidelines, any student who indicated a Hispanic/Latinx ethnicity was coded as such, regardless of having also listed another race. Thus, though I may refer to students by racial group only for brevity (e.g. "Black students"), students in each race category are also non-Hispanic. Also, multiracial students are those who indicated one or more of race group, and are thus multiracial, non-Hispanic.

Students' first-generation status was based on a single measure that asked students "Which best describes the educational experience of your parents/guardians?", to which they could respond: "Neither parent/guardian attended any college," "One or both parents/guardians attended some college, but neither has a four-year degree," "One parent/guardian has a four year degree", "Both parents/guardians have a four-year degree," "One parent/guardian has a graduate professional degree," or finally "Both parents/guardians have a graduate or professional degree."

While there are a host of ways researchers have previously operationalized first-generation status (Toutkoushian et al, 2019), I elected to use the most conservative definition, designating only students who said neither parent or guardian attended any college as first-generation college students.

To operationalize year in college (sometimes referred to as class standing), I relied on two variables. The first asked students' the term they first entered the institution (i.e., fall, winter, spring, summer) and then the year of the term they first entered. Given that the survey was administered in the spring of 2018, students who indicated their first term was summer/fall 2017 or winter/spring 2018 were considered first-year students; if their first term was summer/fall 2016 or winter/spring 2017 they were coded as second-year students; if their first term was summer/fall 2015 or winter/spring 2016 they were coded as third-year students; if their first term was summer/fall 2014 or winter/spring 2015 they were considered fourth-year students, and so on. I used this coding scheme to create a seven-point class standing variable where 1= "First-year" to 7= "Seventh-year or beyond." Relatedly, students' transfer status was added to the student survey data by each institution. Each student in the dataset was coded either as "Freshman entrant" (or a first-time college enrollee), or "Transfer." In the model, transfer students were coded as 1 in reference to first-time enrollees who were coded as 0.

I created the four student-major categories based on student reports of their major and the accompanying Classification of Instructional Programs (CIP) code from the National Center for Education Statistics for that major. Respondents indicated more than 400 different majors which I first collapsed based on CIP code into the 61 CIP categories defined by NCES, and then further aggregated into four broad categories for analysis: science, technology, engineering, math and health (STEM-H) fields, social science fields, humanities and liberal arts fields, and business and

other professional fields. I then dichotomously coded each major category and selected social science majors and the reference group to be excluded from the model for analysis.

The measure for hours per week spent working was based on the sum of two variables from the survey. Respondents were asked "During this academic year, how many hours do you spend in a typical week (7 days) on the following activities? (Must be numeric, enter 0 for none): Paid employment (including internships) on campus;" as well as "During this academic year, how many hours do you spend in a typical week (7 days) on the following activities? (Must be numeric, enter 0 for none): Paid employment (including internships) off campus." I took the sum of these two items and then created a continuous that went from 0 hours to 75 hours per week. The final exogenous variable, distance from campus, was operationalized based on a single item that asked students "How far do you live from campus?" to which they could respond on a five-point scale ranging from: 1 ("On campus or <1 mile") to 5 ("21 miles or more").

In addition to the aforementioned exogenous variables measuring social identities and background characteristics, I initially planned to also include a control for students' GPA, as Pascarella (1985) suggests that measures of student aptitude directly predict other important outcomes, including interaction with faculty and their cognitive skills development. However, among the 2018 SERU respondents there was excessive missing data on measures of GPA (between 40% and 70%). I ultimately decided not to include this measure as I was uncomfortable imputing that many missing values.

Student-faculty Interaction

Pascarella's (1985) model also suggests that interactions with agents of socialization, such as faculty and peers contribute to students' learning and cognitive development both directly and by way of increased student effort. In order to operationalize student-faculty

interaction, used confirmatory factor analysis to develop a four-item measure of student-faculty interaction. Based on prior research that has used the SERU and UCUES data (Kim & Lundberg, 2016; Kim & Sax, 2011; Parker & Trolian, 2020; Soria, 2013), the latent construct of student-faculty interaction relied on three items that measured the frequency of different types of student formal (in class) and informal (out of class) interactions with faculty. On the survey, students were asked "During this academic year, how often have you done each of the following?" and provided several options among them "Contributed to a class discussion," "Communicated with the instructor outside of class about issues and concepts derived from a course," "Had a class in which the professor knew or learned your name." Students responded to each of these items on a scale from 1 ("Never") to 6 (Very often").

In addition to these items, I also included in the latent variable operationalizing student-faculty interaction a measure that asked, "How many professors do you know well enough to ask for a letter of recommendation in support of an application for a job or for graduate or professional school?" to which students could indicate on a scale from "Zero" to "4 or more." While the other variables in the student-faculty interaction factor measure the *frequency* of different interactions, the inclusion of this variable captures the how many faculty members with whom student respondents have a *quality* relationship, which has also been shown to be important (Cole & Griffin, 2013; Pascarella, 1980). Further, the framing of the question suggests the role of student-faculty relationships as an important type of social capital that students can leverage and transform into opportunities that can benefit them monetarily—like a well-paying job or scholarship—or in accumulating other types of capital, such as graduate school admission or a job.

Academic Effort

Higher education scholars have suggested that while relationships and environments play an important role in student success outcomes, the nature of student effort or involvement in their own learning and success is also key (Astin, 1999; Kuh & Hu, 2001; Pascarella, 1985). In this study, I use a single-item measure of student academic effort. I initially attempted to use confirmatory factor analysis create a latent variable representing academic effort but failed to find a combination of variables with sufficient reliability statistics and factor loadings. Thus, I used a single measure that asked students "How frequently during this academic year have you: Increased your academic effort due to the high standards of a faculty member?" to which students could reply on a six-point scale from "Never" to "Very often."

Campus Racial Climate

Campus racial climate—or the social aspect of the institutional context shaped by collective "perceptions, attitudes, and expectations" (Hurtado et al, 1999, p. 5) of race, racism, ethnicity, and racial/ethnic diversity—has been shown for nearly three decades to be a key component of the college environment associated with a variety of student success measures (Cress, 2008; Denson & Chang, 2009; Hurtado, et al., 1998; Hurtado et al, 1999; Milem, 2001; Rankin & Reason, 2005). While campus racial climate can be operationalized in many ways, including the structural diversity of an institution (often assessed by the racial/ethnic demographic representation of students, faculty, and staff on campus) or by the "behavioral dimension" via students' cross-racial interactions (Hurtado et al, 1999), the latent variable developed for this study mainly captures the psychological campus racial climate.

The psychological dimension of campus racial climate captures students' perceptions and feelings about racism and racial discrimination on their college campuses (Hurtado et al., 1999; Hurtado et al., 1998). Thus, the campus racial climate measure for this study was based on four

75

items that assessed students' perceptions. Students were asked how strongly they agreed or

disagreed with the following statements on a scale of "strongly disagree" to "strongly agree":

"Students of my race/ethnicity are respected on this campus;" "Overall, I feel comfortable with

the climate for diversity and inclusiveness at [this Research University];" "Overall, I feel

comfortable with the climate for diversity and inclusion in my classes;" and "[This Research

University] is a welcoming campus."

Table 3.3. Variable Coding Schemes

Variable	Coding Scheme
Gender: Woman	0 = Men; 1 = Women
Race/Ethnicity: Asian/Asian American	0 = Unselected; 1 = Asian/Asian American (Non-Hispanic)
Race/Ethnicity: Black/African American	0 = Unselected; 1 = Black/African American (Non-Hispanic)
Race/Ethnicity: Hispanic/Latinx	0 = Unselected; 1 = Hispanic/Latinx
Race/Ethnicity: white	0 = Unselected; 1 = white (Non-Hispanic)
Race/Ethnicity: Another race/ethnicity	0 = Unselected; 1 = Multiracial (Non-Hispanic) Native American (Non-Hispanic), Alaska Native (Non-Hispanic), Native Hawaiian (Non-Hispanic), Pacific Islander (Non-Hispanic)
Non-U.S. Citizen	0 = U.S. Citizen or Permanent Resident; 1 = Students who are not citizens of the U.S. and are in the country on a visa or temporary basis
First-Generation	0 = One or more parent(s)/guardian(s) attended at least some college; 1 = "Neither parent/guardian attended any college"
Year in College	1 = First-year; 2 = Second-year; 3 = Third-year; 4 = Fourth-year; 5 = Fifth-year; 6 = Sixth-year; 7 = Seventh-year or beyond
Transfer	0 = First-time enrollee 1 = Transfer student
STEM-H Major	0 = Unselected; 1 = Science, technology, engineering, math, or health field major

Variable	Coding Scheme
Arts/Humanities Major	0 = Unselected; 1 = Arts/humanities major
Social Sciences Major	0 = Unselected; 1 = Social science major
Business/Pro Major	0 = Unselected; 1 = Business or other professional field major
Total HPW Employed	Continuous numerical value provided by student
Distance living from campus	1 = "On campus or < 1mile"; 2 = "1 mile to 2 miles" ; 3 = "3 miles to 10 miles"; 4 = "11 to 20 miles"; 5 = "21 miles or more"

Cognitive Skills (College Entry)

When you started here: Analytical & critical thinking skills	1 = "Very Poor" ; 2 = "Poor"; 3 = "Fair"; 4 = "Good"; 5 = "Very Good"; 6 = "Excellent"
When you started here: Ability to be clear & effective when writing	1 = "Very Poor" ; 2 = "Poor"; 3 = "Fair"; 4 = "Good"; 5 = "Very Good"; 6 = "Excellent"
When you started here: Ability to read and comprehend academic material	1 = "Very Poor" ; 2 = "Poor"; 3 = "Fair"; 4 = "Good"; 5 = "Very Good"; 6 = "Excellent"

Student-faculty Interaction

How often: Contributed to class discussion	1 = "Never"; 2 = "Rarely"; 3 = "Occasionally"; 4 = "Somewhat often"; 5 = "Often"; 6 = "Very often"
How often: With instructor outside of class about issues or concepts from course	1 = "Never"; 2 = "Rarely"; 3 = "Occasionally"; 4 = "Somewhat often"; 5 = "Often"; 6 = "Very often"
How often: Had a class in which professor knew name	1 = "Never"; 2 = "Rarely"; 3 = "Occasionally"; 4 = "Somewhat often"; 5 = "Often"; 6 = "Very often"
How many professors do you know well enough to ask for a letter of recommendation?	1 = "Never"; 2 = "Rarely"; 3 = "Occasionally"; 4 = "Somewhat often"; 5 = "Often"; 6 = "Very often"
How often: Increased academic effort due to high standards of a faculty member	1 = "Never"; 2 = "Rarely"; 3 = "Occasionally"; 4 = "Somewhat often"; 5 = "Often"; 6 = "Very often"

Campus Racial Climate

Level of agreement: Students of my race/ethnicity are respected on this campus	1 = "Strongly disagree"; 2 = "Disagree"; 3 = "Somewhat disagree"' 4 = "Somewhat agree"; 5 = "Agree"; 6= "Strongly agree"

Variable	Coding Scheme
Level of agreement: Overall, I feel comfortable with the climate for diversity and inclusiveness at RU	1 = "Strongly disagree"; 2 = "Disagree"; 3 = "Somewhat disagree"' 4 = "Somewhat agree"; 5 = "Agree"; 6= "Strongly agree"
Level of agreement: Overall, I feel comfortable with the climate for diversity and inclusion in my classes	1 = "Strongly disagree"; 2 = "Disagree"; 3 = "Somewhat disagree"' 4 = "Somewhat agree"; 5 = "Agree"; 6= "Strongly agree"
Level of agreement: The RU is a welcoming campus	1 = "Strongly disagree"; 2 = "Disagree"; 3 = "Somewhat disagree"' 4 = "Somewhat agree"; 5 = "Agree"; 6= "Strongly agree"
Cognitive Skills (Present)	
Now: Analytical & critical thinking skills	1 = "Very Poor" ; 2 = "Poor"; 3 = "Fair"; 4 = "Good"; 5 = "Very Good"; 6 = "Excellent"
Now: Ability to be clear & effective when writing	1 = "Very Poor" ; 2 = "Poor"; 3 = "Fair"; 4 = "Good"; 5 = "Very Good"; 6 = "Excellent"
Now: Ability to read and comprehend academic material	1 = "Very Poor" ; 2 = "Poor"; 3 = "Fair"; 4 = "Good"; 5 = "Very Good"; 6 = "Excellent"

Data Analysis

This study used two key analytic approaches to address the three research questions enumerated above. The use of both descriptive and correlational analyses provided a detailed picture of how poor and working-class students with different social identities and academic majors interact with faculty, as well as the extent to which to these interactions significantly contribute to a measure of cognitive skills. Further, I also explored how the relationships between variables are moderated by students' different identities, including gender, race/ethnicity, and major.

Descriptive Analyses

To address Research Question 1, which asks about the frequency with which poor and working-class respondents report engaging with faculty in a variety of ways, I ran frequency

distributions on several items in the dataset that explore students' formal and informal

interactions with faculty. Specifically, these items included how often students had a class in

which the instructor knew their name, as well as how often they contributed to class, asked

questions, communicated with the professor outside of class, and sought academic help. I also

explored how often students reported engaging with faculty in research or creative projects

outside of class, and finally how many faculty students said they knew well enough to ask for a

letter of recommendation. To address sub-question 1a, I ran crosstabulations with the Bonferroni

correction for multiple comparisons on these same faculty interaction items to explore whether

there are gender, racial/ethnic, or academic major differences among poor and working-class

students who reported engaging with faculty in different ways.

Structural Equation Modeling

To address Research Question 2, I employed structural equation modeling (SEM) using

Mplus 8.5 software to test the hypothesized model I developed based on existing literature and

the theoretical framework described in Chapter 2. Structural equation modeling is a widely used

statistical technique that allows for the testing of hypothesized relationships between multiple

independent and dependent variables that are based on prior research and theory. Unlike other

techniques, such as OLS regression that explore how much variance of a single dependent

variable is accounted for by one or more independent variables, SEM allows for the modeling

and simultaneous analysis of multiple independent variables upon dependent variables, which

themselves can serve as predictors of other dependent variables. That is, using SEM I was able to

determine the strength and direction of direct effects of one variable on another, as well as

indirect effects, or the ways in which one variable affects another by way of a third variable.

Further, variables included in structural equation models can be both *observed variables*, or

constructs measured directly by the survey instrument, or *latent variables*, which are unobserved

constructs that may not be measured directly but may be driving the patterns in the observed

variables. These latent constructs are often used to capture phenomena that would be difficult to

precisely measure or operationalize in a single survey item or scale, such as student-faculty

interaction or campus climate.

Data Preparation

Before beginning structural equation modeling, I first evaluated the data for assumptions

of normality. SEM can be particularly sensitive to violations of normality, which can bias

parameter estimates, but *Mplus* allows for the use specific estimation methods that can be used

on non-normal data. Most of the variables and all of the scaled items used to develop the latent

constructs did not violate any assumptions of skew and kurtosis, however some of the

dichotomous control variables included in the model made it such that some of these variables

were unavoidably skewed. Accordingly, I used the robust maximum likelihood estimation in

Mplus to account for this nonnormality in the data.

Table 3.4. Descriptive Statistics of Variables for Omnibus Sample (N=29,819)

Variable	Mean	SD	% Missing
Gender: Woman	.66	.47	0
Race/Ethnicity: Asian/Asian American	.29	.45	0
Race/Ethnicity: Black/African American	.05	.21	0
Race/Ethnicity: Hispanic/Latinx	.39	.49	0
Race/Ethnicity: white	.25	.43	0
Race/Ethnicity: Another race/ethnicity	.02	.13	
Non-U.S. Citizen	.01	.09	0
First-Generation	.47	.50	0
Year in College	2.24	1.21	0
Transfer	.25	.44	0
STEM-H Major	.39	.49	0
Arts/Humanities Major	.10	.30	0[a]
Social Sciences Major	.44	.50	0[a]

Variable	Mean	SD	% Missing
Business/Pro Major	.06	.24	0[a]
HPW Employed	10.3	11.01	0[a]
Distance living from campus	2.01	1.27	0[a]
Cognitive Skills (College Entry)			
When you started here: Analytical & critical thinking skills	3.66	1.02	1.87
When you started here: Ability to be clear & effective when writing	3.62	1.12	1.94
When you started here: Ability to read and comprehend academic material	3.63	1.11	2.05
Student-faculty Interaction			
How often: Contributed to class discussion	3.90	1.33	1.94
How often: With instructor outside of class about issues or concepts from course	3.19	1.43	1.52
How often: Had a class in which professor knew name	3.77	1.58	1.54
How many professors do you know well enough to ask for a letter of recommendation?	1.26	1.20	0.21
How often: Increased academic effort due to high standards of a faculty member	3.74	1.33	1.84
Campus Racial Climate			
Level of agreement: Students of my race/ethnicity are respected on this campus	4.39	1.23	1.62
Level of agreement: Overall, I feel comfortable with the climate for diversity and inclusiveness at RU	4.33	1.29	1.61
Level of agreement: Overall, I feel comfortable with the climate for diversity and inclusion in my classes	4.42	1.25	1.70
Level of agreement: The RU is a welcoming campus	4.57	1.18	1.68
Cognitive Skills (Present)			
Now: Analytical & critical thinking skills	4.60	.88	2.08
Now: Ability to be clear & effective when writing	4.49	.949	2.23
Now: Ability to read and comprehend academic material	4.57	.95	2.27

[a] Indicates variables that were imputed with multiple imputation

I then examined rates of missingness in the data. As previously discussed, none of the exogenous observed variables had any missing data as *Mplus* cannot estimate a model where that is the case. However, as long as exogenous variables are complete, *Mplus* will address

missingness on endogenous variables using full information maximum likelihood (FIML). As shown in Table 3.4, no endogenous variable exceeded rates of missingness beyond 2.5%.

Analytic Procedures

After preparing the data, I conducted the structural equation modeling in three stages. In the first stage I used *Mplus* to conduct confirmatory factor analysis, during which I evaluated the presupposed latent variables included in the hypothesized model. Confirmatory factor analysis, like SEM, takes an a priori approach to factor analysis by testing or validating the conceptual and mathematic relationships between multiple observed variables that, based on theory or prior research, are likely indicative of some latent construct. I first conducted the CFA on the sample representing all poor and working-class students and then on each racial/ethnic subsample to ensure construct validity across samples. This CFA resulted in what is known as the "measurement model," the graphical or mathematical representation of the relationships between observed variables and latent constructs (Byrne, 2013). I assessed the factor loadings of each observed variable to ensure they were above .40 and significant, suggesting strong significant relationships between each observed variable and the latent variable (Brown, 2015). While *Mplus* does not provide measures of reliability, I used SPSS to attain Cronbach's alphas for each latent variable.

Once the measurement model was validated, I moved on to the second stage wherein I tested the full model--which estimates the relationships between the latent constructs developed during the CFA and any observed constructs—on the omnibus sample of all poor and working-class students. I accounted the clustering of students within institutions by using the TYPE=COMPLEX command in *Mplus*, which controls for this non-independence among

respondents by adjusting the standard errors but does not test for differences between the clusters (as would be done with HLM or hierarchical structural equation modeling).

I then evaluated this hypothesized SEM model for "fit," or the degree to which the relationships hypothesized in the model are observed in the dataset (Thakkar, 2020). While the fit statistics of the omnibus model demonstrated adequate fit, I still examined results from the modification indices reported by *Mplus* to determine any suggested changes to the model. These fit indices make recommendations to add or remove paths based only on the mathematical improvement of the model fit, and thus must be scrutinized to ensure any modifications are also theoretically supported. As it happened, the model fit was adequate and none of the suggested changes to model paths from the modification indices were appropriate, thus I maintained the overall structure of the model.

As Research Question 3 is concerned with the extent to which race/ethnicity moderate the hypothesized relationships in the overall structural model, following the development of a structural model, I moved to the third and final stage for analysis, during which I tested the hypothesized model on discrete racial/ethnic subgroups of poor and working-class respondents. Thus, I performed the same procedures described above on four racial/ethnic subsamples of poor and working-class students: Asian American students, Black and African American students, Latinx students, and white students. Given the relatively small number Pacific Islander, Native American/Alaska Native, and multiracial respondents and the large sample size required to test such a complex model, I was unable to test the model on these subgroups. Table 3.5 shows the descriptive statistics of all variables across each racial/ethnic subsample.

I ran these discrete racial/ethnic models and was then able to compare and contrast them to each other and to the model representing all poor and working-class students, which allowed

for an exploration of the racial/ethnic variation among poor and working-class college students. Understanding such specific differences may help to inform policies or programs that can benefit specific racial/ethnic subgroups of students but are obscured in the aggregate model of all poor and working-class students, or even models that group all Students of Color together.

Table 3.5. Descriptive Statistics of Variables for Each Racial/Ethnic Subsample

	Asian American n=8,679			Black n=1,447			Latinx n=11,615			White n=7,549		
	M	SD	% Missing	M	SD	% Missing	M	SD	% Missing	M	SD	% Missing
Gender: Woman	.62	.48	0	.71	.45	0	.67	.47	0	.66	.47	0
Non-U.S. Citizen	.02	.15	0	.01	.08	0	.00	.06	0	.00	.04	0
First-Generation	.45	.50	0	.33	.47	0	.67	.47	0	.25	.43	0
Year in College	2.29	1.20	0	2.31	1.30	0	2.22	1.21	0	2.23	1.21	0
Transfer	.20	.41	0	.26	.44	0	.22	.42	0	.35	.48	0
STEM-H Major	.48	.50	0	.31	.46	0	.33	.47	0	.40	.49	0
Arts/Humanities Major	.06	.23	0	.10	.30	0	.12	.32	0	.13	.34	0
Social Sciences Major	.38	.50	0	.53	.50	0	.51	.50	0	.40	.49	0
Business/Pro Major	.07	.27	0	.06	.23	0	.05	.21	0	.06	.24	0
HPW Employed	7.41	9.30	0	12.43	11.75	0	10.60	11.09	0	12.64	11.72	0
Distance living from campus	1.93	1.18	0	1.98	1.29	0	2.05	1.30	0	2.08	1.33	0
Cognitive Skills (College Entry)												
When you started here: Analytical & critical thinking skills	3.49	.98	.01	3.75	1.01	.03	3.56	1.02	.01	.98	3.97	.04
When you started here: Ability to be clear & effective when writing	3.45	1.07	.01	3.72	1.18	.03	3.49	1.14	.01	1.10	3.98	.04
When you started here: Ability to read and comprehend academic material	3.47	1.05	.01	3.83	1.12	.03	3.56	1.13	.01	1.11	3.87	.04

	Asian American n=8,679			Black n=1,447			Latinx n=11,615			White n=7,549		
	M	SD	% Missing	M	SD	% Missing	M	SD	% Missing	M	SD	% Missing
Student-faculty Interaction												
How often: Contributed to class discussion	3.56	1.28	.01	4.31	1.35	.03	3.87	1.31	.01	4.27	1.31	.04
How often: With instructor outside of class about issues or concepts from course	3.03	1.37	.01	3.57	1.49	.03	3.17	1.45	.01	3.32	1.43	.04
How often: Had a class in which professor knew name	3.31	1.50	.01	4.39	1.51	.03	3.69	1.57	.01	4.26	1.50	.04
How many professors do you know well enough to ask for a letter of recommendation?	1.01	1.12	.01	1.66	1.29	.01	1.20	1.15	.01	1.55	1.27	.01
How often: Increased academic effort due to high standards of a faculty member	3.67	1.35	.01	3.87	1.36	.04	3.76	1.34	.01	3.78	1.30	.04
Campus Racial Climate												
Level of agreement: Students of my race/ethnicity are	4.49	1.026	.01	3.33	1.43	.03	4.14	1.26	.01	4.91	1.11	.04

	Asian American n=8,679			Black n=1,447			Latinx n=11,615			White n=7,549		
	M	SD	% Missing	M	SD	% Missing	M	SD	% Missing	M	SD	% Missing
respected on this campus												
Level of agreement: Overall, I feel comfortable with the climate for diversity and inclusiveness at RU	4.54	1.091	.01	3.45	1.51	.03	4.21	1.35	.01	4.47	1.24	.04
Level of agreement: Overall, I feel comfortable with the climate for diversity and inclusion in my classes	4.58	1.062	.01	3.51	1.51	.03	4.28	1.32	.01	4.64	1.16	.04
Level of agreement: The RU is a welcoming campus	4.63	1.08	.01	4.10	1.31	.03	4.56	1.21	.01	4.62	1.20	.04
Cognitive Skills (Present)												
Now: Analytical & critical thinking skills	4.35	0.89	.01	4.70	.92	.03	4.61	0.84	.01	4.84	0.82	.05
Now: Ability to be clear & effective when writing	4.23	0.95	.01	4.62	.95	.03	4.51	0.92	.02	4.74	0.91	.05

	Asian American n=8,679			Black n=1,447			Latinx n=11,615			White n=7,549		
	M	SD	% Missing	M	SD	% Missing	M	SD	% Missing	M	SD	% Missing
Now: Ability to read and comprehend academic material	4.31	0.952	.01	4.66	.94	.04	4.61	0.92	.02	4.77	0.91	.05

Limitations

There are several key limitations of this study that are important to note. First, in order to keep the model parsimonious, I selected key variables frequently highlighted in the literature and theory discussed in Chapter 2; however I recognize that I was not able to account for many other exogenous variables that may be related to student-faculty interactions or cognitive skills, such as peer-interactions, additional family background variables, and a wide variety of college experiences. Further, I was not able to include any institutional-level variables—which have also been shown in the literature to shape student-faculty interaction and student outcomes—as the institutions each respondent attended were anonymized in the dataset. Future research using these data and other datasets may explore additional factors that portend to more student-faculty interactions and student's cognitive skills.

Somewhat relatedly, this study relied on existing data collected from the 19 institutions that administered the SERU survey in 2018. While the instrument is comprehensive, the annual census design necessitates that the data are cross-sectional. Thus, because I am unable to determine the temporal order of when certain experiences occurred, my study cannot make any causal claims about what characteristics lead students to interact with faculty, nor about the impact of student-faculty interaction on students' cognitive skills. Further, while I am modeling the relationships between student-faculty interaction and cognitive skills as unidirectional and recursive, it is likely that a more complex bi-directional relationship exists, as has been modeled by Kim (2010). Future iterations of this research should explore non-recursive relationships between student-faculty interactions and cognitive skills to better determine causality.

Next, the survey data I rely on is largely based on student self-assessments and perceptions. Consequently, the final dependent variable is based on self-reports of students'

current cognitive skills and the proxy pre-test I used is based on students' retroscpective

perceptions of their cognitive skills when they arrived at college. Prior analyses of the SERU

data have found that student self-reports of their cognitive skills are reliable and align with other

measures of academic achievement (Douglass et al., 2012), and self-reported analyses can be

useful measures to understand *student perceptions of learning* when asked clearly (Pike, 1995,

1996, 2011).

Finally, the data used here used federal race/ethnicity categories, which ask first if

students are Hispanic or Latinx, and then separately asks students to select from one or more of

the following race categories: American Indian/Alaska Native, Asian American, Black/African

American, Pacific Islander, white, and unknown. Where possible, such as in the descriptive

analyses, I disaggregated as much as possible, but relied on the largest and broadest categories

for inferential analyses. To be sure, these aggregated racial/ethnic categories obfuscate

racial/ethnic nuance both within and across these categories, and thus limit the assertions that can

be made about all of the categories and constellations racial/ethnic identity. Further, given the

use of critical race theory in this study, it is important to note that the census and its racial

categories used here are informed by and contribute to the ongoing process racial formation,

which Omi & Winant (2008) theorize as "…the sociohistorical process by which racial identities

are created, lived out, transformed, and destroyed" (p.109). In other words, I have aggregated

students survey respondents into racial categories based on racialized social and historical

communalities in these groups which have real consequences, but in doing so I have also reified

these categories as legitimate and real. Thus, I recognize that while this study aims to elucidate

some the real effects of racialization and class within higher education, I am not an objective

outside observer, but an active participant in this racial project, which is situated within the

broader racial social structures and systems. However, an intentional use of critical race theory, regardless of limitations with the data set, still enables this project to do critical work in considering how students' college experiences and thus their college outcomes are impacted by multiple intersecting systems of domination (e.g., racism, sexism, classism).

Positionality

Given my use of critical theories and my critical research paradigm, I wish to address my own positionality in relation to this study. My interest in poor and working-class college students stems from my own background, having attended a private research university as a working-class, first-generation student thanks to a generous scholarship package and profound emotional support from my family. It was due in large part to support and validation from various faculty members that I was able to successfully navigate the labyrinthine and often perplexing academic and social landscape of the university. Further, my undergraduate degree in gender and sexuality studies shaped my understanding for the need of critical interrogations of systems of power and domination in society and within institutions in order to address longstanding social problems. Accordingly, I approach my research as a higher education scholar with the broader goal of improving colleges and universities such that they might change to better serve students who have been historically excluded from or marginalized within systems of education. Thus, my own identities and my goals as a researcher have informed all of the aspects of the development of this study and informed how I cleaned and analyzed the data, and how I interpreted the findings to devise actionable implications.

Summary

This chapter describes the methodological design of this study on the role of student-faculty interactions in poor and working-class students' cognitive skills development. Using data

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from a nationwide sample of poor and working-class respondents of the 2018 SERU survey, this dissertation employed structural equation modeling to test a hypothesized model based on the college impact literature to which I added further nuance by using Bourdieu's theories of capital, and critical race theory. In short, I submit that interacting with faculty is a valuable form of cultural capital that mediates the effects of students' identities and academic background characteristics on their self-rated cognitive skills. However, as U.S. society and institutions are both deeply racialized, I also explored how race/ethnicity moderated the relationships between variables in the model by testing the model on racial/ethnic subsamples of poor and working-class students. This methodological approach was employed both to advance what is known about poor and working-class students in college and to inform how public research universities might design policies and programs to better serve such students both generally and with specific foci on the experiences of poor and working-class students of color.

CHAPTER FOUR: RESULTS

This chapter presents the results of the descriptive and inferential analyses used to explore the frequency of student-faculty interactions among poor and working-class college students and the extent to which these interactions are linked to an increase in students' self-rated cognitive skills. I begin by reporting descriptive findings about the rates of different kinds of student-faculty interactions among all poor and working-class students, as well as differences in the frequency of such interactions by gender, race/ethnicity, and academic major. Next, I report the results from the structural equation model exploring the relationship between background characteristics, college experiences, student faculty interactions, and self-reported cognitive skills among poor and working-class students and whether and how the relationships between these variables are moderated by race/ethnicity.

Research Question One: Frequencies of student-faculty interactions among all poor and working-class students

The first research question aimed to explore how often poor and working-class college students reported different kinds of engagement with faculty. To address this question, I analyzed the frequency distribution on various measures of student-faculty interaction (Tables 4.1-4.4). Note that complete descriptive statistics for each item are included in Chapter 3.

Table 4.1 presents the frequency distributions for five measures of student-faculty interaction. First, and importantly, almost 40% of poor and working-class students indicated they have "Often" (18.2%) or "Very often" (18.9%) have taken a class in which the professor knew their name. Given common stereotypes around courses at large research-intensive universities (such as those attended by the students in this sample) being large and impersonal, that many poor and working-class students in the sample had courses with faculty who knew their names is

reassuring. Yet, that even 8.4% of the students indicated they had "Never" had that experience is concerning and warrants further understanding of students' experiences in the classroom.

In terms of in-class or formal interactions, most poor and working-class students seem to engage in class discussions fairly often, but they do not frequently ask questions in class. Indeed, more than one-third of poor and working-class college students reported that they "Often" (21.8%) or "Very often" (14.6%) contributed to class discussions. However just over 20% of poor and working-class students indicated they asked insightful questions in class "Often" (14.2%) or "Very often" (7.5%). In fact, more than one-third of poor and working-class students reported "Never" (8.3%) or "Rarely" (23.0)% asking questions. One explanation for this may be due to the qualification of asking "insightful questions" in this item, rather than asking students whether they asked any questions in class at all.

Table 4.1. Frequency Distribution of Student Faculty Interactions Among Poor and Working-Class Students

	Had a Class in Which Professor Knew Name (n=30,215)	Contributed to A Class Discussion (n=30,094)	Asked An Insightful Question in Class (n=30,106)	Communicated With Instructor Outside of Class About Issues/Concepts from Course (n=30,223)	Sought Academic Help From Instructor When Needed (n=30,221)
Never	8.4	2.1	8.3	11.5	8.5
Rarely	15.8	12.9	23.0	23.9	18.3
Occasionally	21.2	27.9	28.5	26.7	27.6
Somewhat often	17.5	20.6	18.6	17.2	18.0
Often	18.2	21.8	14.2	13.0	16.4
Very often	18.9	14.6	7.5	7.6	11.3

However, the other items in Table 4.1 suggest poor and working-class students are not frequently engaging with faculty to address their questions or needs. For example, 35.4% of poor

and working-class students indicated they "Never" or "Rarely" communicated with their instructors outside of class about their coursework, and more than a quarter of students indicated they "Never" or "Rarely" sought academic help from instructors. Tables 4.2 and 4.3 further explore poor and working-class students' interactions with faculty beyond the classroom. As shown in Table 4.2, a majority of poor and working-class students (60.1%) indicated they have never engaged with faculty on something besides coursework—such as, in the context of a student organization, or a research or creative project. Among the remaining 39.9%, most (19%) poor and working-class students had done so just once.

Table 4.2. Frequency Distribution of Poor and Working-Class Students Work with Faculty on Something Besides Coursework (n=30,251)

	Percent
Never	60.1
One Time	19.0
Two Times	9.6
Three or more times	11.3

Table 4.3 reports on *how* students who interact with faculty outside of class spend their time. Notably, among all poor and working-class students, 20.4% reported helping faculty with a research project with 15.8% doing so as a research assistant. Poor and working-class students less frequently helped faculty with creative projects (8.3%), however 13.4% of respondents indicated that they had worked with faculty on their own independent research or creative project (e.g., student honors theses, capstone projects, etc.).

Table 4.3. Proportion of Poor and Working-Class Students Who Assist Faculty with Research or

Creative Projects (n=29,763)

	Percent
Assisted faculty in conducting research	20.4
As a Research Assistant[a]	15.8
As a Research Participant[a]	7.8
As something else[a]	0.4
Assisted Faculty with a Creative project	8.3
Conducted own research/creative project with faculty guidance	13.4

[a]Categories of research participation add to more than 20% because categories were not mutually exclusive.

Table 4.4 shows the distribution of the number of faculty that poor and working-class students reported knowing well enough to ask for a letter of recommendation. As shown, more than one-third of poor and working-class students reported not knowing *any* faculty well enough to ask for a letter of recommendation (34.3%). However, almost 40% of respondents reported knowing at least two faculty members, which is often the minimum required for graduate school and other applications.

Table 4.4. Number of Faculty Poor and Working-Class Students Report Knowing Well Enough to Ask For a Letter of Recommendation (n=30,619)

	Percent
Zero	34.3
1	26.1
2	23.6
3	10.0
4 or more	6.0

In sum, poor and working-class respondents generally reported more frequent interactions with faculty in the context of class than they did outside of class, though a minority of poor and working-class students *did* report interacting with faculty in research or creative projects. Yet, the proportions of students who reported that they had "Never" or "Rarely" had faculty who knew their name or that they know zero faculty who know them well enough to write a letter of recommendation raises concerns about the extent to which poor and working-class students are able to cultivate valuable social capital on campus that can be leveraged for academic and career opportunities. Further, questions remain about whether and how students' other social identities (e.g. gender, race ethnicity) and academic major further moderate these patterns of engagement. The following sections explore such differences *among* poor and working-class students on the previously explored measures.

Gender Differences in Student-Faculty Interactions Among Poor and Working-Class Students

Table 4.5 presents the findings regarding gender differences among poor and working-class students' rates of interaction with faculty. For simplicity and ease of interpretation I aggregated and report only the "Often" and "Very often" categories.

Table 4.5. Gender Differences in Student-Faculty Interactions Among Poor and Working-Class

Students

	Percent Among		
	Men (A) (n=10,081)	Women (B) (n=19, 267)	Non-binary/ Genderqueer (C) (n=48)
Often or Very Often…			
Had a Class in Which Professor Knew Name	37.9[B]	36.2[A]	42.9
Contributed to A Class Discussion	37.4[B]	35.7[A]	45.8
Asked An Insightful Question in Class	24.3[B]	20.0[A]	30.6
Communicated With Instructor Outside of Class About Issues or Concepts from Course	22.7[B]	19.5[A]	16.3
Sought Academic Help When Needed	25.3[B]	29.1[A]	22.4
Know 2+ faculty well enough to ask for a letter of recommendation	41.1[B]	38.4[A]	38.8
Worked with Faculty on an Activity Other Than Coursework One or More time(s)	41.6[B]	38.9[A]	51.0
Have Assisted Faculty in Conducting Research	20.9	20.1	12.5
Have Assisted Faculty With A Creative Project	9.1[B]	7.7[A]	12.8

Note. Superscripts indicate significant differences in proportions at p<.01.

A= Significant difference from Men; B= Significant difference from Women; C= Significant difference from Non-

binary/Genderqueer students.

Across the types of student-faculty interaction examined here, the proportion of men reporting frequent interactions with faculty was statistically significantly greater than the proportion of women to do so on almost every measure. Differences between non-binary and genderqueer students and men and women were also examined, but none emerged as significant, likely due to the relatively small sample size of this student population. As seen in the table, in most cases, the proportions of non-binary and genderqueer working-class students were similar or often *greater* than those of men or women, thus, future research would do well to better understand the experiences of these students with faculty. Further, despite statistically significant differences between men and women, the differences measuring in-class engagement are not practically very large—with almost 40% of men and women reporting they "Often or very often" had a faculty member who knew their name (37.9% and 32.2%, respectively) and contributed to a class discussion (37.4% and 35.7%, respectively). However, as shown in the aggregate findings above, fewer poor and working-class students reported asking questions in class or communicating with faculty outside of class, with no more than a quarter of men or women indicating they did so often or very often. Yet, the one measure of student-faculty interaction which a significantly larger proportion of poor and working-class women reported engaging than men was seeking academic help when needed. Just over 29% of poor and working-class women reported often or very often seeking academic help from instructors, compared to 25.3% of men.

In terms of additional out-of-class interactions, 41.6% of men reported working with faculty on something besides coursework at least once, compared to 38.9% of women who reported doing so. However, there were no significant gender differences in the proportions of poor and working-class students who reported assisting faculty in conducting research, with just over 20% of men and women indicating they did so. Conversely, among the small proportions of

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poor and working-class students who reported assisting faculty with a creative projects, significantly more men (9.1%) than women (7.7%) reported doing so; while 12% non-binary and gender queer students reported doing so, again, small sample sizes precluded any determination of statistical differences in the proportions. Finally, more than 40% of poor and working-class men reported knowing at least 2 faculty well enough to ask for a letter of recommendation, a significantly greater proportion than the 38.4% of women who indicated as such. Overall, this table suggests poor and working-class men are engaging most often with faculty at greater frequencies than their women peers, a relationship that will be further explored in the structural equation models later on in this chapter.

Racial/Ethnic Differences in Student-Faculty Interactions Among Poor and Working-Class Students

Research question 1a also asks about racial/ethnic differences in the rates of student-faculty interactions among poor and working-class students. Findings are reported in Table 4.6.

Table 4.6. Racial/Ethnic Differences in Student-Faculty Interactions Among Poor and Working-Class Students

	Percent Among						
	Asian/ Asian American (A) (n=8,803)	Black/ African American (B) (n=1,450)	Hispanic/ Latinx (C) (n=11,737)	Native American/ Alaska Native (D) (n=67)	Pacific Islander (E) (n=79)	White (F) (n=7,553)	Multiracial (G) (n=405)
Often or Very Often…							
Had a Class in Which Professor Knew Name	24.6[BCDFG]	54.3[AC]	35.1[ABFG]	52.2[A]	37.5	50.5[AC]	55.8[AC]
Contributed to A Class Discussion	25.5[BCDFG]	49.6[AC]	35.4[ABD]	58.2[AC]	38.0	47.9[AC]	44.7[AC]

	Percent Among						
	Asian/ Asian American (A) (n=8,803)	Black/ African American (B) (n=1,450)	Hispanic/ Latinx (C) (n=11,737)	Native American/ Alaska Native (D) (n=67)	Pacific Islander (E) (n=79)	White (F) (n=7,553)	Multiracial (G) (n=405)
Asked An Insightful Question in Class	14.5[BCDFG]	35.3[ACFG]	20.8[ABF]	34.3[A]	27.5[A]	28.2[ABC]	25.7[AB]
Communicated With Instructor Outside of Class About Issues or Concepts from Course	16.4[BCEFG]	31.4[ACFG]	20.8[ABF]	26.9	30.0[A]	23.1[ABC]	22.7[AB]
Sought Academic Help When Needed	25.8[BC]	38.0[ACFG]	29.4[ABF]	28.4	29.3	25.2[BC]	26.7[B]
Know 2+ faculty well enough to ask for a letter of recommendation	30.5[BCDFG]	53.5[AC]	37.3[ABDFG]	59.7[AC]	38.8	49.3[AC]	54.2[AC]
Worked with Faculty on an Activity Other Than Coursework One or More time(s)	40.3[B]	48.8[ACF]	38.4[B]	55.2	43.8	39.7[B]	45.7
Have Assisted Faculty in Conducting Research	20.6[BF]	20.5	18.0[AFG]	26.6	23.4	23.6[AC]	25.7[C]
Have Assisted Faculty With A Creative Project	8.4[B]	11.2[AC]	7.4[BDF]	18.5[C]	11.3	8.9[C]	10.0

Note. Superscripts indicate significant differences in proportions at p<.01. A= Significant difference from Asian/Asian American students; B= Significant difference from Black/African Americans; C= Significant difference from Hispanic/Latinx students, etc.

Several interesting trends emerged from this analysis. First, in general, the proportions of Asian and Asian American students were smaller (often significantly so) than the proportions of students from any other racial/ethnic groups across almost every type of interaction, even

significantly differing from Pacific Islander students with whom Asian and Asian Americans are often aggregated. Conversely, the proportions of Black/African American students reporting having engaged in the actions and experiences in Table 4.6 were often relatively larger, with students from other racial/ethnic groups falling somewhere in the middle. However, unlike the significant differences between men and women, the racial ethnic differences here are practically significant in size. For example, around a quarter of Asian and Asian American poor and working-class students indicated they had a professor who knew their name (24.6%) or had contributed to class discussion (25.5%), proportions significantly smaller than any other racial/ethnic group, and less than *half* of the proportions of Black/African American students (54.3% and 49.6%), Native American/Alaska Native students (52.2% and 58.2%), white students (50.5% and 47.9%), and multiracial students (55.8% and 44.7%).

Similar patterns are seen among the proportions of students who indicated they asked insightful questions in class or communicated with the instructor outside of class "Often or Very often," with greater proportions of every other racial/ethnic group indicating they did these things compared to Asian and Asian American students. In terms of seeking academic help from an instructor, the range was not quite as large. The proportion Black/African Americans who reported seeking academic help was 38%, significantly larger than Asian and Asian American students (25.8%), Hispanic and Latinx students (29.4%), white students (25.2%), and multiracial students (26.7%).

These patterns generally held on the out-of-class engagement measures. Just about half of Black/African American students (48.8%) reported working with faculty on an activity other than coursework, a proportion significantly higher than the proportion of Asian American students (40.3%), Hispanic/Latinx students (38.4%), and white students (39.7%). Notably, 55.2%

of Native American/Alaska Native poor and working-class students reported working with faculty on an activity other than coursework, this was not a statistically significant difference in proportion likely due to sample size.

Next, the racial/ethnic differences in the proportions of poor and working-class students who have assisted faculty with research were different than those seen in other types of student-faculty interaction. For example, 18% of poor and working-class Hispanic/Latinx students, reported assisting faculty with research—the smallest proportion reported across racial/ethnic groups and a proportion significantly smaller than that of Asian and Asian American students (20.6%), white students (23.6%), and multiracial students (25.7%). Further, it is remarkable that so many Black/African American students reported engaging with faculty so often in other ways, but just 20.5% reported conducting with research with faculty. In terms of working with faculty on a creative project, almost one-fifth of Native Americans indicated doing so (18%), a proportion more than twice as high as the proportion of Asian and Asian American students (8.4%), white students (8.9%), and Hispanic/Latinx students (7.4%).

Finally, when looking at the racial/ethnic differences among poor and working-class students who knew at least two faculty well enough to ask for a letter of recommendation, the proportions of Native American/Alaska Native students (59.7%), Black/African American students (53.5%) were the largest, and significantly higher than the proportions of Asian and Asian American students (30.5%) and Latinx students (37.3%); the proportions of White students (49.3%) and multiracial students (54.2%) were also significantly larger than those of Asian/Asian American and Latinx students. While these patterns are logical in the context of Asian and Asian American and Latinx students' relatively lower levels of frequent engagement with faculty in- and out-of-class more broadly, they are no less troubling.

Academic Major Differences in Student-Faculty Interactions Among Poor and Working-Class Students

Lastly, I examined academic major differences in the patterns of student-faculty interaction among poor and working-class college students, as some disciplines often have pedagogical conventions and environments that better facilitate certain types of interactions over others. Such patterns bear out in Table 4.7 below.

Table 4.7. Academic Major Differences in Student-Faculty Interactions Among Poor and Working-Class Students

	Percent Among			
	STEM-H (A) (n=11,645)	Social Science (B) (n=8,259)	Arts/ Humanities (C) (n=2,973)	Business / Other Professional (D) (n=1,780)
Often or Very Often…				
Had a Class in Which Professor Knew Name	29.7[BCD]	39.9[ACD]	66.0[ABD]	44.6[ABC]
Contributed to A Class Discussion	31.1[BCD]	40.9[AC]	50.6[ABD]	39.6[AC]
Asked An Insightful Question in Class	17.8[BCD]	25.1[AC]	32.2[ABD]	23.7[AC]
Communicated With Instructor Outside of Class About Issues or Concepts from Course	19.1[BC]	22.6[AC]	28.4[ABD]	20.6[C]
Sought Academic Help When Needed	29.4[BC]	25.7[A]	24.8[A]	26.7
Know 2+ faculty well enough to ask for a letter of recommendation	36.9[BCD]	42.7[AC]	60.6[ABD]	44.1[AC]

	Percent Among			
	STEM-H (A) (n=11,645)	Social Science (B) (n=8,259)	Arts/ Humanities (C) (n=2,973)	Business / Other Professional (D) (n=1,780)
Worked with Faculty on an Activity Other Than Coursework One or More time(s)	41.6	40.8	41.0	42.6
Have Assisted Faculty in Conducting Research	27.5[BCD]	21.6[ACD]	13.1[AB]	11.1[AB]
Have Assisted Faculty With A Creative Project	8.6[C]	9.0[C]	12.2[ABD]	8.0[C]

Note. Superscripts indicate significant differences in proportions at p<.01. A= Significant difference from STEM-H majors; B= Significant difference from Social Science majors; C= Significant difference from Arts/Humanities major; D= Significant difference from Business/Professional majors.

First, in terms of "Often or Very often" having faculty who knew students' names, each aggregated major group was significantly different from every other group, with just 29.7% of Science, Technology, Engineering, Medicine, and Health (STEM-H) majors indicating as much, compared to 39.9% of social science majors, 44.6% of Business and other professional majors, and finally 66% of poor and working-class arts and humanities majors. Such results are likely explained by class size and pedagogical models used by these different fields, which also explain why the proportions of poor and working-class STEM-H majors who reported often or very often contributing to class discussion (31.1%) and asking questions in class (17.8%) were significantly less than their peers in any other academic majors. Larger proportions of arts and humanities majors not only engaged in these in-class behaviors more often than any other students, but also were more likely than students in any other fields to communicate with an instructor outside of class, with 28.4% reporting they "Often or very often" did so. Conversely, 29.4% of poor and

working-class STEM-H students reported seeking academic help from instructors, a proportion significantly greater than social science majors (25.7%) and arts and humanities majors (24.8%).

In terms of out-of-class interactions, there were no significant academic major differences in the proportions of poor and working-class students who reported working with faculty on an activity other than coursework at least once, with around 40% of students in every field indicating as much. However, unsurprisingly, 27.5% of poor and working-class students in STEM-H majors reported ever having helped faculty with research, which was significantly greater than the proportion of students from the social sciences (21.6%), and more than twice as large as the proportion of arts/humanities students (13.1%) and Business/professional majors (11.1%) who assisted with faculty research. On the other hand, the greatest proportion of students who had assisted faculty with a creative project represented the arts and humanities majors (12.2%), significantly larger than the proportions of other majors, which were between 8-9%). Finally, more than 60% of poor and working-class arts/humanities majors reported knowing at least 2 faculty well enough to ask for a letter of recommendation, a proportion significantly higher than that of any other field. While more than 40% of poor and working-class social science majors and business/professional majors reported having this kind of social capital, just 36.9% of STEM-H majors did, a pattern that mirrors the trends of in-class and out-of-class engagement with faculty above.

In conclusion, there appear to be salient gender, racial/ethnic, and major differences in the patterns of student-faculty interaction. However, much remain unexplored, particularly concerning patterns explained by the relationships between gender, race, and major. For example, additional analyses suggest that a larger preponderance of Asian and Asian American poor and working-class students were STEM-H majors. Given that STEM-H majors interact with

faculty less frequently, perhaps student major explains some of the low-rates of student-faculty interaction among Asian and Asian American students. The next section uses structural equation modeling on multiple racial/ethnic subsamples, and with a variety of controls to explore the associations of multiple facets of students' identities and experiences with rates of student-faculty interaction.

Research Question Two: Predictors of student-faculty interaction and the role of student-faculty interaction in self-reported cognitive skills

Given the patterns observed in these descriptive findings, I turn now to the inferential analysis. I used structural equation modeling (SEM) to address research question two, which sought to explore what background characteristics and experiences predict student-faculty interaction among poor and working-class students and to what extent student faculty interaction portended to students' self-rated cognitive skills. The following sections first present the summary statistics and the results of the confirmatory factor analysis and the final measurement model of the four latent variables included in the study. I then present the results of the full structural model.

Confirmatory Factor Analysis

Confirmatory factor analysis was used to develop the four latent variables (Student-Faculty Interaction, Campus Racial Climate, Cognitive Skills at College Entry, Cognitive Skills at Present) included in the hypothesized model. Full descriptive statistics for the observed variables predicted by each latent variable are listed in Chapter 3. After examining the measures of central tendency and the normality of each observed variable, I then used Mplus 8.5 to estimate the parameters of the measurement model. I evaluated the fit of the measurement model

and the structural equation model later on based on several fit indices[3]: the root mean squared error or approximation (RMSEA), the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), and the standardized root mean squared residual (SRMR) (Byrne, 2012; Hu & Bentler, 1999; Schreiber et al., 2006). The RMSEA is a measure of how well the model fits the data in the covariance matrix and is particularly useful because of the confidence interval one can obtain around the estimated RMSEA value (Byrne, 2012; Schreiber et al., 2006). While RMSEA values below .08 with a narrow confidence interval indicate an acceptable fit (Byrne, 2012), Hu & Bentler (1999) suggest values .06 or below indicate a good fit. Relatedly, the standardized root mean squared residual (SRMR) is another absolute fit index, which compares the covariance matrix of the hypothesized model and the sample data and "…represents the average value across all standardized residuals" (Byrne, 2012, p. 76). The SRMR ranges from 0 to 1.0, with smaller values (.08 or below) indicating a good fit (Byrne, 2012; Hu & Bentler, 1999; Schreiber et al., 2006). Finally, the Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) are comparative fit indices, which compare the hypothesized model to a baseline null model (Browne MacCallum et al., 2002; Byrne, 2012). Generally, CFI and TFI values of .95 or above are indicative of good fit, however the TLI does penalize more complex models with lower values (Byrne, 2012; Hu & Bentler, 1999; Schreiber et al., 2006).

Given these recommended fit indices, the indices of the initial measurement model suggested a poor fit (Chi-Square= 9996.23; df= 71, p<.001; CFI= .93; TFI= .92; RMSEA= .068 [CI: .067, .70]; SRMR= .030). However, the factor loadings for each observed measure were well above the .5 threshold, suggesting strong association between the latent variable and each

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[3] The Chi-Square Test another an absolute fit index used in structural equation models that measures both how well the model being tested fits the data and how parsimonious the model is; I report the Chi-Square under each diagram as is convention, however, it is exceedingly sensitive to sample size and thus not a particularly accurate measure of model fit for this study with samples ranging from 1200 to more than 30,000 (Byrne, 2012).

observed variable. Modification indices suggested that model fit would improve if error terms of the observed variables in each of the Cognitive Skills latent variables were allowed to covary (i.e., critical thinking at college entry with critical thinking presently, etc.). Given the theoretical justification for such a modification, I retested the measurement model with these covariances. This modification resulted in a model with excellent fit. The RMSEA value was .033 (90% CI: .032 to .034), and the CFI was .99 and the TLI was .98. Finally, the SRMR was .024. While Mplus does not provide Cronbach's alpha to assess reliability of each factor, I used SPSS to ascertain alphas for each latent variable. Table 4.8 summarizes the factor loadings and alphas of each latent variable and Figure 4.1 is a graphic depiction of the measurement model, including all four factors.

Table 4.8. Factor Loadings and Reliability for All Poor and Working-Class Students (n=29,816)

Factor/Item	Factor Loading	Cronbach's α
Self-Rated Cognitive Skills (College Entry)		.848
Analytical and critical thinking skills	.826	
Ability to be clear and effective when writing	.818	
Ability to read and comprehend academic material	.779	
Student-Faculty Interaction		.775
How often: Contributed to a class discussion	.670	
How often: Communicated with the instructor outside of class about issues/concepts derived from a course	.665	
How often: Had a class in which the professor knew or learned your name	.769	

Factor/Item	Factor Loading	Cronbach's α
Number of faculty you know well enough to ask for a letter of recommendation	.628	
Campus Racial Climate		.872
Students of my race/ethnicity are respected on this campus	.655	
Overall, I feel comfortable with the climate for diversity and inclusiveness at RU	.918	
Overall, I feel comfortable with the climate for diversity and inclusion in my classes	.854	
Overall, I feel comfortable with the climate for diversity and inclusiveness at RU	.756	
Self-Rated Cognitive Skills (Current)		.838
Analytical and critical thinking skills	.817	
Ability to be clear and effective when writing	.788	
Ability to read and comprehend academic material	.786	

Figure 4.1. Results of Confirmatory Factor Analysis on Sample of All Poor and Working-Class Students
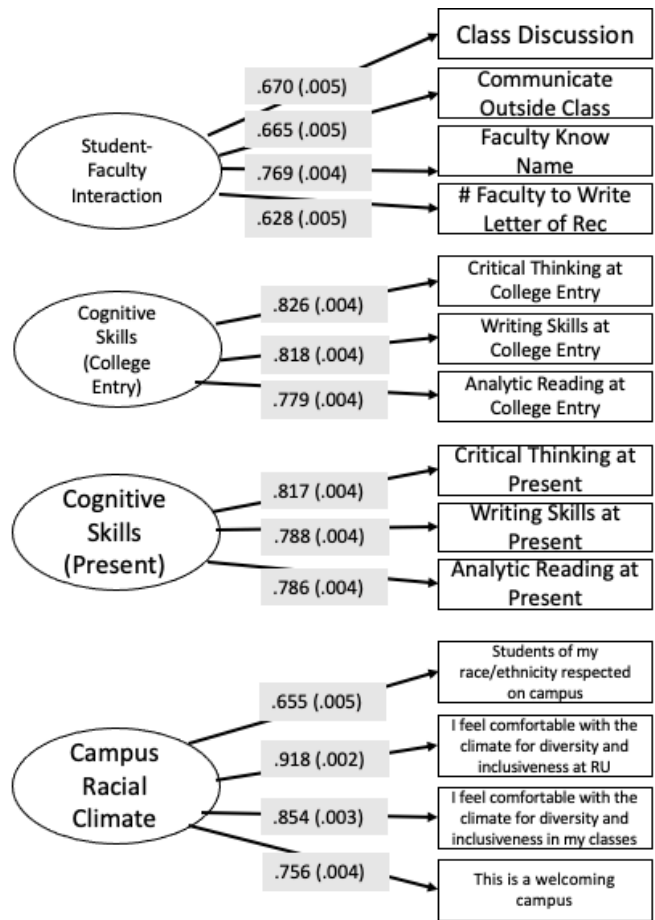
Note. Results of the confirmatory factor analysis (CFA) on all poor and working-class students. Standardized parameter estimates shown in gray boxes with standard errors in parentheses. RMSEA= .033 (90% CI: .032 to .034), CFI= .99, TLI= .98. SRMR= .024. For simplicity error terms and covariances are not shown.

Omnibus Structural Model

Once I achieved a well-fitting measurement model, I next sought to assess the model fit and estimate the parameters of the full hypothesized model on the sample of all poor and working-class college students of the SERU survey. Model fit indices suggested the data fit this hypothesized model well. The RMSEA value was estimated at .033 (90% CI: .033, .034), the

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CFI and TFI both exceeded .95 (CFI= .96; TFI= .95), and the SRMR was .049. Figure 4.2 exhibits the full structural model and the standardized coefficients for all direct paths, with paths significant at p<.05 and insignificant paths indicated as such. All standardized and unstandardized direct, indirect, and total effects, as well as R^2 values for each endogenous variable in the model are presented in Table 4.10. Given the size and complexity of the hypothesized model, the following sections discuss the parameter estimates for subsections of the model.

Predictors of Student-Faculty Interaction

Research question four first asks about the social identities and experiences that may portend to student-faculty interaction among poor and working-class college students. Accordingly, the omnibus structural equation model tested fifteen direct paths from students' reported social identities, characteristics, and experiences to student faculty interaction. Beginning with students' social identities, the patterns borne out in the descriptive analyses above were observed here. That is, compared to white poor and working-class students, poor and working-class students who were Latinx (β = -.292) and Asian or Asian American (β = -.505) engaged in significantly lower rates of student-faculty interactions, while Black poor and working-class students (β = .166) engaged with faculty significantly more. However, indicating another race or ethnicity (i.e. Native American, Alaska Native, Pacific Islander, Native Hawaiian, Multi-Racial) did not significantly predict student-faculty interaction.

The gendered patterns of engaging with faculty were also observed in the structural model as women engaged in significantly less student-faculty interaction than did men (β = -.098). Other social identities included in the model suggest that first-generation working-class college students (β = -.032) engaged in significantly less student-faculty interaction than did their

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continuing-generation peers, while working-class students who were not U.S. Citizens or permanent residents of the U.S. were *more* likely than U.S. citizens and permanent residents to engage with faculty (β = .266).

Turning to students' academic backgrounds, the effects of student major were particularly strong significant predictors of student-faculty interactions. Arts and humanities majors (β = .527) as well as business/professional majors (β = .139) engaged in higher rates of student-faculty interaction than did social science majors (the reference category). However, STEM-H majors (β = -.150) were far less likely than social science majors to engage with faculty. Time spent in college also appeared to be particularly important for engaging more with faculty as evidenced by the fact that community college transfer students (β = .269) engaged in more interactions than their first-time college attending peers, and that the more advanced a students' year in college (i.e. freshman, sophomore, junior, senior), the more they interacted with faculty. Somewhat relatedly, the results from the final model suggested that poor and working-class students with higher self-rated cognitive skills at college entry were more likely to engage with faculty.

Figure 4.2. Final Structural Model for All Poor and Working-Class Students (N=29,816)
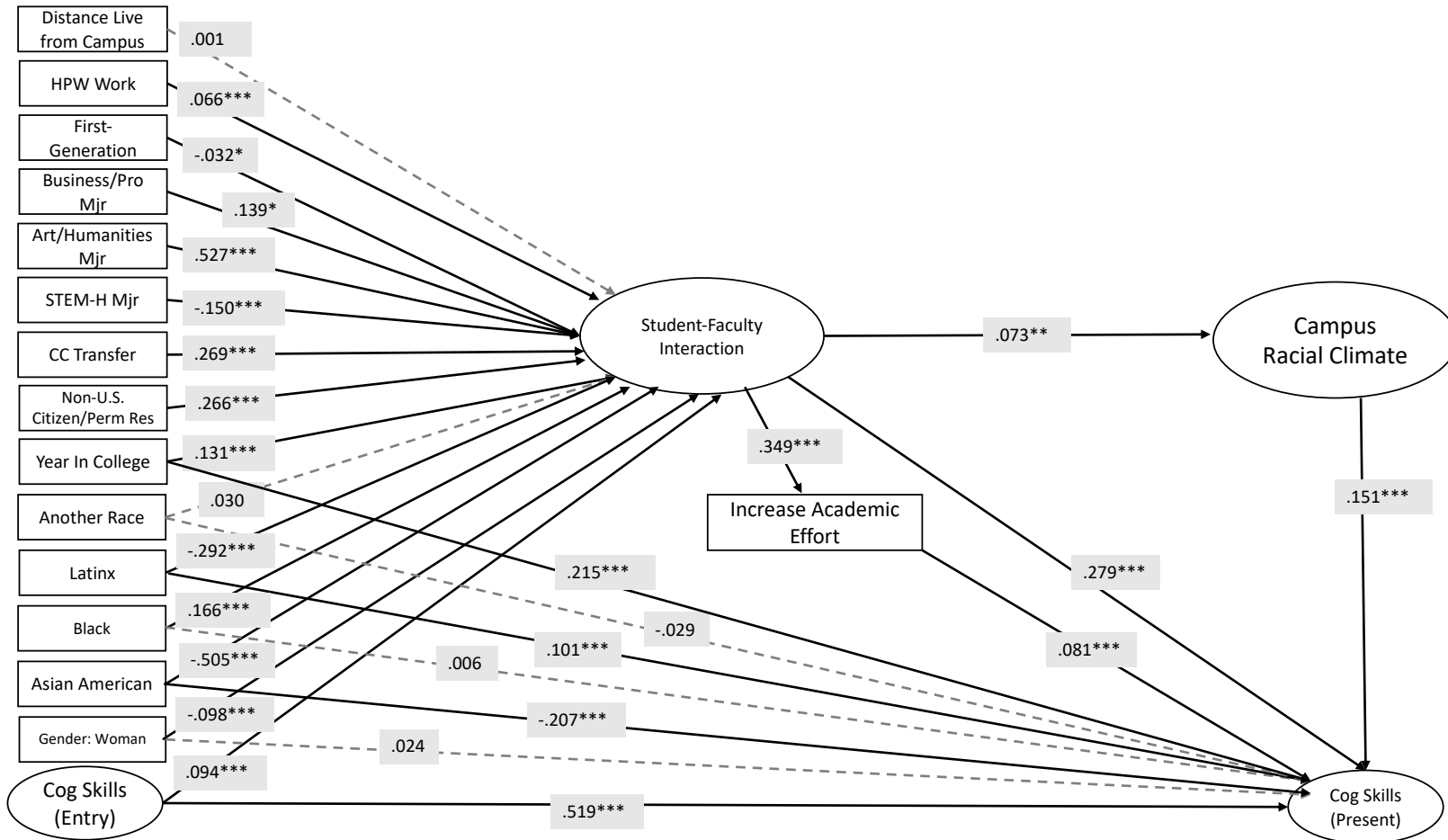
*p <. 05. **p < .01. ***p < .001.
Note. This figure demonstrates the relationships between observed variables (rectangles) and latent variables (ovals) predicting students' cognitive skills. RMSEA= .033 (CI: .032, .034), CFI= .96, TLI= .95, SRMR= .05. Standardized beta coefficients for each path are shown in grey boxes. All path coefficients were significant at *p* < .05, unless indicated by grey dotted line. For simplicity, observed variables predicted by each latent variable are omitted, as are residual error terms/disturbances and covariances.

Table 4.9. Direct, Indirect, and Total Effects for Omnibus Model (N=29,816)

	Student-Faculty Interaction R^2= .15			Academic Effort R^2= .12			Campus Racial Climate R^2= .01			Cognitive Skills (Present) R^2= .52		
	B	SE	β	B	SE	β	B	SE	β	B	SE	β
Gender												
Direct Effects	-.087***	.020	-.098	--	--	--	--	--	--	.018	.009	.024
Indirect Effects	--	--	--	-.046***	.011	-.034	-.006*	.002	-.007	-.023***	.006	-.031
Total Effects	-.087***	.020	-.098	-.046***	.011	-.034	-.006*	.002	-.007	-.005	.010	-.007
Asian/Asian Am.												
Direct Effects	-.446***	.040	-.505	--	--	--	--	--	--	-.150***	.021	-.207
Indirect Effects	--	--	--	-.236***	.019	-.176	-.030**	.009	-.037	-.116***	.006	-.168
Total Effects	-.446***	.040	-.505	-.236***	.019	-.176	-.030**	.009	-.037	-.266***	.020	-.368
Black/African Am.												
Direct Effects	.147***	.024	.166	--	--	--	--	--	--	.004	.025	.006
Indirect Effects	--	--	--	.078***	.013	.058	.010*	.004	.021	.038***	.007	.053
Total Effects	.147***	.024	.166	.078***	.013	.058	.010*	.004	.021	.042	.027	.059
Hispanic/Latinx												
Direct Effects	-.258***	.047	-.292	--	--	--	--	--	--	.073***	.013	.101
Indirect Effects	--	--	--	-.136***	.024	-.102	-.017**	.005	-.021	-.067***	.011	-.093
Total Effects	-.258***	.047	-.292	-.136***	.024	-.102	-.017**	.005	-.021	.006	.014	.008
Another Race												
Direct Effects	.026	.034	.030	--	--	--	--	--	--	-.021	.027	-.029
Indirect Effects	--	--	--	.014	.018	.010	.002	.002	.002	.007	.009	.009
Total Effects	.026	.034	.030	.014	.018	.010	.002	.002	.002	-.014	.028	-.019
Non-U.S. Citizen												
Direct Effects	.235***	.055	.266	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	.124***	.027	.093	.016**	.005	.019	.061***	.013	.085
Total Effects	.235***	.055	.266	.124***	.027	.093	.016**	.005	.019	.061***	.013	.085
First-Generation												
Direct Effects	-.028*	.013	-.032	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	-.015*	.007	-.011	-.002	.001	-.002	-.007*	.004	-.010
Total Effects	-.028*	.013	-.032	-.015*	.007	-.011	-.002	.001	-.002	-.007*	.004	-.010
Class Standing												
Direct Effects	.096***	.009	.131	--	--	--	--	--	--	.129***	.005	.215

	Student-Faculty Interaction R²= .15			Academic Effort R²= .12			Campus Racial Climate R²= .01			Cognitive Skills (Present) R²= .52		
	B	SE	β	B	SE	β	B	SE	β	B	SE	β
Indirect Effects	--	--	--	.051***	.005	.046	.006*	.002	.010	.025***	.002	.042
Total Effects	.096***	.009	.131	.051***	.005	.046	.006*	.002	.010	.154***	.005	.257
Transfer												
Direct Effects	.237***	.044	.268	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	.125***	.023	.094	.016**	.006	.019	.062***	.012	.085
Total Effects	.237***	.044	.268	.125***	.023	.094	.016**	.006	.019	.062***	.012	.085
STEM-H Major												
Direct Effects	-.132***	.032	-.150	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	-.070***	.015	-.052	-.009***	.002	-.011	-.035***	.008	-.048
Total Effects	-.132***	.032	-.150	-.070***	.015	-.052	-.009***	.002	-.011	-.035***	.008	-.048
Arts/Humanities Major												
Direct Effects	.466***	.038	.527	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	.246***	.018	.013	.031**	.010	.038	.122***	.010	.168
Total Effects	.466***	.038	.527	.246***	.018	.013	.031**	.010	.038	.122***	.010	.168
Business/Pro Major												
Direct Effects	.123*	.053	.139	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	.065*	.028	.049	.008	.005	.010	.032*	.014	.044
Total Effects	.123*	.053	.139	.065*	.028	.049	.008	.005	.010	.032*	.014	.044
HPW Employed												
Direct Effects	.005***	.001	.066	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	.003***	.000	.023	.001*	.000	.005	.001***	.000	.021
Total Effects	.005***	.001	.066	.003***	.000	.023	.001*	.000	.005	.001***	.000	.021
Distance from Campus												
Direct Effects	.001	.010	.001	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	.001	.005	.001	.000	.001	.000	.000	.003	.000
Total Effects	.001	.010	.001	.001	.005	.001	.000	.001	.000	.000	.003	.000
Cog. Skills (college entry)												
Direct Effects	.098***	.011	.094	--	--	--	--	--	--	.446***	.008	.519
Indirect Effects	--	--	--	.052***	.066	.033	.007**	.002	.007	.026***	.002	.030
Total Effects	.098***	.011	.094	.052***	.066	.033	.007**	.002	.007	.472***	.009	.549

	Student-Faculty Interaction R²= .15			Academic Effort R²= .12			Campus Racial Climate R²= .01			Cognitive Skills (Present) R²= .52		
	B	SE	β	B	SE	β	B	SE	β	B	SE	β
Student-Faculty Interaction												
Direct Effects	--	--	--	.528***	.019	.349	.066**	.022	.073	.229***	.012	.279
Indirect Effects	--	--	--	--	--	--	--	--	--	.032***	.003	.039
Total Effects	--	--	--	.528***	.019	.349	.066**	.022	.073	.261***	.013	.318
Academic Effort												
Direct Effects	--	--	--	--	--	--	--	--	--	.044***	.003	.081
Indirect Effects	--	--	--	--	--	--	--	--	--	--	--	--
Total Effects	--	--	--	--	--	--	--	--	--	.044***	.005	.081
Campus Racial Climate												
Direct Effects	--	--	--	--	--	--	--	--	--	.135***	.011	.151
Indirect Effects	--	--	--	--	--	--	--	--	--	--	--	--
Total Effects	--	--	--	--	--	--	--	--	--	.135***	.009	.151

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

Finally, the model also captured aspects of poor and working-class students' extra-curricular lives that prior research has suggested can make it challenging to interact with faculty and engage in campus life more generally. While the distance students lived from campus was not a significant predictor to rates of student-faculty engagement, the model suggests that the more hours per week poor and working-class students work (based on self-reports of total hours-per-week students worked on and/or off campus) ($\beta = .066$), the more likely they were to engage with faculty, a finding that is somewhat counter to prior research.

Direct Relationships Between Exogenous Variables and Students' Self-Rated Cognitive skills

Overall, students' social identities and background characteristics exhibited strong relationships with their rates of student-faculty interaction as hypothesized by the model with race/ethnicity, academic major, and class standing and transfer status being particularly salient. Given that many of these identities and characteristics may also have a direct relationship with students' self-reported cognitive skills and the importance of controlling for such relationships, I also tested direct paths from each race/ethnicity category, gender, year in college, and students' self-reported cognitive skills at college entry. Unsurprisingly, students' self-reported cognitive skills when they began college ($\beta = .519$) (i.e. the proxy "pretest" for this dependent variable) was the strongest positive predictor of their self-rated cognitive skills at present. However, students' year in college or class standing was also significant, with more advanced students expectedly reporting higher rates of cognitive skills. Turning to students' social identities, while there was no significant relationship between gender, being Black, or being another race/ethnicity (e.g. Native American/Alaska Native, Pacific Islander/Native Hawaiian, or something else) and students' self-rated cognitive skills, Latinx students ($\beta = .101$) reported significantly higher cognitive skills at present than did white students. Conversely, Asian and

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Asian American students (β = -.207) reported significantly lower cognitive skills than their white peers.

The Direct and Indirect Effects of Student-Faculty Interaction on Cognitive Skills

Looking next at the second half of the model, this section describes the effects of student faculty interaction on students' self-rated cognitive skills. First, results from the model indicate that student-faculty interaction had a strong positive direct effect on cognitive skills (β = .279), such that the more students interacted with faculty, the greater their self-reported cognitive skills. However, the relationship between cognitive skills and student-faculty interaction was at least partially explained by increased academic effort and campus racial climate. Not surprisingly, engaging more with faculty positively predicted a more frequent increase in academic effort (β = .349), and increasing academic effort had a smaller but still significantly positive effect on self-reported cognitive skills (β = .081). Additionally, working-class students who reported more student faculty interaction also indicated more positive perceptions of campus racial climate (β = .073). Further, the results suggest that more positive perceptions of campus racial climate were strongly associated with working-class students self-rated cognitive skills (β = .151).

While these specific indirect paths are statistically significant, suggesting that both increased academic effort and campus racial climate each partially explain the positive relationship between student-faculty interaction and self-rated cognitive skills, the effect size indicated by the standardized path coefficient of this indirect path (β = .039) is small, and certainly much less salient than the direct relationship between student-faculty interaction and cognitive skills. Further, a testing of the model without the direct path from student-faculty interaction to cognitive skills yielded fit statistics slightly worse than the model with the path included, as reported in Table 4.9. Thus the relatively smaller effect size of the indirect effects of

student-faculty interaction on cognitive skills and the poorer fitting model when the direct path between student-faculty interaction and cognitive skills is removed provides support for partial mediation. That is, that increased academic effort and campus racial climate *partially* explain the relationship between student-faculty interaction and cognitive skills rather than fully explain this relationship.

Table 4.10. Fit Statistics for Original and Alternative Model Testing Mediation of Student-Faculty Interaction and Self-Rated Cognitive Skills

Model	Chi-Square	df	CFI	TLI	Change in Chi-Sq	Change in CFI	Change in TLI
Original Model	9090.962	271	.958	.951			
Alternative Model: No direct path from student-faculty interaction to T2 Cognitive Skills	10199.155	272	.953	.945	1108.193	.05	.06

The Mediating Effects of Student-Faculty Interaction. Finally, research question two asks about the mediating role of student-faculty interaction in explaining the relationships between poor and working-class students' social identities and background characteristics and their self-rated cognitive skills. First, the findings suggest that student-faculty interaction mediated the relationship between poor and working-class students' race/ethnicity and their self-reported cognitive skills in unique ways. First, the model suggested there was not a significant relationship directly nor indirectly between identifying as another race/ethnicity and self-rated cognitive skills. However, as previously stated, Asian and Asian American poor and working-class students engaged with faculty significantly less ($\beta = -.505$) and rated their cognitive skills lower than their white counterparts ($\beta = -.207$). However, given the generally positive relationship between student' faculty interaction and cognitive skills' rating, the path coefficient

for the total indirect effect between being Asian/Asian American and cognitive skills ($\beta = -.168$) is *less negative* than the coefficient for the direct path from being Asian/Asian American and cognitive skills. This suggests that student-faculty interaction partially mediates the relationship between Asian and Asian American students' race/ethnicity and their self-rated cognitive skills. Specifically, it appears that Asian and Asian American students engage with faculty less frequently than their white peers, which is concerning; however, it also appears there are benefits when they do so. The model suggests that Asian and Asian American students who engage more frequently with faculty rate their cognitive skills *less negatively* than those who do not, even when controlling for a variety of other variables. Thus, Asian and Asian American students' lower rates of faculty interaction appear to hinder their cognitive skills development, not only because student-faculty interaction is associated with higher self-ratings of cognitive skills, but also due to the fact that lower faculty interaction may adversely affect academic effort and perceptions of campus racial climate as well.

The mediating relationship for Black students appears to be somewhat different. As noted previously, there was not a significant association between identifying as Black and students' self-rated cognitive skills ($\beta = .004$). However, the indirect effect between these variables was significant and positive ($\beta = .053$), suggesting that Black students' high rates of engagement with faculty relative to white students *totally* mediates their self-rated cognitive skills. While the effect size of this path coefficient is practically small, suggesting other variables likely also contribute to Black poor and working-class students' cognitive skills, Black students' high rates of engagement with faculty appear to portend higher self-ratings of cognitive skills.

Finally, as previously mentioned, Latinx students reported lower rates of student-faculty interactions relative to white students ($\beta = -.292$), however they rated their cognitive skills higher

than their white peers (β = .101). Thus, the negative path coefficient for the indirect relationship between identifying as Latinx and students' self-rated cognitive skills via student-faculty interaction (β = -.093) suggests that Latinx students' lower rates of engagement with faculty negatively impacts their otherwise high cognitive skills self-ratings.

Beyond the significant indirect effects of race/ethnicity, student-faculty interaction also mediated the effect of gender on students' self-rated cognitive skills. As noted, gender was not significantly associated with cognitive skills directly, suggesting faculty-interactions fully mediated the relationship between gender and cognitive skills. However, women were significantly less likely than men to interact with faculty (β = -.098) and more student-faculty interaction was associated with more positive self-ratings of cognitive skills (β = .261). Thus women's low rates of interaction with faculty resulted in a significant negative indirect path coefficient (β = -.031) also negatively impacted their self-rated cognitive skills.

Finally, class standing and self-rated cognitive skills at college entry, the final variables with both direct and indirect paths to students' self-rated cognitive skills, functioned in similar ways. In both cases, these variables had strong positive direct relationships with cognitive skills (β = .215 and β = .519), however they were also positively associated with student-faculty interaction. The coefficients of the indirect paths between class standing and cognitive skills (β = .042) and self-rated cognitive skills at college entry and self-rated cognitive skills later (β = .030), are smaller than those for the direct paths though still significant, suggesting that student-faculty interaction partially mediates the relationship between these variables and students' self-rated cognitive skills.

The rest of the exogenous variables in the model are associated with students self-rated cognitive skills only by way of student faculty interaction. For example, the positive and

significant indirect path coefficients to students' current self-rated cognitive skills from being a transfer student ($\beta = .085$), a non-use citizen or permanent resident ($\beta = .061$), majoring in the arts/ humanities ($\beta = .168$) or a business/professional field ($\beta = .044$), suggest that the high rates of engagement in student-faculty interaction among these students explains the positive significant effect of these variables on poor and working-class students' cognitive skills.

Further, while working more hours per week was also associated with more student-faculty interactions, and thus had a significant positive indirect relationship on students' self-rated cognitive skills, the effect was small ($\beta = .021$). Conversely, the significantly lower rates of engaging with faculty among first-generation students relative to their continuing generation peers at least partially explains the negative indirect relationship between being first-generation and cognitive skills ($\beta = -.010$). Similarly, being a STEM-H major portended to lower rates of faculty interaction compared to social science majors, which partially explains the significant negative indirect path coefficient from being a STEM-H major to cognitive skills ($\beta = -.048$).

Research Question Three: How Race/Ethnicity Moderates the Predictors of Student-Faculty Interaction and Cognitive Skills

Research question three sought to explore to what extent and how the hypothesized model changes when applied to racial ethnic subsamples of poor and working-class students. The following four sections review the model fit statistics and direct and indirect relationships for Asian and Asian American poor and working-class students, Black and African American poor and working-class students, Hispanic/Latinx poor and working-class students, and white poor and working-class students.[4]

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[4] In the following sections and in tables, I sometimes use shorthand when referring to groups of students (e.g., referring to students just as "Black" instead of "Black/African American" or "working-class" instead of "poor and working-class") for brevity. Note that all students in the sample are poor and working-class and this shorthand is meant to be inclusive of the broader group when used.

Asian and Asian American Poor and Working-Class Student Model

Asian and Asian American Measurement Model

Before testing the full structural model on the Asian and Asian American subsamples, I also validated the measurement model to ensure that the relationships among latent variables that held in the full model also did so on the racial/ethnic subsamples of students. Table 4.11 shows the factor loadings for each observed variable as well as the Cronbach's alpha test of reliability. Figure 4.3 depicts the measurement model tested on the Asian and Asian American students graphically.

Table 4.11. Factor Loadings and Reliability for Asian and Asian American Poor and Working-Class Students (n=8,677)

Factor/Item	Factor Loading	Cronbach's α
Student-Faculty Interaction		.769
How often: Contributed to a class discussion	.656	
How often: Communicated with the instructor outside of class about issues/concepts derived from a course	.709	
How often: Had a class in which the professor knew or learned your name	.750	
Number of faculty you know well enough to ask for a letter of recommendation	.590	
Self-Rated Cognitive Skills (College Entry)		.858
Analytical and critical thinking skills	.813	
Ability to be clear and effective when writing	.837	
Ability to read and comprehend academic material	.804	

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Factor/Item	Factor Loading	Cronbach's α
Self-Rated Cognitive Skills (Current)		
Analytical and critical thinking skills	.821	
Ability to be clear and effective when writing	.810	
Ability to read and comprehend academic material	.801	
Campus Racial Climate		.876
Students of my race/ethnicity are respected on this campus	.648	
Overall, I feel comfortable with the climate for diversity and inclusiveness at RU	.917	
Overall, I feel comfortable with the climate for diversity and inclusion in my classes	.866	
Overall, I feel comfortable with the climate for diversity and inclusiveness at RU	.810	

Figure 4.3. Results of Confirmatory Factor Analysis on Sample of Asian and Asian American Poor and Working-Class Students
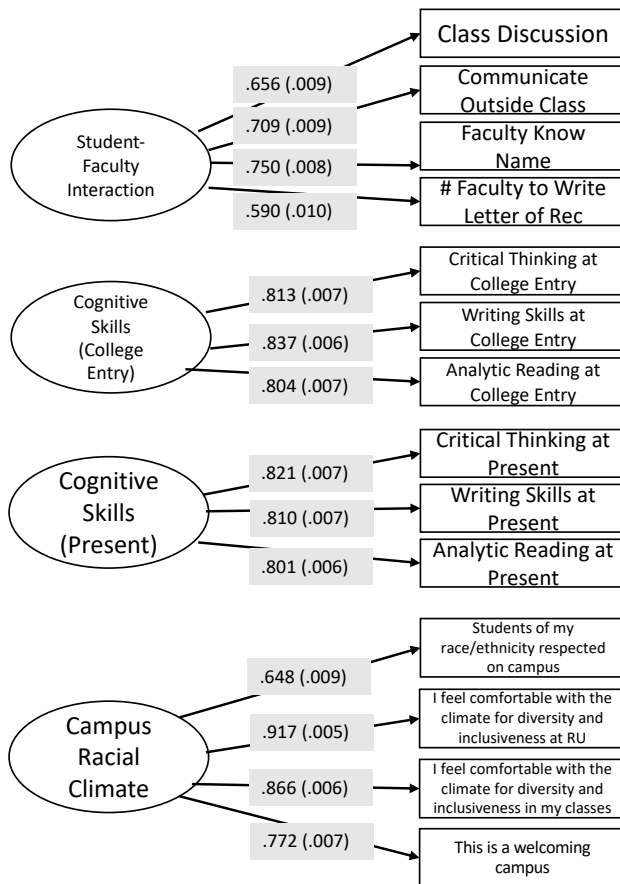
Note. Results of the confirmatory factor analysis (CFA) on Asian and Asian American poor and working-class students. Standardized parameter estimates shown in gray boxes with standard errors in parentheses. Chi-Square= 585.67, df= 68, RMSEA=.030 (90% CI: .027, .032), CFI= .99, TLI= .98, SRMR= .022. For simplicity error terms and covariances are not shown.

Fit statistics of the measurement model suggest the data fit the model well. The RMSEA value was .030 (90% CI: .027, .032), the CFI was .99 and the TLI was .98, and the SRMR was .022. Standardized parameter estimates are provided in Figure 4.3.

Asian and Asian American Full Structural Model

Below, Figure 4.4 shows the full model when tested on the subsample of Asian and Asian American students. Overall, the fit statistics on this subsample indicate that the model fit the data well. The RMSEA value was .031 (90% CI=.030, .033), the CFI and TFI were .964 and .958 respectively, and the SRMR was .037. Most paths were significant at $p<.05$ and were consistent with the hypothesized model and the model representing all poor and working-class students.

Predictors of Student-Faculty Interaction. Among Asian and Asian American poor and working-class students, key social identities, academic background characteristics, and other responsibilities emerged as salient predictors of student faculty interactions. Beginning with students' social identities, Asian and Asian American women engaged with faculty significantly less frequently than did Asian American men (β = -.129), a pattern visible in the descriptive analyses and among poor and working-class students writ large. Also mirroring results from the omnibus model, findings from the structural equation model suggest that working-class Asian and Asian American students who are not U.S. citizens or permanent residents engaged with faculty at significantly higher rates than their peers who were U.S. citizens/permanent residents (β = .423). However, first-generation college student status did not emerge as a significant predictor of student-faculty interaction among poor and working-class Asian and Asian Americans.

Next, the more time Asian and Asian American students spent in college the more likely they were to engage with faculty, as evidenced both by the strong positive relationship between year in college and student-faculty interaction (β = .106) as well as by being a transfer student (versus not being a transfer student) (β = .266). Poor and working-class Asian and Asian American students' college major was also significantly related to their rates of student-faculty interaction, with arts and humanities (β = .588) and business and professional majors (β = .181) engaging

more frequently with faculty than their peers who were social science majors. However, students majoring in STEM or health fields were less likely than social science majors to interact with faculty. Finally, poor and working-class Asian and Asian American students who had higher self-ratings of their cognitive skills when they arrived in college engaged with faculty more frequently ($\beta = .152$)

Lastly, beyond poor and working-class Asian and Asian American students' social identities and academic backgrounds, two other contextual variables were included in the model. Among poor and working-class Asian and Asian American students, the distance they lived from campus did not have a significant relationship with their rates of student-faculty interaction. However, as observed in the model tested on all poor and working-class students, the more hours per week Asian and Asian Americans spent working, the more often they interacted with faculty.

Figure 4.4. Final Structural Model for Asian and Asian American Poor and Working-Class Students (n=8,677)
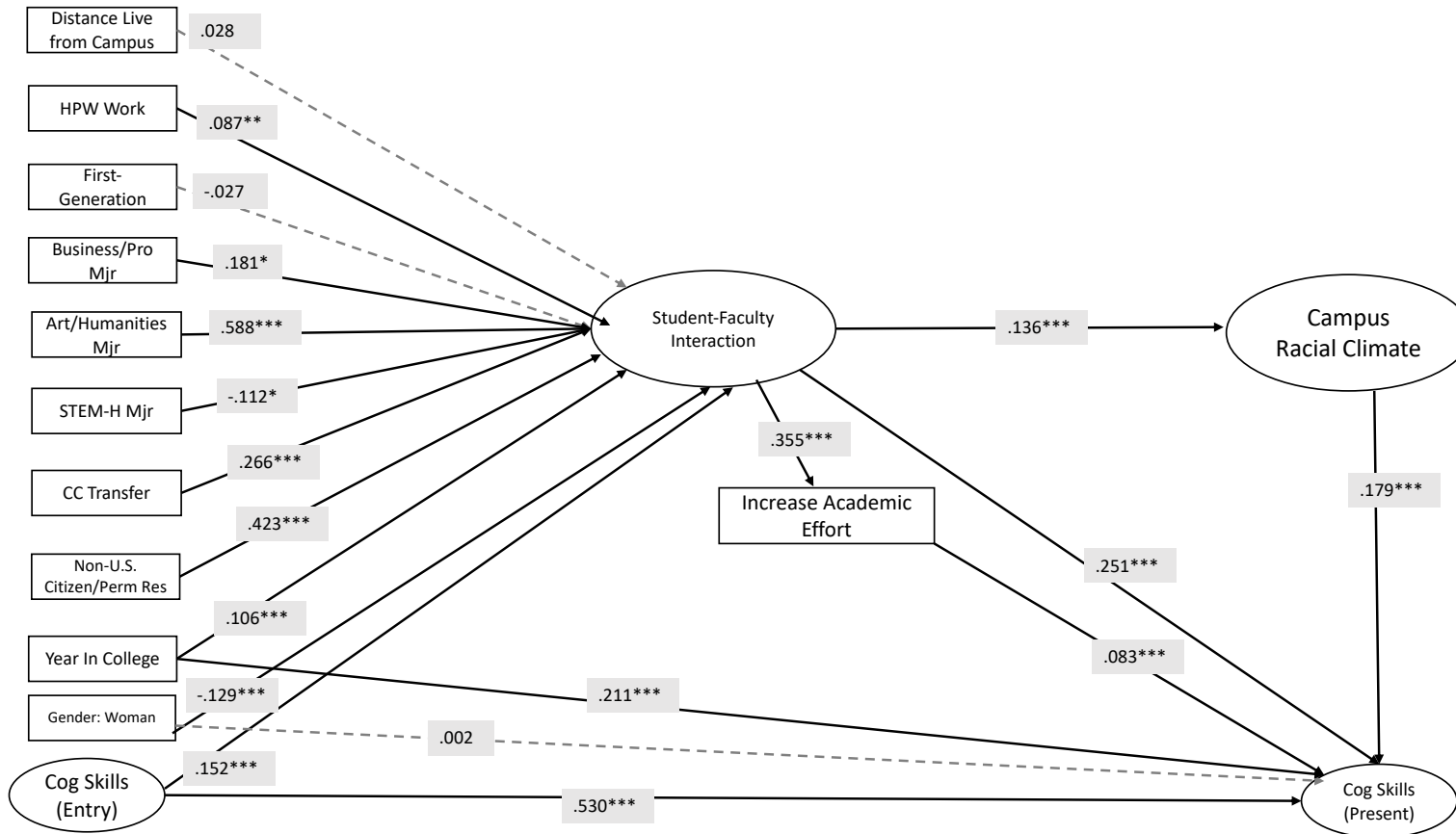
*p <. 05. **p < .01. ***p < .001.
Note. This figure demonstrates the relationships between observed variables (rectangles) and latent variables (ovals) predicting Asian and Asian American students' self-rated cognitive skills. Chi-Square= 2094.50, df= 219, RMSEA= .031 (90% CI: 030, .033), CFI= .96, TLI= .96, SRMR= .04. Standardized beta coefficients for each path are shown in grey boxes. All path coefficients were significant at *p* < .05, unless indicated by grey dotted line. For simplicity, observed variables predicted by each latent variable are omitted, as are residual error terms/disturbances and covariances.

Direct Relationships Between Exogenous Variables and Students' Self-Rated

Cognitive skills. As with the omnibus model, each racial/ethnic subgroup model tested direct relationships between key exogenous variables and their current self-rated cognitive skills (the final DV in the model). In each model, direct relationships between gender, year in college, and students' cognitive skills at entry were tested. Among poor and working-class Asian and Asian American students, there was not a significant relationship between gender and students self-rated cognitive skills, however both year in college (β = .211) and students' self-rated cognitive skills at college entry (β = .530) had strong positive associations with students' self-rated cognitive skills later.

The Direct and Indirect Effects of Student-Faculty Interaction on Cognitive Skills. Among poor and working-class Asian and Asian American students, interacting with faculty had strong positive effects on their self-rated cognitive skills both directly and indirectly. The direct path between the frequency of student-faculty interaction and cognitive skills was significant and positive (β = .251). However, interacting with faculty also had strong positive associations with increased academic effort (β = .355) and Asian and Asian American students' more positive perceptions of campus racial climate (β = .136), both of which also portended to higher self-ratings of their cognitive skills. Yet, as in the omnibus model, the relatively smaller path coefficient of the indirect paths from student-faculty interaction to cognitive skills (β = .054) suggested that increased academic effort and perceptions of campus racial climate *partially* mediate the relationship student-faculty interaction to cognitive skills rather than fully.

Table 4.12. Direct, Indirect, and Total Effects for Asian and Asian American Model (n=8,677)

	Student-Faculty Interaction R²=.10			Academic Effort R²=.13			Campus Racial Climate R²=.02			Cognitive Skills (Present) R²=.52		
	B	SE	β	B	SE	β	B	SE	β	B	SE	β
Gender												
Direct Effects	-.108***	.021	-.129	--	--	--	--	--	--	.001	.014	.002
Indirect Effects	--	--	--	-.062***	.014	-.046	-.-12***	.003	-.018	-.029***	.007	-.039
Total Effects	-.108***	.021	-.129	-.062***	.014	-.046	-.-12***	.003	-.018	-.028*	.013	-.037
Non-U.S. Citizen												
Direct Effects	.354***	.078	.423	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	.203***	.044	.150	.038***	.009	.057	.096***	.019	.129
Total Effects	.354***	.078	.423	.203***	.044	.150	.038***	.009	.057	.096***	.019	.129
First-Generation												
Direct Effects	-.022	.017	-.027	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	-.013	.010	-.009	-.002	.002	-.004	-.006	.004	-.008
Total Effects	-.022	.017	-.027	-.013	.010	-.009	-.002	.002	-.004	-.006	.004	-.008
Class Standing												
Direct Effects	.074***	.012	.106	--	--	--	--	--	--	.131***	.004	.211
Indirect Effects	--	--	--	.043***	.006	.038	.008***	.002	.014	.020***	.003	.032
Total Effects	.074***	.012	.106	.043***	.006	.038	.008***	.002	.014	.152***	.005	.244
Transfer												
Direct Effects	.223***	.037	.266	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	.128***	.022	.095	.024***	.005	.036	.060***	.012	.081
Total Effects	.223***	.037	.266	.128***	.022	.095	.024***	.005	.036	.060***	.012	.081
STEM-H Major												
Direct Effects	-.093*	.042	-.112	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	-.054*	.023	-.040	-.010**	.004	-.015	-.025*	.010	-.034
Total Effects	-.093*	.042	-.112	-.054*	.023	-.040	-.010**	.004	-.015	-.025*	.010	-.034
Arts/Humanities Major												
Direct Effects	.492***	.038	.588	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	.282***	.020	.209	.053***	.008	.080	.133***	.012	.179
Total Effects	.492***	.038	.588	.282***	.020	.209	.053***	.008	.080	.133***	.012	.179
Business/Pro Major												
Direct Effects	.152*	.065	.181	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	.087*	.037	.064	.016*	.008	.025	.041*	.018	.055

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	Student-Faculty Interaction R²=.10			Academic Effort R²=.13			Campus Racial Climate R²=.02			Cognitive Skills (Present) R²=.52		
	B	SE	β	B	SE	β	B	SE	β	B	SE	β
Total Effects	.152*	.065	.181	.087*	.037	.064	.016*	.008	.025	.041*	.018	.055
HPW Employed												
Direct Effects	.008**	.001	.087	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	.008**	.001	.087	.001***	.001	.012	.002***	.000	.026
Total Effects	.008**	.001	.087	.008**	.001	.087	.001***	.001	.012	.002***	.000	.026
Distance from Campus												
Direct Effects	.020	.012	.028	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	.020	.012	.028	.002	.001	.004	.005	.003	.009
Total Effects	.020	.012	.028	.020	.012	.028	.002	.001	.004	.005	.003	.009
Cog. Skills (college entry)												
Direct Effects	.159***	.017	.152	--	--	--	--	--	--	.495***	.010	.530
Indirect Effects	--	--	--	.091***	.009	.054	.017***	.002	.021	.043***	.003	.046
Total Effects	.159***	.017	.152	.091***	.009	.054	.017***	.002	.021	.538***	.011	.576
Student-Faculty Interaction												
Direct Effects	--	--	--	.573***	.026	.355	.108***	.014	.136	.223***	.017	.251
Indirect Effects	--	--	--	--	--	--	--	--	--	.048***	.005	.054
Total Effects	--	--	--	.573***	.026	.355	.108***	.014	.136	.271***	.018	.304
Academic Effort												
Direct Effects	--	--	--	--	--	--	--	--	--	.046***	.004	.083
Indirect Effects	--	--	--	--	--	--	--	--	--	--	--	--
Total Effects	--	--	--	--	--	--	--	--	--	.046***	.004	.083
Campus Racial Climate												
Direct Effects	--	--	--	--	--	--	--	--	--	.200***	.013	.179
Indirect Effects	--	--	--	--	--	--	--	--	--	--	--	--
Total Effects	--	--	--	--	--	--	--	--	--	.200***	.013	.179

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

The Mediating Effects of Student-Faculty Interaction. Given the strong positive relationship between student-faculty interaction and poor and working-class Asian and Asian American students' cognitive skills, the findings from this model suggest that interaction with faculty can play an important role. For example, while year in college and Asian and Asian American Students' self-rated cognitive skills at college entry had strong positive associations with their self-rated cognitive skills later on (Year in college to Cognitive Skills directly β = .211; Cognitive skills at college entry to Cognitive Skills directly β = .530), these characteristics also portend to more interaction with faculty (β = .106 and β = .152) which also portended to higher self-rated cognitive skills. While though the indirect path coefficients from year in college to cognitive skills via student-faculty interaction (β = .032) and cognitive skills at college entry to cognitive skills later via student-faculty interaction (β = .046) are smaller in magnitude than the direct path coefficients, the model still suggests that interacting with faculty more frequently partially mediates the relationships between these two variables and self-rated cognitive skills.

Conversely, gender did not have a significant association with poor and working-class Asian and Asian American students' self-rated cognitive skills. However, Asian and Asian American women did appear to engage significantly less frequently with faculty than Asian and Asian American men (β = -.129). Thus among Asian and Asian American students, the negative indirect effect of identifying as a woman on students' self-rated cognitive skills (β = -.039) is totally explained by Asian and Asian American women's lower rates of student-faculty interaction. A similar explanation exists for the significant negative indirect path coefficient for poor and working-class Asian and Asian American STEM-H majors (β = -.034). That is, the low rates of student-faculty interaction among STEM-H majors relative to social science majors

explains at least some of the negative relationship between majoring in a STEM or health field and students' self-rated cognitive skills.

The rest of the significant exogenous variables in the model had both positive associations with more frequent student-faculty interactions and thus positively portended to increased self-ratings in Asian and Asian Americans' cognitive skills. In other words, the positive indirect association between students' self-rated cognitive skills and being a transfer student (β = .081), an international student/non-permanent resident of the U.S. (β = .129), an art/humanities (β = .179) or business/professional major (β = .055) or working more hours per week (β = .026) are somewhat explained by the fact that each of these characteristics made it more likely that poor and working-class Asian and Asian American students would engage with faculty more frequently.

Black and African American Poor and Working-Class Student Model

Black and African American Measurement Model

Before testing the full structural model on the Black and African American subsample, I validated the measurement model on the subsample. Table 4.13 shows the factor loadings for each observed variable as well as the Cronbach's alpha test of reliability. Figure 4.5 depicts the measurement model tested on the Black and African American students graphically. Fit statistics of the measurement model suggest the data fit the confirmatory factor structure well. The RMSEA value was .038 (90% CI: .032, .044), the CFI was .98 and the TLI was .97, and the SRMR was .031. Standardized parameter estimates are provided in Figure 4.5.

Table 4.13. Factor Loadings and Reliability for Black and African American Poor and Working-

Class Students (n=1,447)

Factor/Item	Factor Loading	Cronbach's α
Student-Faculty Interaction		.744
How often: Contributed to a class discussion	.669	
How often: Communicated with the instructor outside of class about issues/concepts derived from a course	.640	
How often: Had a class in which the professor knew or learned your name	.703	
Number of faculty you know well enough to ask for a letter of recommendation	.587	
Self-Rated Cognitive Skills (College Entry)		.813
Analytical and critical thinking skills	.781	
Ability to be clear and effective when writing	.783	
Ability to read and comprehend academic material	.740	
Self-Rated Cognitive Skills (Current)		.851
Analytical and critical thinking skills	.807	
Ability to be clear and effective when writing	.754	
Ability to read and comprehend academic material	.783	
Campus Racial Climate		.891
Students of my race/ethnicity are respected on this campus	.773	
Overall, I feel comfortable with the climate for diversity and inclusiveness at RU	.933	

Factor/Item	Factor Loading	Cronbach's α
Overall, I feel comfortable with the climate for diversity and inclusion in my classes	.825	
Overall, I feel comfortable with the climate for diversity and inclusiveness at RU	.752	

Figure 4.5. Results of Confirmatory Factor Analysis on Sample of Black and African American Poor and Working-Class Students
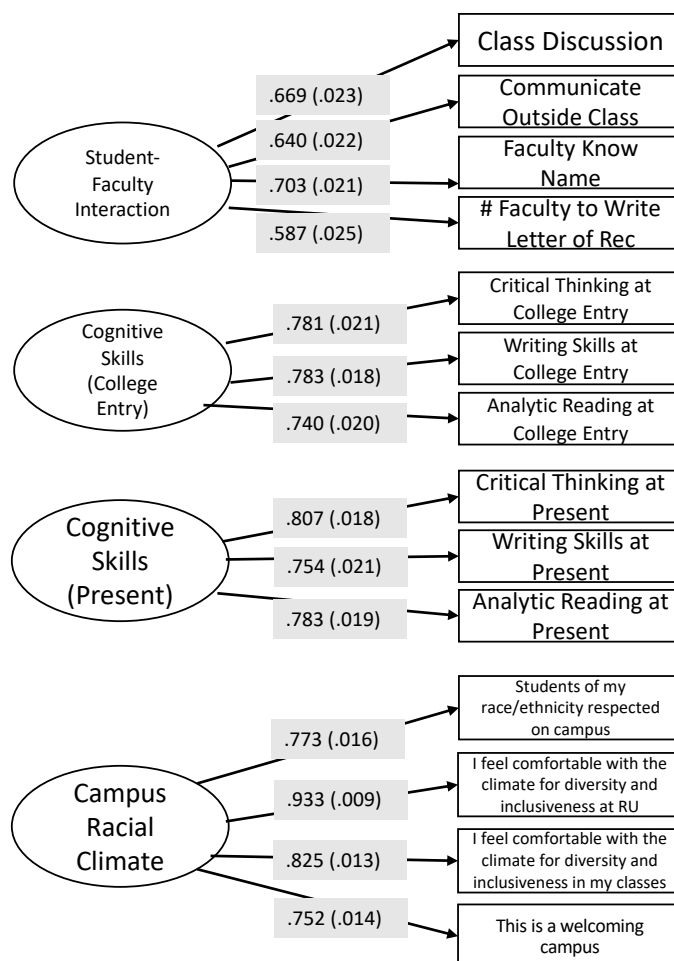
Note. Results of the confirmatory factor analysis (CFA) on Black and African American poor and working-class students. Standardized parameter estimates shown in gray boxes with standard errors in parentheses. Chi-

Square= 209.82, df= 68, RMSEA= .038 (90% CI: .032, .044), CFI= .98, TLI= .97, SRMR= .031. For simplicity error terms and covariances are not shown.

Black and African American Full Structural Model

Next, the hypothesized model was run on a subsample of Black poor and working-class students. Model fit statistics suggest that the data fit the model well with each statistic meeting or exceeding recommended thresholds. The RMSEA value was .035 (90% CI:.032, .039), the CFI was .96 and the TLI was .95, and the SRMR was .048. Figure 4.6 shows the relationships between all of the variables in the model.

Predictors of Student-Faculty Interaction. Notably, compared to the omnibus model of all poor and working-class college students and the model representing only poor and working-class Asian and Asian American students, fewer exogenous models emerged as significant predictors of student-faculty interaction among poor and working-class Black students. Among the variables that were significant, as in the prior two models, gender had a significant negative relationship with student-faculty interaction among Black students (β = -.143). In other words, poor and working-class Black women engaged significantly less frequently with faculty compared to Black men. However, the other social identities included in the model—first-generation status and U.S. citizenship—did not have significant relationships with Black students' rates of student-faculty interaction.

As seen in the other models, the salience of Black students' academic backgrounds and extra-curricular contexts (e.g. work and living situations) in the frequency with which they engaged with faculty were also explored. Some similar patters were observed. For example, Black transfer students engaged with faculty more frequently than their first-time peers (β = .242), as did Black students with higher self-rated cognitive skills at college entry (β = .110).

However, year in college did not significantly portend to more or less frequent student-faculty interaction as it did in other models. Concerning college major, poor and working-class Black students studying in arts and humanities fields engaged more frequently than those social science majors ($\beta = .458$), while STEM majors engaged with faculty significantly less often ($\beta = -.222$). On the other hand, having a business major was not significantly associated with interacting with faculty among Black students. Finally, as seen in the other models, the more hours per week poor and working-class Black students spend working, the more frequently they interacted with faculty ($\beta = .095$). However, living nearer to campus was not associated with rates of student-faculty interaction among Black students, just as it was not for Asian and Asian American students.

Direct Relationships Between Exogenous Variables and Students' Self-Rated Cognitive Skills. Direct paths from student gender, students' self-rated cognitive skills at college entry, and year in college to students' self-rated cognitive skills were also tested. While gender did not have a significant association with Black students' self-rated cognitive skills, both students' year in college ($\beta = .205$) and their self-rated cognitive skills at college entry ($\beta = .505$) had strong positive associations with their self-rated cognitive skills.

The Direct and Indirect Effects of Student-Faculty Interaction on Cognitive Skills. Among poor and working-class Black students, student-faculty interaction has a positive relationship with their self-rated cognitive skills. As seen in previous models, student-faculty interaction has a strong positive direct association with poor and working-class Black students self-rated cognitive skills ($\beta = .270$). However, more frequent interactions with faculty was also positively associated with increased academic effort among poor and working-class Black students ($\beta = .390$) as well as with more positive perceptions of campus climate ($\beta = .096$), and

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these variables also had significant positive associations with Black students' self-rated cognitive skills (β = .105, β = .082, respectively). However, as observed in previous models, the smaller relative magnitude of the indirect path coefficient (β = .049) from student-faculty interaction to self-rated cognitive skills suggests that increased academic effort and more positive perceptions of campus racial climate only partially mediate the relationship between student-faculty interaction and self-rated cognitive skills among poor and working-class Black students.

Figure 4.6. Final Structural Model for Black Poor and Working-Class Students (n=1,447)
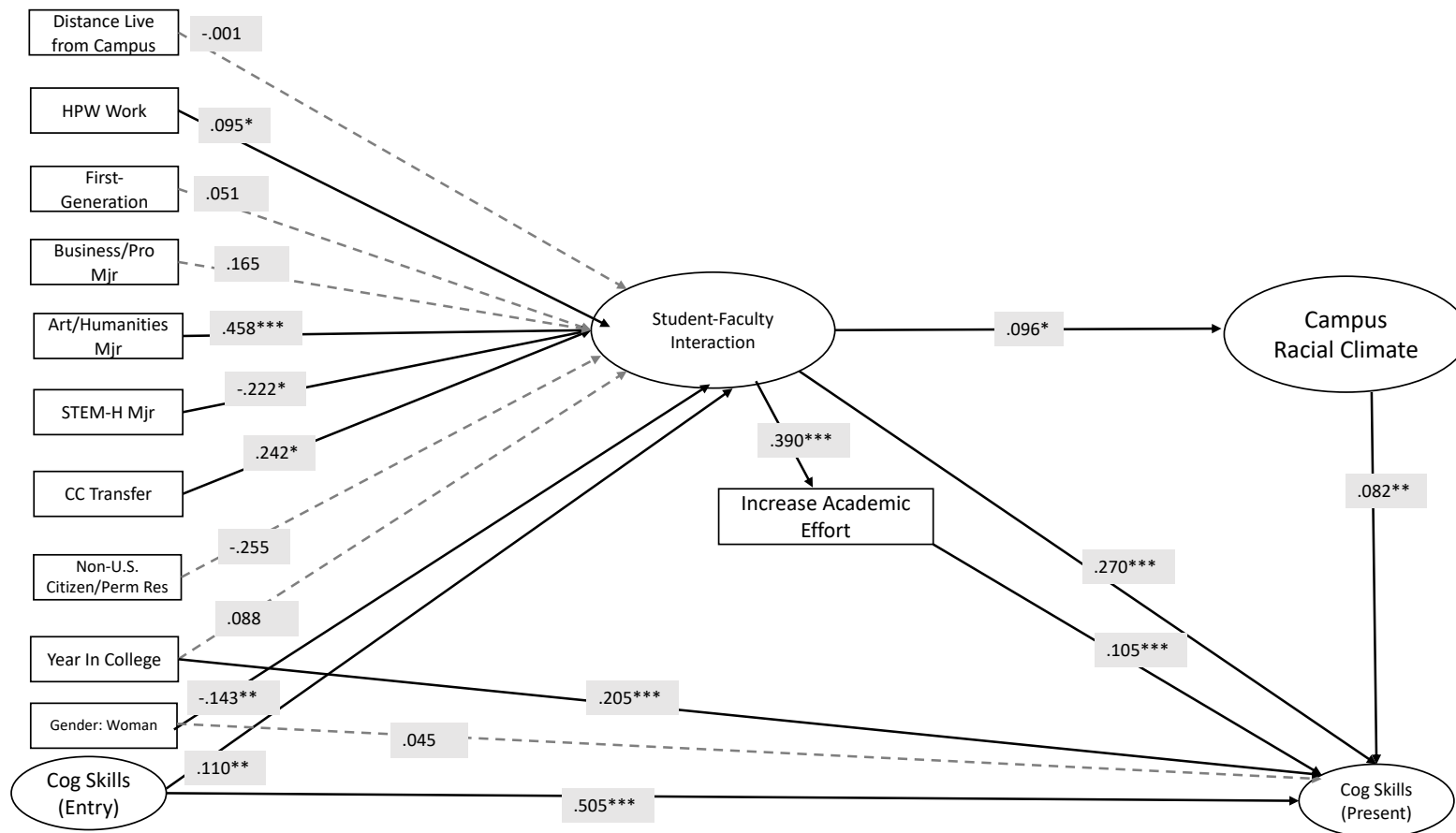
*p <. 05. **p < .01. ***p < .001.
Note. This figure demonstrates the relationships between observed variables (rectangles) and latent variables (ovals) predicting Black and African American students' self-rated cognitive skills. Chi-Square= 617.35, df= 219, RMSEA= .035 (90% CI: 032, .039), CFI= .96, TLI= .95, SRMR= .05. Standardized beta coefficients for each path are shown in grey boxes. All path coefficients were significant at *p* < .05, unless indicated by grey dotted line. For simplicity, observed variables predicted by each latent variable are omitted, as are residual error terms/disturbances and covariances.

Table 4.14. Direct, Indirect, and Total Effects for Black and African American Model (n=1,447)

	Student-Faculty Interaction $R^2=.09$			Academic Effort $R^2=.15$			Campus Racial Climate $R^2=.01$			Cognitive Skills (Present) $R^2=.46$		
	B	SE	β	B	SE	β	B	SE	β	B	SE	β
Gender: Woman												
Direct Effects	-.130**	.048	-.143	--	--	--	--	--	--	.034	.034	.045
Indirect Effects	--	--	--	-.076**	.028	-.056	-.015	.010	-.014	-.035**	.013	-.046
Total Effects	-.130**	.048	-.143	-.076**	.028	-.056	-.015	.010	-.014	.000	.034	-.001
Non-U.S. Citizen												
Direct Effects	-.231	.235	-.255	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	-.135	.140	.099	-.027	.023	-.025	-.062	.061	-.081
Total Effects	-.231	.235	-.255	-.135	.140	.099	-.027	.023	-.025	-.062	.061	-.081
First-Generation												
Direct Effects	.046	.066	.051	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	.027	.038	.020	.005	.008	.005	.012	.018	.016
Total Effects	.046	.066	.051	.027	.038	.020	.005	.008	.005	.012	.018	.016
Class Standing												
Direct Effects	.061	.036	.088	--	--	--	--	--	--	.119***	.017	.205
Indirect Effects	--	--	--	.036	.020	.034	.007	.005	.008	.016	.010	.028
Total Effects	.061	.036	.088	.036	.020	.034	.007	.005	.008	.136***	.023	.233
Transfer												
Direct Effects	.219*	.108	.242	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	.128*	.063	.094	.026	.017	.023	.058	.031	.077
Total Effects	.219*	.108	.242	.128*	.063	.094	.026	.017	.023	.058	.031	.077
STEM-H Major												
Direct Effects	-.201*	.089	-.222	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	-.118*	.051	-.087	-.024*	.009	-.021	-.054*	.023	-.071
Total Effects	-.201*	.089	-.222	-.118*	.051	-.087	-.024*	.009	-.021	-.054*	.023	-.071
Arts/Humanities Major												
Direct Effects	.415***	.078	.458	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	.243***	.045	.179	.049*	.024	.044	.110***	.022	.146
Total Effects	.415***	.078	.458	.243***	.045	.179	.049*	.024	.044	.110***	.022	.146
Business/Pro Major												
Direct Effects	.150	.091	.165	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	.087	.051	.064	.018	.013	.016	.040	.025	.053

	Student-Faculty Interaction R²= .09			Academic Effort R²= .15			Campus Racial Climate R²= .01			Cognitive Skills (Present) R²= .46		
	B	SE	β	B	SE	β	B	SE	β	B	SE	β
Total Effects	.150	.091	.165	.087	.051	.064	.018	.013	.016	.040	.025	.053
HPW Employed												
Direct Effects	.007*	.003	.095	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	.004*	.002	.037	.001	.001	.009	.002*	.001	.030
Total Effects	.007*	.003	.095	.004*	.002	.037	.001	.001	.009	.002*	.001	.030
Distance from Campus												
Direct Effects	.000	.030	-.001	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	.000	.018	.000	.000	.004	.000	.000	.008	.000
Total Effects	.000	.030	-.001	.000	.018	.000	.000	.004	.000	.000	.008	.000
Cog. Skills (college entry)												
Direct Effects	.126**	.036	.110	--	--	--	--	--	--	.483***	.028	.505
Indirect Effects	--	--	--	.073***	.021	.043	.015	.008	.011	.033***	.009	.035
Total Effects	.126**	.036	.110	.073***	.021	.043	.015	.008	.011	.517***	.030	.540
Student-Faculty Interaction												
Direct Effects	--	--	--	.585***	.041	.390	.117*	.049	.096	.225***	.026	.270
Indirect Effects	--	--	--	--	--	--	--	--	--	.041***	.008	.049
Total Effects	--	--	--	.585***	.041	.390	.117*	.049	.096	.266***	.024	.319
Academic Effort												
Direct Effects	--	--	--	--	--	--	--	--	--	.058***	.013	.105
Indirect Effects	--	--	--	--	--	--	--	--	--	--	--	--
Total Effects	--	--	--	--	--	--	--	--	--	.058***	.013	.105
Campus Racial Climate												
Direct Effects	--	--	--	--	--	--	--	--	--	.056**	.017	.082
Indirect Effects	--	--	--	--	--	--	--	--	--	--	--	--
Total Effects	--	--	--	--	--	--	--	--	--	.056**	.017	.082

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

The Mediating Effects of Student-Faculty Interaction. Given the strong positive association between student-faculty interaction and Black students self-rated cognitive skills, it stands to reason that student-faculty interaction also at least partially explains the indirect relationship between some of their social identities and background characteristics and their self-rated cognitive skills. For example, as gender was not significantly associated with Black students' self-rated cognitive skills but was negatively associated with more frequent student-faculty interaction (β = -.129), the negative indirect relationship between being a Black woman and self-rated cognitive skills (β = -.046) is mediated by the lower rates of student-faculty interaction among Black women relative to Black men.

A positive mediating effect is also evident in the relationship between Black students' self-rated cognitive skills at entry and their self-rated cognitive skills later. That is, while a strong positive direct relationship exists between these variables (β = .505), a significant positive indirect relationship by way of student-faculty interaction is also clear (β = .035). Unsurprisingly, the relative magnitude of this indirect path coefficient is much smaller than that of the direct path, suggesting that the more frequent student-faculty interaction that students' with high self-rated cognitive skills at college entry engage in only partially explains the relationship between students' self-rated cognitive skills when they entered college and their cognitive skills later on.

On the other hand, as poor and working-class Black students' class standing had no significant association with more frequent student-faculty interaction but a strong-positive direct association with their self-rated cognitive skills (β = .205), student-faculty interaction does not explain this positive relationship. In other words, Black students who are more advanced in their

class standing are more likely to rate their cognitive skills higher, regardless of how often they interact with faculty.

Most of the remaining variables in the model, including being an arts or humanities major (β = .146) or working more hours per week (β = .030) had significant positive indirect relationships with Black students' self-rated cognitive skills, which suggests that these positive relationships are due in part to the fact that poor and working-class Black students who are arts and humanities majors, and work more hours per week interact with faculty more frequently. Conversely, there is a significant *negative* indirect relationship between majoring in a STEM-H field and Black students' self-rated cognitive skills (β = -.071), likely due, at least in part, to the lower rates of student faculty interaction among Black STEM-H majors relative to Black social science majors. Finally, while a significant positive relationship was apparent between being a transfer student and interacting with faculty more frequently (β = .242), there was not a significant indirect relationship between being a transfer student and Black students' self-rated cognitive skills.

Latinx Poor and Working-Class Student Model

Latinx Measurement Model

As done previously, I validated the measurement model on the Latinx subsample. Table 4.15 shows the factor loadings for each observed variable as well as the Cronbach's alpha test of reliability. Figure 4.7 depicts the measurement model tested on the Latinx students graphically. Fit statistics of the measurement model suggest the data fit the model well. The RMSEA value was .034 (90% CI: .032, .036), the CFI was .99 and the TLI was .98, and the SRMR was .025. Standardized parameter estimates are reported in Figure 4.7.

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Table 4.15. Factor Loadings and Reliability for Latinx Poor and Working-Class Students

(n=11,615)

Factor/Item	Factor Loading	Cronbach's α
Student-Faculty Interaction		.771
How often: Contributed to a class discussion	.652	
How often: Communicated with the instructor outside of class about issues/concepts derived from a course	.692	
How often: Had a class in which the professor knew or learned your name	.765	
Number of faculty you know well enough to ask for a letter of recommendation	.607	
Self-Rated Cognitive Skills (College Entry)		.851
Analytical and critical thinking skills	.836	
Ability to be clear and effective when writing	.819	
Ability to read and comprehend academic material	.779	
Self-Rated Cognitive Skills (Current)		.830
Analytical and critical thinking skills	.806	
Ability to be clear and effective when writing	.784	
Ability to read and comprehend academic material	.777	
Campus Racial Climate		.886
Students of my race/ethnicity are respected on this campus	.718	
Overall, I feel comfortable with the climate for diversity and inclusiveness at RU	.919	

Factor/Item	Factor Loading	Cronbach's α
Overall, I feel comfortable with the climate for diversity and inclusion in my classes	.844	
Overall, I feel comfortable with the climate for diversity and inclusiveness at RU	.771	

Figure 4.7. Results of Confirmatory Factor Analysis on Sample of Latinx Poor and Working-Class Students
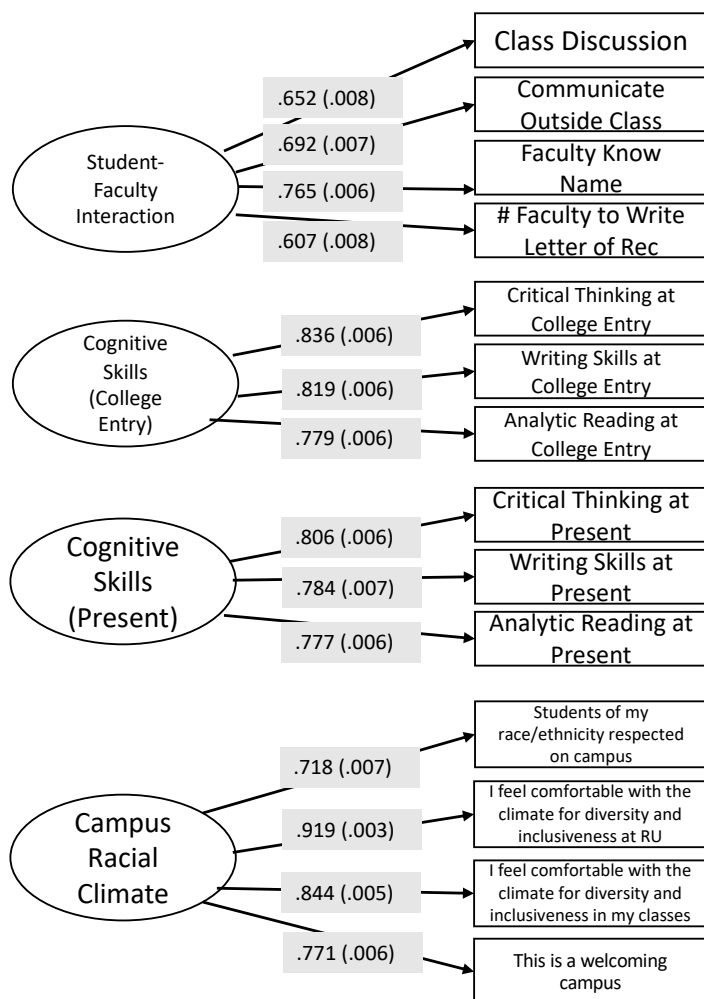
Note. Results of the confirmatory factor analysis (CFA) on Latinx poor and working-class students.

Standardized parameter estimates shown in gray boxes with standard errors in parentheses. Chi-Square=

976.91, df= 68, RMSEA= .034 (90% CI: .032, .036), CFI= .99, TLI= .99, SRMR= .025. For simplicity error terms and covariances are not shown.

Latinx Full structural Model

I next ran the hypothesized model on a subsample of poor and working-class Latinx students. Overall, the fit statistics suggest that the model fit the Latinx student data well. The RMSEA value was .036 (90% CI: .035, .037), the CFI and TLI were both .98, and the SRMR was .049. Figure 4.8 shows the parameter estimates for the poor and working-class Latinx student model. As shown in Figure 4.8 and in Table 4.16, a majority of the hypothesized paths were significant at $p<.05$.

Predictors of Student-Faculty Interactions. A majority of the exogenous variables in the model had significant associations with the frequency of student-faculty interactions among poor and working-class students. Starting with students' social identities, the results suggest that poor and working-class Latinas engage with faculty significantly less often than do their Latino peers ($\beta = -.148$). Similarly, first-generation status had a negative association with engaging with faculty more frequently, such that first-generation students interacted with faculty significantly less frequently than continuing generation Latinx students ($\beta = -.075$). Lastly, the results suggested that citizenship was not significantly associated with engaging with faculty more or less frequently.

Academic background characteristics were also associated with engaging with faculty more frequently among poor and working-class Latinx students. First, Latinx students with more advanced class standing ($\beta = .332$) as well as those who were community college transfer students (relative to first-time students) ($\beta = .332$) interacted with faculty significantly more often. Additionally, poor and working-class Latinx students who indicted higher self-rated

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cognitive skills at college also engaged with faculty more frequently (β = .070). Latinx students' college majors also appear to be associated with the extent to which they engage with faculty. For example, Latinx students in arts and humanities fields interacted with faculty more frequently than those with social science majors (β = .584). However, poor and working-class Latinx STEM-H majors interacted with faculty significantly less often than did Latinx students in the social sciences (β = -.146). Finally, as observed in the other models, the more hours per week poor and working-class Latinx students worked, the more frequently they interacted with faculty (β = .064). However, the distance Latinx students lived from campus was not associated with the frequency with which they interacted with faculty.

Direct Relationships Between Exogenous Variables and Students' Self-Rated Cognitive Skills. As in the prior models, I also tested direct relationships between gender, year in college, and cognitive skills at college entry on Latinx students' self-rated cognitive skills. While there was not a significant association between gender and self-rated cognitive skills, the other two variables did have a significant positive association. As expected, poor and working-class Latinx students who had spent more years in college (β= .288) and those who highly rated their cognitive skills at college entry (β = .498) also had higher self-ratings of their cognitive skills later on.

Figure 4.8. Final Structural Model for Latinx Poor and Working-Class Students (n=11,615)
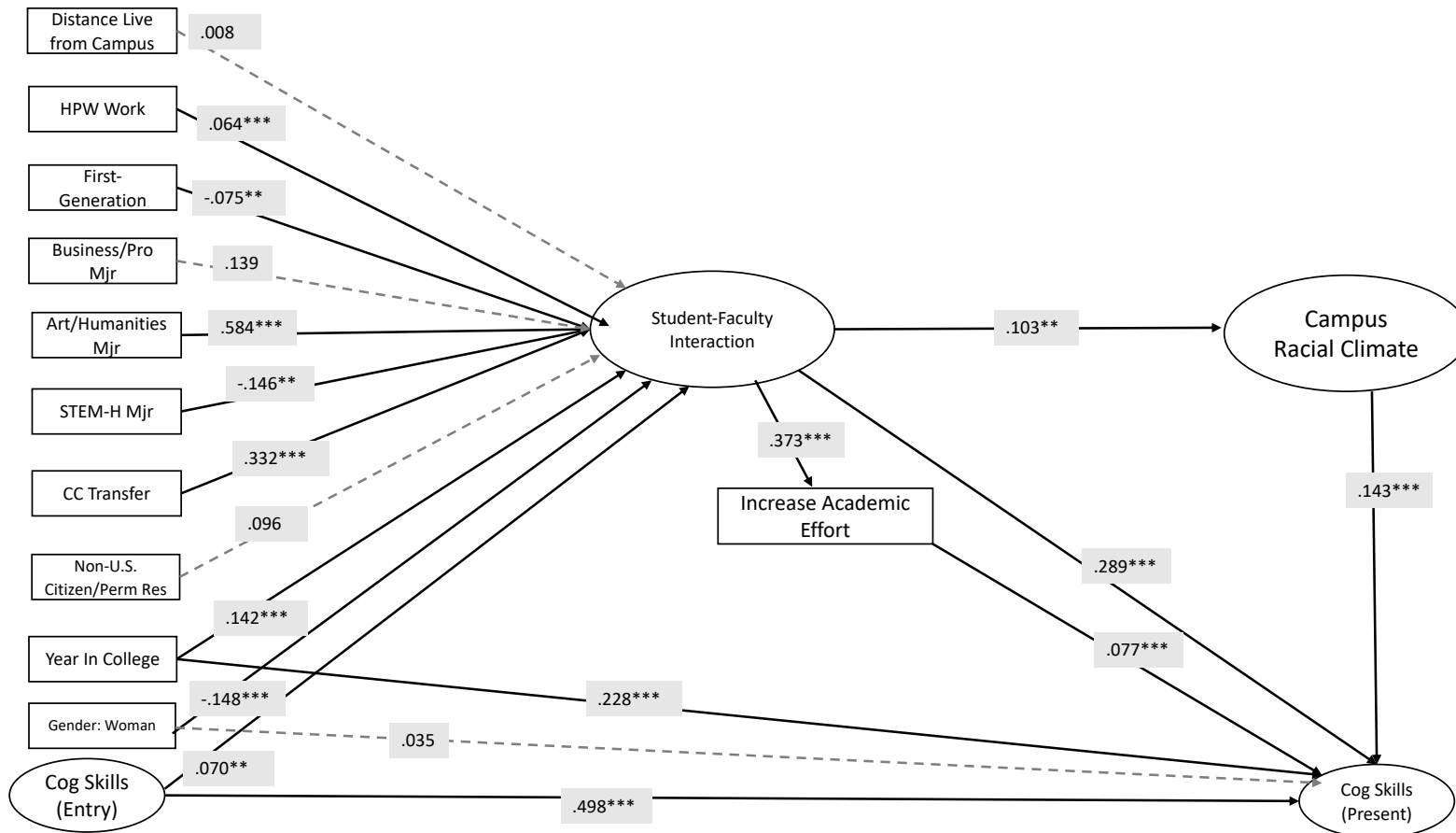
*p <. 05. **p < .01. ***p < .001.
Note. This figure demonstrates the relationships between observed variables (rectangles) and latent variables (ovals) predicting Latinx students' self-rated cognitive skills. Chi-Square= 153592.74, df= 255, RMSEA= .036 (90% CI: 035, .037), CFI= .98, TLI= .98, SRMR= .05. Standardized beta coefficients for each path are shown in grey boxes. All path coefficients were significant at *p* < .05, unless indicated by grey dotted line. For simplicity, observed variables predicted by each latent variable are omitted, as are residual error terms/disturbances and covariances.

The Direct and Indirect Effects of Student-Faculty Interaction on Cognitive Skills.

Among poor and working-class Latinx students, more frequent student-faculty interaction appears to be positively associated with students' self-rated cognitive skills both directly and indirectly. Thus, while more frequent student-faculty interaction has a strong positive association with Latinx students' self-rated cognitive skills (β = .289), frequent faculty interactions were also positively associated with an increase in Latinx students' academic effort (β = .373) as well as with more positive perceptions of campus racial climate (β = .103). As both increased academic effort (β = .077) and perceptions of campus racial climate (β = .143) were also positively associated with Latinx students' self-rated cognitive skills, this suggests that more frequent student-faculty interaction are also *indirectly* related to cognitive skills. As has been the case with the prior models, the magnitude of the direct path coefficient from student-faculty interaction to cognitive skills (β = .289) is substantially larger than that of the indirect path coefficient (β = .044) suggests that increased academic effort and perceptions of campus racial climate only partially mediate the relationship between student-faculty interaction and self-rated cognitive skills.

The Mediating Effects of Student-Faculty Interaction. Findings from the Latinx model suggest that student-faculty interaction plays a mediating role between students' background characteristics and their self-rated cognitive skills. For example, in the absence of a significant direct association between gender and self-rated cognitive skills, the significant negative indirect relationship between gender and self-rated cognitive skills (β = -.049) is explained by the fact that Latinas interact with faculty significantly less frequently than do Latinos.

Table 4.16. Direct, Indirect, and Total Effects for Latinx Model (n=11,615)

	Student-Faculty Interaction R²= .11			Academic Effort R²= .14			Campus Racial Climate R²= .01			Cognitive Skills (Present) R²= .48		
	B	SE	β	B	SE	β	B	SE	β	B	SE	β
Gender												
Direct Effects	-.126***	.017	-.148	--	--	--	--	--	--	.024	.015	.035
Indirect Effects	--	--	--	-.074***	.011	-.055	-.014**	.005	-.015	-.034***	.005	-.049
Total Effects	-.126***	.017	-.148	-.074***	.011	-.055	-.014**	.005	-.015	-.010**	.016	-.014
Non-U.S. Citizen												
Direct Effects	.082	.208	.096	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	.048	.122	.036	.009	.023	.010	.022	.056	.032
Total Effects	.082	.208	.096	.048	.122	.036	.009	.023	.010	.022	.056	.032
First-Generation												
Direct Effects	-.064**	.021	-.075	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	-.037**	.013	-.028	-.007	.004	-.008	.017**	.006	-.025
Total Effects	-.064**	.021	-.075	-.037**	.013	-.028	-.007	.004	-.008	.017**	.006	-.025
Class Standing												
Direct Effects	.100***	.010	.142	--	--	--	--	--	--	.131***	.006	.228
Indirect Effects	--	--	--	.059***	.005	.053	.011***	.003	.015	.027***	.002	.047
Total Effects	.100***	.010	.142	.059***	.005	.053	.011***	.003	.015	.158***	.007	.275
Transfer												
Direct Effects	.282***	.061	.332	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	.166***	.036	.124	.031**	.011	.034	.076***	.018	.111
Total Effects	.282***	.061	.332	.166***	.036	.124	.031**	.011	.034	.076***	.018	.111
STEM-H Major												
Direct Effects	-.124**	.038	-.146	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	-.073**	.021	-.054	-.014**	.004	-.015	-.033**	.010	-.048
Total Effects	-.124**	.038	-.146	-.073**	.021	-.054	-.014**	.004	-.015	-.033**	.010	-.048
Arts/Humanities Major												
Direct Effects	.495***	.065	.584	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	.292***	.033	.218	.055**	.016	.060	.134***	.017	.194
Total Effects	.495***	.065	.584	.292***	.033	.218	.055**	.016	.060	.134***	.017	.194
Business/Pro Major												
Direct Effects	.118	.080	.139	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	.070	.047	.052	.013	.010	.014	.032	.022	.046

	Student-Faculty Interaction R²= .11			Academic Effort R²= .14			Campus Racial Climate R²= .01			Cognitive Skills (Present) R²= .48		
	B	SE	β	B	SE	β	B	SE	β	B	SE	β
Total Effects	.118	.080	.139	.070	.047	.052	.013	.010	.014	.032	.022	.046
HPW Employed												
Direct Effects	.005***	.001	.064	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	.003***	.001	.024	.001**	.001	.007	.001***	.001	.021
Total Effects	.005***	.001	.064	.003***	.001	.024	.001**	.001	.007	.001***	.001	.021
Distance from Campus												
Direct Effects	.005	.013	.008	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	.003	.008	.003	.001	.002	.001	.001	.004	.003
Total Effects	.005	.013	.008	.003	.008	.003	.001	.002	.001	.001	.004	.003
Cog. Skills (college entry)												
Direct Effects	.070***	.014	.070	--	--	--	--	--	--	.402***	.013	.498
Indirect Effects	--	--	--	.041***	.008	.026	.008**	.002	.007	.019***	.003	.023
Total Effects	.070***	.014	.070	.041***	.008	.026	.008**	.002	.007	.421***	.014	.522
Student-Faculty Interaction												
Direct Effects	--	--	--	.590***	.022	.373	.110**	.034	.103	.236***	.013	.289
Indirect Effects	--	--	--	--	--	--	--	--	--	.035***	.003	.044
Total Effects	--	--	--	.590***	.022	.373	.110**	.034	.103	.271***	.015	.333
Academic Effort												
Direct Effects	--	--	--	--	--	--	--	--	--	.040***	.004	.077
Indirect Effects	--	--	--	--	--	--	--	--	--	--	--	--
Total Effects	--	--	--	--	--	--	--	--	--	.040***	.004	.077
Campus Racial Climate												
Direct Effects	--	--	--	--	--	--	--	--	--	.109***	.011	.143
Indirect Effects	--	--	--	--	--	--	--	--	--	--	--	--
Total Effects	--	--	--	--	--	--	--	--	--	.109***	.011	.143

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

Somewhat differently, year in college and students' self-rated cognitive skills at college entry both had significant strong positive direct associations with their self-rated cognitive skills, however they also each had significant indirect relationships via student-faculty interaction. Thus, the positive indirect relationship between class-standing and self-rated cognitive skills (β = .047) suggests that the association between these variables is partially explained by the more frequent student-faculty interaction among more advanced Latinx students. The same can be said of the positive indirect path between Latinx students' self-rated cognitive skills at college entry and their cognitive skills later (β = .023).

Finally, the model suggests student-faculty interaction at least partially mediates the relationships between several of the remaining exogenous variables and their self-rated cognitive skills. For example, the negative relationship between being a STEM-H major and students' self-rated cognitive skills (β = -.048) is likely explained by the fact that STEM-H majors interact with faculty less frequently than social science majors. Similarly, the lower self-reported cognitive skills among first-generation students (β = -.025) is due to in part to first-generation Latinx students' less frequent interactions with faculty. However, the positive association between being a transfer student (β = .111), majoring in the arts and humanities (β = .194), and working more hours per week (β = .021) and Latinx self-rated cognitive skills is explained by the higher rates of interacting with faculty among transfer students (relative to first-time students, arts and humanities majors (relative to social science majors), and poor and working-class Latinx students who work more hours.

White Poor and Working-Class Student Model

White Measurement Model

Before testing the full structural model on the White subsample, I first validated the

measurement model on the subsample. Table 4.17 shows the factor loadings for each observed

variable as well as the Cronbach's alpha test of reliability. Figure 4.9 depicts the measurement

model tested on the white students graphically.

Table 4.17. Factor Loadings and Reliability for White Poor and Working-Class Students

(n=7,548)

Factor/Item	Factor Loading	Cronbach's α
Student-Faculty Interaction		.753
How often: Contributed to a class discussion	.638	
How often: Communicated with the instructor outside of class about issues/concepts derived from a course	.621	
How often: Had a class in which the professor knew or learned your name	.742	
Number of faculty you know well enough to ask for a letter of recommendation	.636	
Self-Rated Cognitive Skills (College Entry)		.814
Analytical and critical thinking skills	.804	
Ability to be clear and effective when writing	.770	
Ability to read and comprehend academic material	.743	
Self-Rated Cognitive Skills (Current)		.797
Analytical and critical thinking skills	.784	
Ability to be clear and effective when writing	.730	

Factor/Item	Factor Loading	Cronbach's α
Ability to read and comprehend academic material	.751	
Campus Racial Climate		.817
Students of my race/ethnicity are respected on this campus	.441	
Overall, I feel comfortable with the climate for diversity and inclusiveness at RU	.901	
Overall, I feel comfortable with the climate for diversity and inclusion in my classes	.839	
Overall, I feel comfortable with the climate for diversity and inclusiveness at RU	.734	

Figure 4.9. Results of Confirmatory Factor Analysis on Sample of White Poor and Working-Class Students
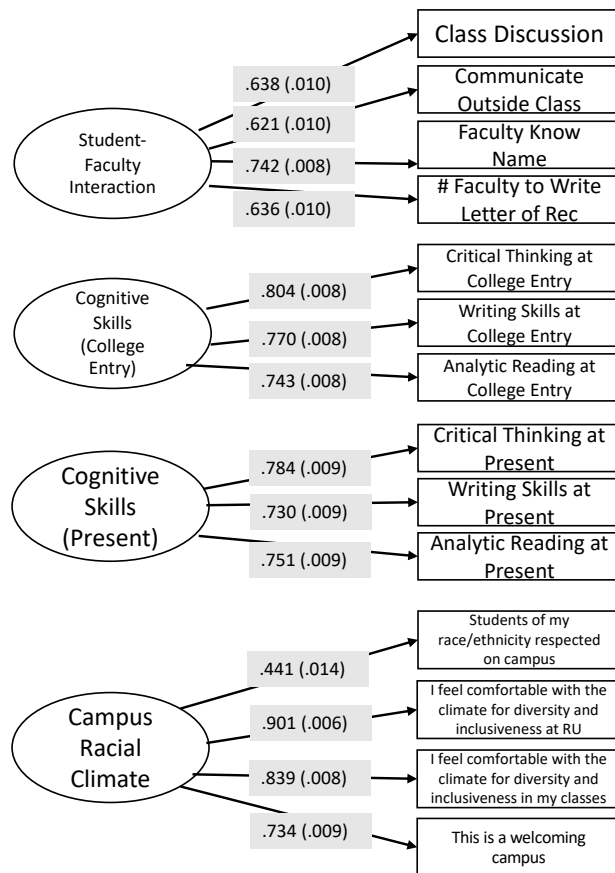
Note. Results of the confirmatory factor analysis (CFA) on white poor and working-class students. Standardized parameter estimates shown in gray boxes with standard errors in parentheses. Chi-Square= 636.17, df= 68, RMSEA= .033 (90% CI: .031, .036), CFI= .98, TLI= .98, SRMR= .026. For simplicity error terms and covariances are not shown.

Fit statistics of the measurement model suggest the data fit the confirmatory factor structure well. The RMSEA value was .033 (90% CI: .031, .036), the CFI was .98 and the TLI was .98, and the SRMR was .026. Standardized parameter estimates are provided in Figure 4.9. All parameter estimates were statistically significant at $p<.001$ and exceeded the recommended threshold of .40.

White Full Structural Model

Finally, I ran the hypothesized model on a subsample of white poor and working-class students. Fit statistics suggests an adequate fit between the model and the data. The RMSEA value was .036 (90% CI: .035, .038), the CFI was .94 and the TLI was .93, and the SRMR was .044. Despite the CFI and TFI values being slightly lower than the recommended .95 threshold, findings from Hu and Bentler's (1999) simulation study suggest that the model fits the data adequately given the low RMSEA and SRMR values. Figure 4.10 shows the diagram of the full hypothesized model and Table 4.18 shows the parameter estimates for all direct and indirect paths in the model.

Predictors of Student-Faculty Interaction. The model suggests several significant relationships between white poor and working-class students' background characteristics and the frequency with which they interact with faculty. Notably, gender, first-generation college student status, and citizenship—all social identities did have significant associations with student-faculty interact in prior other models—were not significantly related to more frequent student-faculty interactions among poor and working-class white students. However, several academic characteristics did appear to portend to more interactions with faculty. For example, as in the other models, more advanced poor and working-class white students engaged with faculty more frequently (β = .148), as did community college transfer students relative to first-time college students (β = .262). Similarly, white students who rated their cognitive skills higher at college entry also interacted with faculty more often (β = .051). In terms of college major, white poor and working-class who studied arts and humanities majors interacted with faculty more often than their peers in social science fields (β = .439). On the other hand, white students in STEM-H fields interacted with faculty with less frequency than social science majors (β = -.185). Lastly,

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like the patterns observed in the other models, the distance white students live from campus was not significantly associated with student-faculty interaction, however the more hours per week white students worked the more they interacted with faculty ($\beta = .041$).

**Direct Relationships Between Exogenous Variables and Students' Self-Rated Cognitive skills.** As with the other models, I also tested the direct effects between gender, class standing, and cognitive skills at college entry on white students' self-rated cognitive skills. While there was no significant association between gender and students' self-rated cognitive skills, students who were move advanced college students ($\beta = .223$) and who rated their cognitive skills higher at college entry ($\beta = .546$) had higher self-ratings of cognitive skills later on.

The Direct and Indirect Effects of Student-Faculty Interaction on Cognitive Skills. Having explored the predictors of student-faculty interaction, we turn now to the association between student-faculty interaction and white poor and working-class students' cognitive skills. As seen among students of all races/ethnicities, a strong positive direct relationship exists between more frequent student-faculty interaction and white students' self-rated cognitive skills ($\beta = .282$). Further, more frequent student-faculty interaction also portended to increased academic effort among poor and working-class students ($\beta = .354$) and more positive perceptions of campus racial climate ($\beta = .087$), both of which are positively associated with white students' cognitive skills as well. Thus, these two variables partially mediate the positive relationship between student-faculty interaction and self-rated cognitive skills via increased academic effort or perceptions of campus racial climate as evidenced by the indirect path ($\beta = .041$) that is significant though less salient than the direct path between student-faculty interaction and students' self-rated cognitive skills.

Figure 4.10. Final Structural Model for White Poor and Working-Class Students (n=7,548)
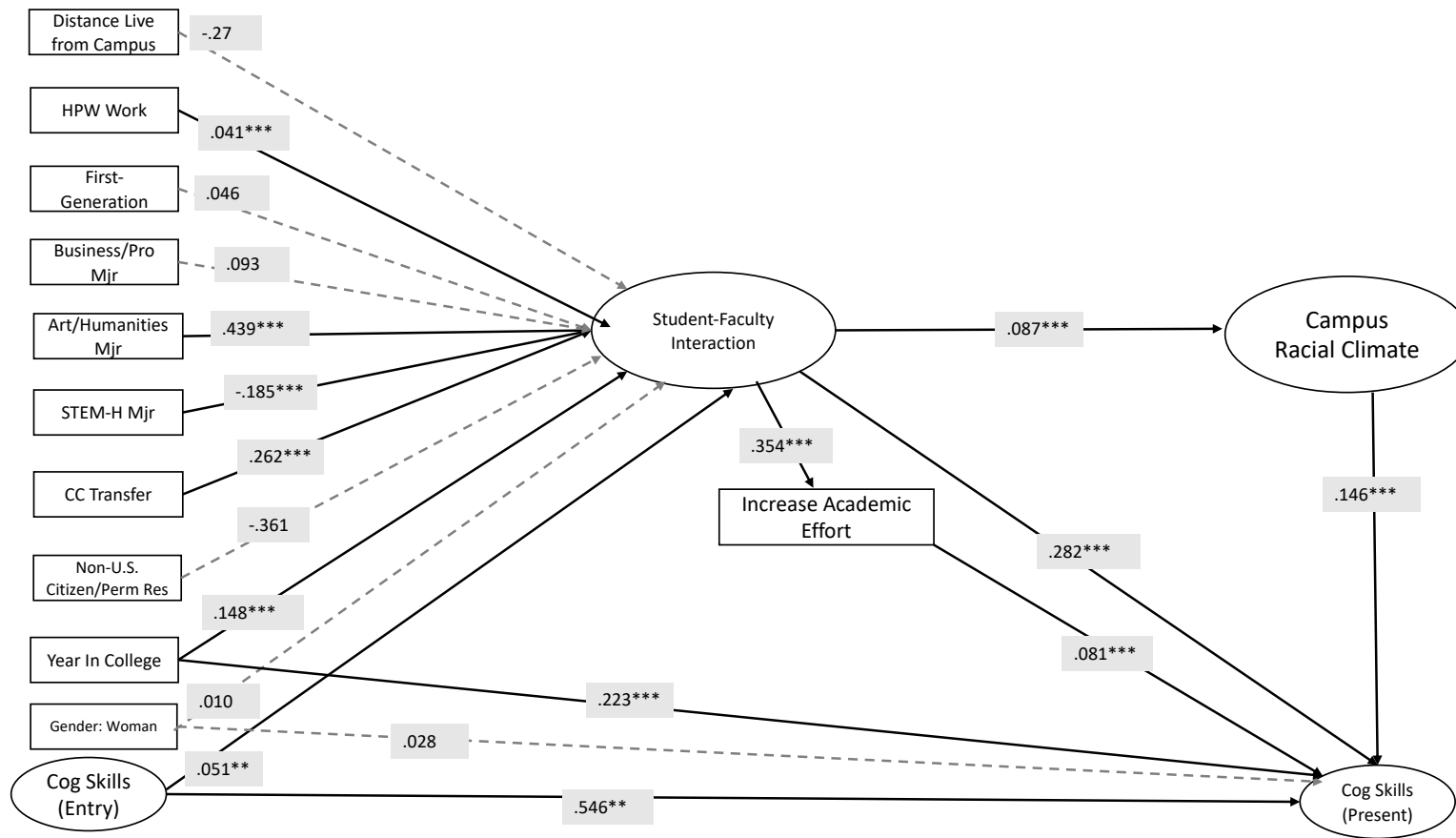
*p <. 05.

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

Note. This figure demonstrates the relationships between observed variables (rectangles) and latent variables (ovals) predicting white students' self-rated cognitive skills. Chi-Square= 2403.31, df= 219, RMSEA= .036 (90% CI: 035, .038), CFI= .94, TLI= .93, SRMR= .04. Standardized beta coefficients for each path are shown in grey boxes. All path coefficients were significant at *p* < .05, unless indicated by grey dotted line. For simplicity, observed variables predicted by each latent variable are omitted, as are residual error terms/disturbances and covariances

The Mediating Effects of Student-Faculty Interaction. Finally, I turn to the mediating role of student faculty interaction in explaining the relationships between white poor and working-class students' background characteristics and their self-rated cognitive skills. First, while there was a strong positive *direct* relationship between white students' class standing and their self-rated cognitive skills ($\beta = .233$) as well as between students with high self-ratings of cognitive skills at college entry and their cognitive skills later ($\beta = .546$), these exogenous variables were also significantly *indirectly* associated with white students' cognitive skills. While these indirect path coefficients from year in college to cognitive skills ($\beta = .048$) and cognitive skills at college entry and their cognitive skills later ($\beta = .017$) are significant, they are of a much smaller magnitude than the direct paths, suggesting that more frequent student-faculty interaction only partially mediates these relationships.

Student-faculty interaction also mediated the significant positive relationships between white poor and working-class students' cognitive skills and transfer status ($\beta = .085$), majoring in arts and humanities ($\beta = .142$), and hours per week spent working ($\beta = .013$). In other words, the positive relationship between being a transfer student, an art/humanities major, or working more hours during the week and students' self-rated cognitive skills is explained to some extent by the fact that transfer students (relative to first-time college students), arts and humanities majors (relative to social science majors), and students who work more hours all engage in more frequent student-faculty interaction. Conversely, the significantly lower self-rated cognitive skills of white STEM-H majors (relative to social science majors) is due at least in part to the low rates of faculty interaction among STEM-H majors.

Table 4.18. Direct, Indirect, and Total Effects for White Model (n=7,548)

	Student-Faculty Interaction $R^2= .08$			Academic Effort $R^2= .13$			Campus Racial Climate $R^2= .01$			Cognitive Skills (Present) $R^2= .52$		
	B	SE	β	B	SE	β	B	SE	β	B	SE	β
Gender												
Direct Effects	.008	.021	.010	--	--	--	--	--	--	.019	.015	.028
Indirect Effects	--	--	--	.005	.020	.004	.000	.002	.001	.002	.009	.003
Total Effects	.008	.021	.010	.005	.020	.004	.000	.002	.001	.021	.019	.031
Non-U.S. Citizen												
Direct Effects	-.300	.203	-.361	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	-.166	.108	-.128	-.015	.012	-.031	-.078	.050	-.117
Total Effects	-.300	.203	-.361	-.166	.108	-.128	-.015	.012	-.031	-.078	.050	-.117
First-Generation												
Direct Effects	.039	.021	.046	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	.021	.011	.016	.002	.001	.004	.010	.005	.015
Total Effects	.039	.021	.046	.021	.011	.016	.002	.001	.004	.010	.005	.015
Class Standing												
Direct Effects	.102***	.017	.148	--	--	--	--	--	--	.124***	.011	.223
Indirect Effects	--	--	--	.056***	.010	.052	.005***	.001	.013	.027***	.005	.048
Total Effects	.102***	.017	.148	.056***	.010	.052	.005***	.001	.013	.150***	.012	.271
Transfer												
Direct Effects	.218***	.045	.262	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	.121***	.024	.093	.011***	.003	.023	.057***	.011	.085
Total Effects	.218***	.045	.262	.121***	.024	.093	.011***	.003	.023	.057***	.011	.085
STEM-H Major												
Direct Effects	-.154***	.041	-.185	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	-.085***	.024	-.065	-.008***	.002	-.016	-.040***	.011	-.060
Total Effects	-.154***	.041	-.185	-.085***	.024	-.065	-.008***	.002	-.016	-.040***	.011	-.060
Arts/Humanities Major												
Direct Effects	.365***	.048	.439	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	.202***	.023	.155	.019***	.005	.038	.095***	.011	.142
Total Effects	.365***	.048	.439	.202***	.023	.155	.019***	.005	.038	.095***	.011	.142
Business/Pro Major												
Direct Effects	.077	.070	.093	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	.043	.037	.033	.004	.004	.008	.020	.017	.030

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	Student-Faculty Interaction R²= .08			Academic Effort R²= .13			Campus Racial Climate R²= .01			Cognitive Skills (Present) R²= .52		
	B	SE	β	B	SE	β	B	SE	β	B	SE	β
Total Effects	.077	.070	.093	.043	.037	.033	.004	.004	.008	.020	.017	.030
HPW Employed												
Direct Effects	.003*	.001	.041	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	.002*	.001	.015	.0000	.000	.004	.001*	.000	.013
Total Effects	.003*	.001	.041	.002*	.001	.015	.0000	.000	.004	.001*	.000	.013
Distance from Campus												
Direct Effects	-.017	.009	-.027	--	--	--	--	--	--	--	--	--
Indirect Effects	--	--	--	-.009	.005	-.009	-.001	.001	-.002	-.004	.003	-.009
Total Effects	-.017	.009	-.027	-.009	.005	-.009	-.001	.001	-.002	-.004	.003	-.009
Cog. Skills (college entry)												
Direct Effects	.054**	.017	.051	--	--	--	--	--	--	.462***	.014	.546
Indirect Effects	--	--	--	.030**	.009	.018	.003*	.001	.004	.014**	.004	.017
Total Effects	.054**	.017	.051	.030**	.009	.018	.003*	.001	.004	.476***	.015	.563
Student-Faculty Interaction												
Direct Effects	--	--	--	.553***	.032	.354	.051***	.011	.087	.227***	.013	.282
Indirect Effects	--	--	--	--	--	--	--	--	--	.033***	.005	.041
Total Effects	--	--	--							.260***	.016	.323
Academic Effort												
Direct Effects	--	--	--	--	--	--	--	--	--	.042***	.009	.081
Indirect Effects	--	--	--	--	--	--	--	--	--	--	--	--
Total Effects	--	--	--	--	--	--	--	--	--	.042***	.009	.081
Campus Racial Climate												
Direct Effects	--	--	--	--	--	--	--	--	--	.200***	.026	.146
Indirect Effects	--	--	--	--	--	--	--	--	--	--	--	--
Total Effects	--	--	--	--	--	--	--	--	--	.200***	.026	.146

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

Conclusion

This chapter enumerated the results from this study. First, I descriptively explored the frequency of student-faculty interaction among poor and working-class college students as well as gender, racial/ethnic, and academic major differences in the rates of these interactions. I then validated factors and tested the hypothesized structural model on the sample of all poor and working-class students as well as four subsamples of poor and working-class students: Asian and Asian American poor and working-class students, Black and African American poor and working-class students, Latinx poor and working-class students, and white poor and working-class students.

Descriptive findings suggested that, in general, poor and working-class men interacted with faculty more frequently than poor and working-class women did. Further, clear racial disparities emerged, with poor and working-class Asian and Asian American students often reporting the lowest rates of classroom and extracurricular interaction with faculty, while poor and working-class Black and African American students reported some of the highest rates of these interactions with the exception of participating in research with faculty. Finally, poor and working-class students in different majors interacted with faculty in different, but expected ways, with arts and humanities majors interacting with faculty most often, and STEM-H majors reporting the lowest rates of interaction.

Results of the structural equation models suggested that the models fit the data well across the subsamples, and most of the hypothesized paths were significant. While predictors of student-faculty interaction slightly differed across the models, in most cases class-standing, transfer status, student major, and working for pay more hours per week had the strongest significant associations with more frequent student-faculty interaction. Further, in every model,

the frequency of student-faculty interaction had a strong positive *direct* relationship with students' self-rated cognitive skills as well as significant positive *indirect* relationships via increased academic effort and perceptions of campus racial climate. Thus, across all of the models, student-faculty interaction mediated the relationships between a variety students' social identities, academic background characteristics, and extra-curricular responsibilities to some extent. Overall, these findings suggest the benefits and importance of interacting with faculty for poor and working-class students. However, the variation in the salient variables associated with more frequent student-faculty interaction points to key student populations—poor and working-class first-generation students, Women of Color, first and second-year students, first-time students—that student affairs practitioners and faculty might focus on as they seek to develop programs, initiatives, and opportunities for students to build relationships and networks of faculty. The following chapter further details the findings in this chapter and contextualizes them alongside existing literature and theory in order to provide implications for research and practice.

CHAPTER FIVE: DISCUSSION AND IMPLICATIONS

In this chapter I will provide a brief overview of the study at hand. I will then briefly summarize the findings from both the descriptive analyses and the five structural equation models discussed at length in Chapter Four. Next, I will situate these key findings into context with the existing literature on student-faculty interactions and poor and working-class college students. Finally, I provide implications for faculty and administrators in higher education and conclude by suggesting how the findings and limitations for this dissertation may inform future research in higher education.

Overview of The Study

Over the last half century, higher education scholars have empirically demonstrated the importance of frequent high-quality interaction with faculty in variety of important outcomes, including persistence, academic achievement, sense of belonging, graduate school aspirations, and more (Cole, 2008, 2010; Cole & Griffin, 2013; Kim & Sax, 2017; Mayhew et al., 2016; Pascarella, 1980; Pascarella & Terenzini, 1978, 2005; Seifert et al., 2008; Umbach & Wawrzynski, 2005). Consistently, this body of work suggests that faculty are powerful social actors on campus whose support and guidance is critical for student success. Yet, also over the last fifty years, the students pursuing higher education have become more diverse in terms of race/ethnicity, economic background, gender, and a variety of other categories. While some existing research has explored student-faculty interaction among racially/ethnically diverse students (Anaya & Cole, 2001; Anderson et al., 1995; Cole, 2008, 2010; Cole & Griffin, 2013; Kim & Lundberg, 2016; Kim & Sax, 2017; Lundberg & Schreiner, 2004) as well as the gendered effects of faculty interactions (Cole, 2007; Kim & Sax, 2009; Sax et al., 2005), less is known about to what extent and how poor and working-class college students interact with faculty and

any benefits these students reap from doing so. Among the research that does exist, it is generally understood that poor and working-class college students interact with faculty less frequently than their wealthier peers and that this less frequent interaction may explain some of the disparities seen across outcomes between poor and working class students and their middle class/wealthy peers (Jack, 2016, 2019; Kim & Sax, 2009; Lathe, 2017; Longwell-Grice & Longwell-Grice, 2008; Soria & Bultmann, 2014; K. M. Soria, 2015; Terenzini et al., 2001; Walpole, 2003, 2008). Much of this work suggests that poor and working-class students—who stand to especially benefit from positive relationships with faculty—are least likely to seek out their professors and that they suffer the consequences of failing to do so (Collier & Morgan, 2008; Dika, 2012; Jack, 2016, 2019; Mullen, 2011; Scherer, 2020; Soria, 2013; Stuber, 2011). Notably, much of the existing scholarship focuses on the disparities between poor and wealthy students or looks qualitatively at small—usually racially homogenous—samples of poor and working-class students.

This study sought to build upon and expand this scholarship by looking exclusively at poor and working-class college students, the kinds of characteristics and experiences that portend more interaction with faculty among them, and to what extent interacting with faculty benefited them academically. Further, by examining racial/ethnic variation among poor and working-class students, I aimed to complicate existing knowledge that often obscures these differences. As such, this inquiry was guided by the following research questions:

1. How frequently do poor and working-class respondents report engaging with faculty (e.g. participating with faculty in-class, communicating with an instructor outside of class, working with faculty outside of class on research, accessing letters of recommendation)?

a. Are there gender, racial/ethnic, or academic differences in the frequencies with which poor and working-class students report different types of academic interaction with faculty?

2. Among poor and working-class college students, what are the social identities and characteristics that portend to student-faculty interaction and to what extent does student-faculty interaction mediate the relationship between (a) student background characteristics and academic experiences and (b) self-rated cognitive skills?

3. To what extent and how does race/ethnicity moderate the relationships between other demographic characteristics, student-faculty interaction, campus climate, and self-reported cognitive gains among working-class college students?

In order to address these questions, I relied on a theoretical framework based heavily on Pascarella's (1985) General Model of Assessing Change, which models the relationships between student experiences, environments, and interactions that impact student learning. I also sought to employ a class-based *and* racially-conscious analysis that was cognizant and critical of the social forces and power dynamics at play on campus. To that end, I drew upon Bourdieu's concepts of social and cultural capital, viewing the practice of interacting with faculty as an aspect dominant cultural capital—that is, a specific practice valued by the dominant social classes that often serve to signal social status and that can be transformed into other benefits (Bourdieu, 1986; Bourdieu & Passeron, 1990). Also, several tenets of critical race theory in education also informed my approach to framing this study and my interpretation of the results, namely that racism is a permanent fixture of American social life and institutions, including institutions of higher education, and this fact may explain the patterns seen in the data and results

(Baber, 2016; Cabrera, 2018; Delgado et al., 2017; Ladson-Billings & Tate, 2016). Thus, racial inequalities observed in rates of student-faculty interaction, or any other outcome, are to some extent the result of the white supremacy inherent in social relations and reproduced in and by institutions.

Guided by this framework, I used student survey data from the 2018 Student Experience in the Research University (SERU) surveys. Specifically, my analytic sample was comprised of nearly 30,000 poor and working-class college students who attended 19 large public research universities across the United States. To address my first research question, I first ran descriptive analyses to examine the frequency with which poor and working-class students engaged in different kinds of student-faculty interactions. I then ran additional analyses to explore if these patterns of participation differed by gender, race/ethnicity and academic major. Then, to address my second and third research question, I employed structural equation modeling to test the hypothesized relationships between variables and outcomes. I tested the model first on all poor and working-class students, and then tested the same model on four racial/ethnic subsamples of poor and working-class students—Asian and Asian American students, Black students, Hispanic/Latinx students, and white students—to explore racial/ethnic differences in the relationships between variables.

Summary and Discussion of Findings

Chapter Four enumerates all of the descriptive and inferential findings, which generally suggested that there was a positive relationship between student-faculty interaction and poor and working-class students' self-rated cognitive skills, but that there were racial, gender, and academic major disparities in the rates of student-faculty interaction among poor and working-

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class college students. The following section, organized by research question, aims to make meaning of these findings in the broader context of relevant literature and theory.

Research Question One: How frequently do poor and working-class respondents report engaging with faculty?

Much of the existing literature on poor and working-class students generally suggests that they do not interact with faculty as frequently as their wealthier counterparts. However, this study was less interested in indexing social class inequalities in engagement, and rather sought to explore the rates and kinds of interactions in which poor and working-class students' reported engaging. Overall, poor and working-class students reported high rates of formal interactions with faculty in class. For example, most reported having courses in which the professor knew their name at least "occasionally," and more than half reported contributing to class discussion at least "somewhat often." However, the frequency with which poor and working-class students in the sample reported "often or very often" asking questions in class, communicating with the professor outside of class, or seeking help when needed were relatively lower. While it may be that some portion of these students truly do not require academic assistance from faculty or do not feel the need to discuss the course material and assignments, it may also be that poor and working-class students are not aware that faculty are available to students as sources of support or that there is value in building relationships with faculty outside of the class.

These patterns echo findings in existing literature on poor and working-class students, particularly around reticence to reach out to teachers or faculty with questions, concerns, or when in need of help (Bettencourt, 2019; Calarco, 2018; Jack, 2016, 2019; Kolluri, 2020; Scherer, 2020). As early as kindergarten, poor and working-class students across races and ethnicities have been observed not asking their teachers for help, clarification, or accommodations when

needed, having been socialized to view teachers primarily as authority figures rather than supporters (Calarco, 2018). Students carry these beliefs through the K-12 system and to college, and then often struggle without the faculty support that their wealthier peers seem to be able to access with ease (Armstrong & Hamilton, 2013; Calarco, 2018; Collier & Morgan, 2008; Jack, 2019; Mullen, 2011; Scherer, 2020). Further, poor and working-class students, especially poor and working-class Students of Color, also experience classism and racism from faculty in the classroom and from peers, often resulting in further internalization of shame, stereotype threat, and creating even more social distance between students and faculty (Allan et al., 2016; Ardoin, 2018; Ardoin & martinez, 2019; Bettencourt, 2021; Kolluri, 2020; Spencer, 2020).

In addition to the frequency of interactions around coursework, I also explored the extent to which students engaged with faculty in other ways. Notably, 60% of poor and working-class students said they had never worked with faculty on something besides coursework, however one-fifth of the respondents indicated they assisted faculty in conducting research; fewer students reported having had faculty advise their own independent research (13.4%) or having assisted faculty with creative projects (8.3%). While it is encouraging to see some poor and working-class students report participation in these activities, it appears there is also room to recruit more students to such projects, as assisting with faculty research and conducting independent research are critical college experiences that serve to socialize students and equip them with marketable skills to be successful in both academia and the workforce (Ceyhan & Tillotson, 2020; Cole & Griffin, 2013; Flowers, 2004; Hurtado et al., 2011; Kinkead, 2003; Posselt & Black, 2012; Tate et al., 2015; Winkle-Wagner & McCoy, 2016). Such experiences may be especially important for students—such as Students of Color and those who are poor and working-class—who have historically been denied access to research and academic spaces, especially in STEM fields

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(Chang et al., 2014; Hurtado et al., 2011; Peifer, 2019; Strayhorn, 2010; Winkle-Wagner & McCoy, 2016).

Existing literature suggests that participating in research opportunities is extremely impactful, as doing so allows students to develop cultural capital and marketable skills that can be leveraged later on in careers and graduate school *and* to develop a network of relationships with faculty PIs and graduate students (Ceyhan & Tillotson, 2020; Hurtado et al., 2011; Luedke et al., 2019; Posselt & Black, 2012; Winkle-Wagner & McCoy, 2016). However, poor and working-class students may be constrained both by a lack of knowledge about these opportunities and time. For example, unless they are in a structured undergraduate research program, poor and working-class students may be less aware of what it means to be a research assistant and that these opportunities are available to students who seek them (Posselt & Black, 2012; Scherer, 2020). Yet even when they are aware, serving as a research assistant is time consuming and often done on a volunteer basis, which may deter poor and working-class students who often need to work for pay from participating. However, evidence suggests that when these barriers are removed—in other words, when students are made aware of research roles and opportunities and especially when they are paid—poor and working-class students may be more likely to take advantage of them (Ceyhan & Tillotson, 2020; Kim & Sax, 2009; Ovink & Veazey, 2011).

Lastly, I also looked into the number of faculty poor and working-class students reported knowing well enough to ask for a letter of recommendation. I found that around one-third reported not knowing any faculty well enough to ask for a letter, however almost 40% had two or more faculty they knew well enough to ask. In some ways, letters of recommendation can be seen as the materialization of students' accrued social capital, representing relationships with

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important institutional agents who can transmit skills and information and broker a host of opportunities on campus and after graduation (Holland, 2010; Scherer, 2020). If it is the case that poor and working-class students interact with faculty infrequently in and out of class—whether due to disparities in cultural capital, shame or anxiety, their busy work schedules, or any other factor—then it stands to reason these students may struggle with amassing the close relationships that often yield letters of recommendation and other benefits. However, prior research suggests some of these barriers can be ameliorated through explicitly talking with students about the role of faculty in student success (Ardoin, 2018; Bettencourt, 2019; Collier & Morgan, 2008; Jack, 2016, 2019; Soria, 2015), structured mentorship and research opportunities (Fuentes et al., 2014; Ramos, 2019), and when students enroll in smaller classes with faculty invested in teaching undergraduates (Beattie & Thiele, 2016; Scherer, 2020).

Research Question One A: Are there gender, racial/ethnic, or academic differences in the frequencies with which poor and working-class students report different types of academic interaction with faculty?

In the interest of accounting for poor and working-class students' intersecting identities and academic contexts, I explored students' rates of faculty interaction by gender, race/ethnicity, and academic major. The gender findings were particularly striking, suggesting that poor and working-class men interacted with faculty at significantly higher rates than women across all types of interactions, with two exceptions: help seeking (which women reported doing significantly more frequently) and conducting research (for which there was no statistical difference between women and men). These gendered patterns are counter to those found in much of the prior literature on gender and student-faculty interaction among college students more generally, which has found women generally tend to interact with faculty more often than

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men (Anaya & Cole, 2001; Cohen, 2018; Kim & Sax, 2009; Sax et al., 2005; Sax, 2008), with the exception of participating in research, which men tend to report doing more frequently (Kim & Sax, 2009).

Research on poor and working-class women alone is limited such that speculating about the cause of the gender disparity observed in this study is challenging. Some explainations might be that poor and working-class students in general are not socialized to advocate for their own self-interests (Covarrubias et al., 2019; Nguyen & Nguyen, 2020; Stephens et al., 2012) and this phenomenon may be even more acute among women. Additionally, women generally tend to have more family and childcare responsibilities than men which may prevent them from spending as much time on campus activities (Beeler, 2016; Polakow et al., 2004; Sax, 2008). Regardless, these findings underscore the importance of studying students who are poor and working-class in their own right, as findings generated from studying samples of all college students in general may not actually apply to all students.

I next explored patterns of student-faculty interaction by poor and working-class students' racial/ethnic identity. In general, I found poor and working-class Black students reported the highest rates of frequent interactions with faculty across many of the different categories of interaction. These findings echo those of prior research, which suggests that Black college instudents generally tend to interact with faculty more frequently than do students from other racial/ethnic groups (Cole, 2007, 2008, 2010; Cole & Griffin, 2013; Kim & Lundberg, 2016; Kim & Sax, 2009, 2017). However, while the frequency of poor and working-class Black students' interactions with faculty is encouraging, a limitation of this study is that I cannot ascertain the *quality* of these interactions nor the race/ethnicity of the faculty with whom students are interacting. Prior research suggests that Black students are often less satisfied with their

interactions with faculty and benefit less from them than students of other races and ethnicities (Anaya & Cole, 2001; Cole, 2007, 2010; Cole & Griffin, 2013; Kim & Lundberg, 2016; Park et al., 2020). Critical race scholars in education have attributed much of this dissatisfaction and difference in impact to racism and racial microaggresions often inherent in these interactions, especially from white faculty—with Black students often perceiving faculty members' low academic expectations, lack of support, and being overlooked for research roles, among other problematic interactions (Cole, 2007, 2008; S. Harper, 2012; Johnson-Ahorlu, 2012; Park et al., 2020; Solorzano et al., 2000).

After Black and African American students, white students in this sample typically reported the next highest rates of interaction, and I found they interacted with faculty at similar rates to multiracial non-Hispanic students, Native Americans/Alaska Natives, and Pacific Islander students. Notably, small samples of these two latter groups preclude making many inferences and this finding should not suggest that these students do not experience racism or classism on campus. Rather, their small numbers in this sample and in higher education in general belie the role of white settler colonialism in shaping who has been and continues to be denied access to higher education in the United States, and how the racial project of the university was and is predicated on the removal and extinction of indigenous people (Brayboy et al., 2012; Fish & Syed, 2018; Stein, 2020; Wilder, 2014). However, that sizable proportions of poor and working-class multiracial non-Hispanic students, Native Americans/Alaska Natives, and Pacific Islander students reported frequent interactions with faculty is encouraging, particularly since the demographics of the professoriate would suggest many of these students may never be taught or mentored by a faculty member who shares their race/ethnicity (U.S. Department of Education, 2019).

Additionally, my descriptive analyses suggested that poor and working-class Asian and Asian American and Hispanic/Latinx students had worryingly low rates of interaction with faculy compared to students in other racial/ethnic groups. These findings mirror the prior research on Asian and Asian Americans students which suggests these students are often least likely to interact with faculty compared to students from any other racial/ethnic group, with the exception of their engagement in research (Kim et al., 2009; Kim, 2010; Kim & Sax, 2009). I also add to the more complicated body of research on Latinx students, which suggests Latinx students frequently seek out mentorship from faculty (Cole, 2007) though they participate in research opportunities at rates far lower than students of other races (Anaya & Cole, 2001; Kim & Sax, 2009). Notably, prior research suggests that Asian and Asian American students and Latinx students *do* tend to benefit academically, socially, and otherwise from their interactions the faculty when they engage with them (Kim et al., 2009; Kim, 2010), however, it may be incumbent on faculty to do more outreach with poor and working-class students from these racial/ethnic groups.

Finally, I wish to emphasize that the racial/ethnic variation in poor and working-class students' interactions with faculty are not *caused* by race/ethnicity or by being poor. For example, that Asian and Asian American students were comparatively less likely than other students to ask questions in class, but were more likely than students from other races/ethnicities to have assisted faculty with research, reflects broader racial/ethnic disparities in who pursues STEM-H fields, specifically, the high concentration of Asian and Asian American students in these fields. Yet the construction of who belongs in and pursues STEM-H fields is far from neutral, and is bound up in longstanding class and racial stereotypes about intelligence, academic dedication, and knowledge production (Fries-Britt & Turner, 2001; Johnson-Ahorlu, 2012;

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Museus & Kiang, 2009; Ortiz et al., 2019). While the effects of these stereotypes are persistent, scholarship that explores racially/ethnically diverse students in STEM-H fields, particularly at minority serving institutions, suggests they are not impossible to defy (Cole & Griffin, 2013; Crisp et al., 2009; Hurtado et al., 2011; National Academies of Sciences, Engineering, and Medicine, 2019; Washington et al., 2015; Winkle-Wagner & McCoy, 2016). For example, WinkleWagner and McCoy's (2018) study comparing Black undergraduate students in STEM fields at a mid-adlantic HBCU and Black students at a mid-adlantic predominantly white university found that the Black students at the PWI described feeling like outsiders with limited academic and social support, and accordingly more limited access to the requisite social and cultural capital needed to be successful. Conversely, students at the HBCU described close-knit communities of faculty and graduate students in their major departments that were dedicated to supporting students and equipping them with cultural capital to graduate and look into STEM graduate school programs (Winkle-Wagner & McCoy, 2018). Yet, the work of Jack (2016, 2019) and others (Fuentes et al., 2014; Kolluri, 2020; Nguyen & Nguyen, 2020; Ramos, 2019; Scherer, 2020; Wang, 2012) suggests that poor and working-class Students of Color across academic fields and at other institution types *can* be socialized to see and use faculty as resources in their academic success if college staff and faculty are willing to take the time to do so.

Beyond racial/ethnic differences, I also explored the role of student-faculty interaction by student major. In general, the findings aligned with common understandings of the different types of pedagogy used in different academic fields. Generally, the arts and humanities majors in the sample reported the most interaction, followed by social science and business/professional majors, while STEM-H students reported the least frequent interaction with faculty. For example, poor and working-class STEM-H majors reported the lowest rates of contributing to

class discussion, asking a question, or attending office hours to discuss course material. These findings make sense in the context of the "teacher-centered" pedagogy used in most STEM fields at large research institutions, wherein instructors are the active authority figures in the classroom, conveying knowledge to passive students (most often through lecture) and then assessing students' recall of that knowledge with exams (Hancock et al., 2002). Further evidence of this passive classroom experience can be seen by the fact that less than one-third of poor and working-class STEM-H students said they "often" or "very often" had a class in which the professor knew their name. Conversely, more than double that rate (66%) of students in the arts/humanities reported having instructors who knew their names, and humanities majors also boasted the highest rates of in-class interaction and communicating with professors outside of class compared to students in any other field. Like the findings about STEM-H students, these findings are likely due to smaller class sizes and the more student-centered and active learning strategies used in arts/humanities pedagogy, which more often incorporate class discussion and other student-centered approaches (Kim & Sax, 2011; Nelson Laird & Cruce, 2009; Smart et al., 2000).

Broadly these findings echo those of others who have explored academic disciplines and found that arts/humanities and social science faculty tend to interact with students more often than do faculty from other fields (Kim & Sax, 2011; Nelson Laird & Cruce, 2009; Smart et al., 2000; Umbach & Wawrzynski, 2005) however the poor and working-class STEM-H majors in this sample were, unsurprisingly, more likely than those from other academic majors to interact with faculty in a research setting. While this is to be expected, these academic major differences—along with the low-rates of research participation among poor and working-class students more generally—suggest faculty from other fields beyond the traditional "bench

sciences" might do more to socialize undergraduate students into what research is and looks like in different disciplinary contexts. Doing so not only conveys valuable information to students but may also serve to increase their aspirations and the likelihood that they get involved in this beneficial and rewarding experience (Posselt & Black, 2012).

Research Question Two: Among poor and working-class college students, what are the social identities and characteristics that portend more frequent student-faculty interaction and to what extent does student-faculty interaction mediate the relationship between (a) student background characteristics and academic experiences and (b) self-rated cognitive skills?

Informed largely by Pascarella's (1985) General Model of Assessing Change, I developed a hypothesized structural model and tested it with the sample of all poor and working-class respondents to the 2018 SERU survey. In his model, Pascarella suggests that students' identities and background characteristics predict their learning and development directly and by way of their relationships with "agents of socialization" and the institutional environment. The model I developed hypothesized the relationships between students' social identities and background characteristics, their interaction with faculty, and the extent to which that those interactions predicted students' self-rated cognitive skills directly and indirectly via academic effort and perceptions of campus racial climate. Overall, the fit statistics (reported in detail in Chapter Four) suggested that this hypothesized structural model fit the data well, and most paths were significant.

The model tested the relationships between 15 variables representing various student characteristics and the frequency with which students interacted with faculty. Findings from this portion of the omnibus model provide key insights of which student identities and background

characteristics portend more frequent interaction with faculty, even when accounting for the effects of other variables. For instance, gender and racial/ethnic identity were salient predictors of interacting with faculty. That is, poor and working-class women interacted with faculty significantly less frequently than men, and Asian/Asian American and Hispanic/Latinx students engaged with faculty less frequently than white students, while Black students did so significantly more often, even when controlling for a host of other variables. As previously noted, the gendered patterns seen here are counter to patterns commonly seen in research on college students at large (Kim & Sax, 2017; Sax et al., 2005; Sax, 2008), while the racial/ethnic patterns are similar to prior work (Anaya & Cole, 2001, 2001; Cole, 2007, 2010; Cole & Griffin, 2013; Kim, 2010, 2010; Kim & Lundberg, 2016). Regardless, these findings point to key student populations (e.g., poor and working-class women, poor and working-class Asian and Asian American and Latinx students) who may need more explicit socialization around the role of faculty, who might benefit from faculty reaching out to them to initiate contact, or who might be experiencing more negative interactions with faculty and are thus deterred.

Beyond students' race/ethnicity and gender, student major was also salient, and the results are parallel to those seen in the descriptive analyses. That is, even when accounting for other characteristics, arts/humanities and business/professional majors interacted with faculty more frequently than social science majors, while STEM-H majors interacted with faculty less often. This suggests social science and STEM-H faculty may do well to use more active forms of pedagogy that both encourage student participation and allow for the development of relationships between students and faculty. Setting a foundation of trust and open communication between students and faculty may be especially important for poor and working-class students across races and ethnicities in these research-intensive fields, as such relationships

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may lay the groundwork for research positions in faculty labs and other opportunities that poor and working-class students may not seek out on their own (Hurtado et al., 2011; Luedke et al., 2019; Posselt & Black, 2012; Winkle-Wagner & McCoy, 2016).

I also included in the model a measure of students' first-generation status, defined as neither parent having attended any college. Findings from the structural equation model suggest that poor and working-class students who were also first-generation interacted with faculty less often than did poor and working-class students whose parents/guardians attended at least some college, even when accounting for other variables. Ample literature has focused on the experiences of first-generation students in college and the myriad struggles they face, however much of this work uses first-generation status as a proxy measure for social class or income (Bettencourt et al., 2020; Goward, 2018; Soria, 2018). Findings from this suggest that first-generation students who are *also* poor and working-class may face multiple interlocking challenges, both from the relative lack of cultural capital often attributed to their social class identity *and* the lack of social capital transmitted from college educated parents, which is useful for successfully navigating college and expanding new networks on campus.

Most of the remaining predictors of student-faculty interaction in the model also highlight the importance of what Yosso (2014) refers to as "navigational capital." For instance, the model suggests that poor and working-class transfer students interacted more frequently with faculty than did first-time college students, that international students interacted more often with faculty than did domestic students, and students who worked more hours per week engaged with faculty more frequently. Notably, all of these student characteristics have been previously discussed in existing literature as deficits which place students at a relative disadvantage, due to inadequate academic preparation (Alexander et al., 2009; Laanan, 2001), language/cultural barriers (H.J.

Chen et al., 2002; J. J. Lee & Rice, 2007; Museus & Park, 2015), or simply limited hours in the week dedicated to academic endeavors (Matus-Grossman & Gooden, 2002; Pascarella et al., 2004; Terenzini et al., 1996; Wilson, 2016). However, that these characteristics portended to *more* interaction with faculty in the model at hand suggests that these poor and working-class students—who have successfully navigated the transfer pipeline, international admissions, or who juggle heavy work responsibilities in addition to going to college full-time—have likely developed the skills and knowledge necessary to navigate educational bureaucracy. Key to that successful navigation is understanding the institutional agents who can support your progress and working with them closely, which may explain these students' more frequent interactions.

Relatedly, findings from the model also suggested that every year students spent on campus portended more frequent student faculty interaction. This is largely unsurprising as more advanced students in their second year of college and beyond have had both more time to interact with faculty more frequently as well as more time to get acquainted with the norms and expectations of the institution. Prior research has also found older students tend to participate in more "high impact practices" like research (Kuh & Hu, 2001), underscoring the need of faculty and institutions to work to socialize students in their first and second years to set these students up for success throughout the rest of their college experience (Fuentes et al., 2014). Lastly, the higher poor and working-class students rated their cognitive skills at college entry, the more frequently they interacted with faculty, even when controlling for a host of other variables. This finding reiterates prior research on the importance of academic self-concept among college students, namely that more academically confident students are more likely to interact with faculty, get involved in research and other activities, cultivate graduate aspirations, and complete college (Astin, 1997; Cole, 2007; Kim, 2010; Mayhew et al., 2016). That similar patterns hold

among poor and working-class students' is encouraging and highlights the need for K-12 teachers, staff and mentors to reinforce and build students' academic confidence and skills, especially among poor and working-class students who, research shows, tend to be less confident in their academic abilities than their wealthier peers when they get to college (Jack, 2016, 2019; Scherer, 2020).

Understanding the identities and characteristics that portend to more student-faculty interaction among poor and working-class college students, I turn now to the mediating role of student faculty interaction in explaining the relationship between these students' identities and backgrounds and their self-rated cognitive skills. To be sure, understanding what factors induce students to interact with faculty more frequently is of little concern if it turns out that interacting with faculty is not beneficial to poor and working-class students. However, the structural equation model suggested there was a strong relationship between more frequent interactions with faculty and with higher cognitive skills self-ratings, both directly and indirectly. The direct relationship between faculty interaction and cognitive skills was strong and positive even when controlling for students' cognitive skills when they began college as well as other variables, echoing decades of prior research that suggest interacting with faculty affords students myriad academic and social benefits (Cole & Griffin, 2013; Fuentes et al., 2014; Kim & Sax, 2017; Kuh & Hu, 2001; E. T. Pascarella, 1980; E. T. Pascarella & Terenzini, 1978). That this relationship holds among poor and working-class college students as well, even when controlling for a variety of other factors, underscores the importance of using policy, programs, and pedagogical practices to increase the frequency with which poor and working-class students and faculty engage.

The indirect relationships between student-faculty interaction and cognitive skills serve to partially explain why student-faculty interaction is positively associated with cognitive skills. On one hand, the model suggests that students who interact with faculty more frequently are also more likely to increase the effort they dedicate to academic tasks, which is associated with higher self-rated cognitive skills. This finding validates both Pascarella's (1985) model as well as decades of research on student impact that has demonstrated the importance of academic effort in students' academic success and college completion (Astin, 1999; Kim & Lundberg, 2016; Pascarella, 1985). Thus, as seen in the general college-going population, more frequent interactions and support from faculty likely encourage poor and working-class students to dedicate more time and effort to their academic work; it is also likely this increased effort, in addition to yielding academic benefits like higher self-rated cognitive skills, also feeds back into portending more frequent and supportive interactions with faculty who recognize and validate students' effort.

In addition to affecting poor and working-class students' self-rated cognitive skills by way of increased academic effort, the model also suggests student faculty interaction portends to more positive perceptions of the campus racial climate, which then is also positively associated with self-rated cognitive skills. For more than three decades, scholars have emphasized the importance of campus racial climate in academic success, sense of belonging, persistence, and completion, especially for Students of Color who are more likely to experience hostile climates at historically and/or predominantly white institutions (Harper & Hurtado, 2007; Hurtado et al., 1999; Kim et al., 2018; Milem, 2001; Museus et al., 2008; Solorzano et al., 2000). While racism is endemic to social and structural arrangements at every level (e.g. macro national policy to micro individual interactions), so too is campus racial climate shaped by a variety of factors at

every level (Hurtado et al., 1999). Thus, while the findings of this model cannot address the totality of racism baked into every level of how colleges operate, that more frequent student faculty interaction was *positively* associated with more positive perceptions of campus racial climate suggests something encouraging about the positive nature of these interactions with faculty. Further, that this more positive perception of campus racial climate also portends to students' higher self-rated cognitive skills is indicative of similar relationships found in prior research (Cress, 2008; Kim et al., 2018; Museus et al., 2008; Parker & Trolian, 2019) and further underscores that building and maintaining a supportive campus racial climate is not only important for Students of Color, but beneficial to students across race and class.

Thus, my findings suggest there *is* a mediating role of student faculty interaction in explaining the relationships between students' identities and background characteristics and their self-rated cognitive skills. This was especially clear for the race/ethnicity and gender variables for which I also tested direct relationships with self-rated cognitive skills. For example, there was no significant relationship between being Black (relative to white) and students' self-rated cognitive skills or between being a woman (relative to being a man) and students' self-rated cognitive skills, which suggests that in this model, the relationship between these identities and students' cognitive skills is completely mediated by students' interactions with faculty. Conversely, there were significant direct relationships between the dependent variable of students' current self-ratings of their cognitive skills and being Asian/Asian American, Latinx, their self-rated cognitive skills when beginning college, and their year in college, which indicates student-faculty interaction *partially* mediates or explains these relationships. Accordingly, this model lends further support to the broader literature on student-faculty interaction, which suggests relationships with faculty are key gateways to students' academic and social success

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(Kim & Sax, 2017; Kuh & Hu, 2001; Lundberg & Schreiner, 2004; Nelson Laird & Cruce, 2009).

Research Question Three: To what extent and how does race/ethnicity moderate the relationships between other demographic characteristics, student-faculty interaction, campus climate, and self-reported cognitive gains among working-class college students?

The final objective of this study was to explore whether and how poor and working-class students' race/ethnicity moderated any of the relationships between the variables seen in the model tested on all poor and working-class students. To meet this objective, I tested the same model hypothesized for all poor and working-class students on four racial/ethnic subsamples: Asian and Asian American students, Black students, Hispanic/Latinx students, and white students. When I did so, the hypothesized factors in the omnibus model also held across these racial/ethnic models supporting the validity of these latent variables. Also, the fit statistics for all four models were well within accepted limits, suggesting the models fit the data from each racial/ethnic subsample well. Overall, this suggests the structure of the hypothesized model was validated with the data. Most notably, the positive direct and indirect relationships between the frequency of student-faculty interaction and students' self-rated cognitive skills held across all of the racial/ethnic models. In other words, more frequent student-faculty interaction was beneficial to poor and working-class students even when looking across discrete racial/ethnic subgroups of poor and working-class students.

This finding is in some ways counter to some of the existing literature on the conditional racial effects of student-faculty interaction, which frequently have found strong positive effects when looking at students in the aggregate but report a non-significant or even negative effects when examining at the role of student-faculty interaction among racial/ethnic subpopulations of

students (Anaya & Cole, 2001; Cole, 2010; Cole & Griffin, 2013; Kim, 2010; Kim & Sax, 2017). This deviation from existing literature may indicate the especially important and positive role faculty can play in the academic success of poor and working-class Students of Color s relative to their more middle-class and wealthy peers. Research on these students suggests that they appreciate student-centered pedagogy and academic support, as all students do (Cole, 2007; Jack, 2019; Kolluri, 2020; Winkle-Wagner & McCoy, 2016), but it might be the case that poor and working-class students across races and ethnicities experience benefits to student-faculty interaction beyond those seen in the general population.

However, while the relationship between interacting with faculty and poor and working-class students' cognitive skills was uniformly positive across racial/ethnic subsamples, differences and departures from the findings of the omnibus model did emerge when exploring the identities and background characteristics associated with more student-faculty interaction. First, when exploring differences across subsamples, it became clear certain subpopulations may be driving the findings in the omnibus sample in important ways. For example, only in the Asian and Asian American model did being a non-U.S. citizen/permanent resident have a significant relationship with the frequency of poor and working-class students' faculty interaction; this relationship was not significant in any other racial/ethnic model. To some extent this finding is likely driven by the racial/ethnic identities of international students in this sample. Most of the students in the sample who were not U.S. citizens or permanent residents were Asian, which is not surprising given the prevalence with which large public research institutions (like those represented this sample) recruit international students from Asia. Such recruitment practices— aimed at attracting international students who pay more tuition—have become more common as public institutions grapple with state and federal defunding (Cantwell, 2015). It may also be that

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students of other races and ethnicities who were not U.S. citizens were did not wish to disclose their citizenship status, particularly given the racism and xenophobia around immigration in 2018's political climate. Regardless, the strong positive relationship between not being a U.S. citizen/permanent resident and more frequent student-faculty interaction among only poor and working-class Asian students is notable and may be explained by the navigational capital these students' possess to successfully enroll and complete college and thus understand the importance of support networks as mentioned earlier (Anandavalli, 2019, 2021; Oropeza et al., 2010). The frequency with which these students interact with faculty is encouraging, particularly given that supportive relationships from faculty and staff have also been shown to mitigate some of the negative effects of racism experienced by Asian international students in prior research (H.J. Chen et al., 2002)

A second notable difference between the racial ethnic sub models and the omnibus model is that first-generation status was only a significant negative predictor in the Hispanic/Latinx model and was non-significant in the other racial/ethnic models. Additional analyses revealed that 66.9% of Hispanic/Latinx students indicated that neither parent had attended any college, a rate higher than that for all poor and working-class students (47.3%) and much higher than the rate of Asian/Asian American (44.6%), Black (33.4%) white students (24.8%) who met this definition of first-generation. Thus this variable's salience in the model is in some ways likely a result of the greater proportion of first-generation Hispanic/Latinx students. However, the directionality if the relationship between these variables remains concerning. Other research (Cuellar, 2014; Gloria et al., 2005; Jack, 2019; Stebleton & Aleixo, 2015), including Kolluri's (2020) recent qualitative study of low-income first-generation Latinx students at the University of California, has captured first-generation Latinx students' reticence to engage with faculty. His

participants described both their fear and apprehension around attending office hours, but also how important having the support of a faculty member was to their academic success once they finally realized professors "…are people too" after several quarters (Kolluri, 2020, p.16). These findings from the poor and working-class Latinx model point to a site for intervention to encourage more interaction, as evidence suggests that when first-generation Latinx students *do* interact with faculty, they often reap the benefits (Anaya & Cole, 2001; Jack, 2019; Kolluri, 2020).

A final difference across models that I wish to draw attention to is the fact identifying as a woman was only significantly negatively associated with the frequency of student-faculty interaction in the Asian/Asian American, Black, and Hispanic/Latinx models; gender was not a significant variable in the model tested only on white students. Further, given that gender did not have a significant direct relationship with students' self-rated cognitive skills in any of the samples, this suggests that the negative relationship between identifying as a woman and students' self-rated cognitive skills is entirely mediated by the low-rates of student-faculty interaction among Women of Color. As mentioned in Chapter Two, much of the existing literature that has looked at the predictors and outcomes of student-faculty interaction by students' identities has done so through a single lens, finding for example that poor and working-class students interact with faculty less-frequently than middle-class and wealthy students, or that women generally interact with faculty more frequently than men, or that Black students interact with faculty most compared to other racial ethnic groups, and Asian/Asian American students do so least, while students of other races fall somewhere in the middle (Cole & Griffin, 2013; Kim et al., 2009; Kim & Sax, 2009; Sax et al., 2005). Yet the question remains: what from this body of scholarship do we know specifically about the experiences and outcomes of poor and

working-class Women of Color? Rather little, in fact. While some research exists on the role of faculty in the success of Black women (Strayhorn, 2010; Williams & Johnson, 2019), and a slightly larger body of work has looked particularly at the experiences of Women of Color in STEM fields (Espinosa, 2011; Johnson, 2012; Ong et al., 2011, 2018; Reyes, 2011), our knowledge of best practices in higher education that support Women of Color in general, let alone those who are poor and working-class, is far from exhaustive. To be sure, this concerning finding and the limited literature with which to contextualize it underscores the importance of examining student experiences while being mindful of students' multiple identities. However, in relying on critical race theory, these findings can be explained, in part, by the multiplicity of interlocking oppressions—classism, racism, sexism and likely others not accounted for here— that poor and working-class Women of Color face on campus and elsewhere in the social world (Crenshaw, 1991; Harris & Patton, 2019).

Implications

Having placed the findings of this study in the context of literature and theory I move now to describing what I believe to be the key implications of the study. In the following sections, I will briefly summarize implications for theory, for faculty practice, and for institutional policy.

Implications for Theory

As previously discussed, I relied heavily on Pascarella's (1985) General Model of Assessing Change to structure the hypothetical structural model I later tested. In addition, I drew from key concepts from Bourdieu's scholarship on the role of education in social reproduction and framed the study in a broader context of persistent and quotidian racism as asserted by critical race theorists to interpret the findings. Accordingly, there are two key theoretical

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implications I suggest here. First, the structural models informed by Pascarella's model generally held, suggesting his assertions made decades ago continue to be applicable beyond the general college-going population to racially/ethnically diverse poor and working-class college students. However, the use of the additional power-conscious frameworks to interpret the significant relationships and differences across the model allowed me to account for various social and structural arrangements that students' social lives shape and are shaped by. This added specificity is key to interpreting results in a way that captures the lived realities of students who face racism and classism in their daily lives.

Secondly, while some have suggested Bourdieu's theorizing is race-neutral at best and oppressive at worst, a growing number of scholars are pairing his concepts with other critical and race-conscious frameworks (Horvat, 2003; Mcknight & Chandler, 2012; Tichavakunda, 2019), as I have done here. While I have by no means tested his theory completely, I believe my findings underscore the utility of conceptualizing interacting with faculty as a form of dominant cultural capital (specific to the field of public research institutions) that can be leveraged to student benefit, as others have also suggested (Ardoin, 2018; Collier & Morgan, 2007; Jack, 2019; Mullen, 2011; Scherer, 2020). This interpretation of student-faculty interaction as a form of capital is useful in that it accounts for the role of social class and thus family, schooling, micro and macro social arrangements and interactions, and other factors that all inform how students navigate relationships with faculty and experience in higher education.

Implications for Faculty

If anything, the findings from this study suggest that faculty play an important role in the self-assessed learning of poor and working-class college students across racial/ethnic groups, as more frequent interaction portended greater self-rated cognitive skills as well as increased

academic effort and greater perceptions of campus climate. Accordingly, there are several

implications for faculty to consider in their teaching and advising. First, in general, poor and

working-class college students tended to report less interaction with faculty in ways that

involved asking questions, help-seeking, or getting their needs met. This kind of interaction was

even less frequent among certain subpopulations of poor and working-class students (e.g., men,

Asian/Asian American students, Latinx students). Research on academic help-seeking suggests

that poor and working-class students may be anxious or unsure about asking for support,

clarification, or accommodations (Ardoin, 2018; Calarco, 2018; Collier & Morgan, 2008; Jack,

2016, 2019; Scherer, 2020). However, evidence also exists to suggest that faculty can ameliorate

(or further exacerbate) students' anxieties around interacting with them with certain

"accessibility cues" (Cole & Griffin, 2013; Neville & Parker, 2019; Wilson et al., 1974). These

cues, which can include everything from a faculty member's moods and demeanor in the

classroom and office hours, to their engagement with questions and class discussion, to the

frequency and tenor with which they critique students, have been shown to send students covert

and overt signals about how interested faculty are in interacting with them (Wilson et al., 1974).

Students then rely on these cues as they determine whether or not to reach out to faculty,

cultivate relationships, or ask for help and support[1] (Cole, 2007; Cole & Griffin, 2013; Umbach

& Wawrzynski, 2005).

Thus, faculty should be mindful about the messaging they may be sending to students

with their actions and classroom climates, especially to those who are poor and working-class

and may be reticent to reach out anyway. In order to cultivate more positive perceptions among

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[1] A somewhat related concept—racial or classist microaggressions—or the "systemic, everyday racism [and classism] used to keep those at the racial [and class] margins in their place" (Perez Huber & Solorzano, 2014, p. 298), can also be understood as a type of accessibility cue particularly informative to poor and working-class students and especially poor and working-class Students of Color.

these students, prior literature suggests taking time to incorporate student questions and

discussion in class, to allow for students' questions and ideas to steer the direction of the class

period to the extent possible, to ask students for course-content-related examples and ideas and

demonstrate interest when students share them, and to be flexible in your course policies to

accommodate students' needs (Neville & Parker, 2019). Additionally, students from all

backgrounds, but especially poor and working-class students who are first-generation or have

limited navigational capital, may be more inclined to interact more frequently with faculty if

their instructors explicitly discuss aspects of the "hidden curriculum" like the role and function

of office hours, email and other communication norms between students and faculty, the function

of applicable departmental and campus resources (e.g. the writing center, office for international

students, registrar etc.), and open research lab positions and what those entail (Ardoin, 2018;

Bettencourt, 2019; Collier & Morgan, 2008; Jack, 2019; Scherer, 2020; Spencer, 2020). With

more clarification around norms and expectations, faculty can address some of their low rates of

interaction with poor and working-class students.

Somewhat relatedly, there were academic major disparities in rates of faculty interaction

among poor and working-class students. In particular, poor and working-class STEM-H majors

interacted with faculty at low rates across the board, with the exception of assisting with

research. Students—especially those who are poor and working-class, first-generation, women,

and Students of Color—arrive to college with pre-existing perceptions about STEM-H majors

and who is meant to succeed in them (Chen & Buell, 2018; McGee, 2016; Weston et al., 2019).

To the extent STEM-H faculty can challenge those assumptions, whether through their own

accessibility cues as well as their pedagogy, they may catalyze a whole host of benefits from

increasing student-faculty interaction (which this study found is also linked to increasing

students' self-rated cognitive skills), as well as potentially recruiting and retaining students who have been historically excluded from STEM-H fields. Scholars and STEM-H professional organizations have been calling for changes to STEM-H pedagogy for years as doing so may stand to recruit and retain more students to STEM-H majors and more racially/ethnically diverse students to boot (National Academies of Sciences, 2017; National Research Council, 2011). While all of the recommendations are too numerous to list here, Cole and Griffin (2013) encourage the use of practices of Steele's (1997) "wise schooling" to increase more high-quality student-faculty interaction among diverse students which include: "…providing students with challenging work, building students' self-efficacy, affirming that they belong (academically) in college, valuing multiple perspectives, providing role models, and creating a safe student-faculty relationship in which responses to students are nonjudgmental provide pedagogical practices that reduce stereotype threat and increase the educational success of Students of Color" (p. 579).

In general, the findings of this study affirm the important role that faculty play in the success of poor and working-class students across racial/ethnic groups, and faculty should be encouraged to recognize that importance. Faculty and instructors should be aware of the power of their support, of their kindness, and of their critique, particularly for students who have been historically and systemically excluded from higher education for most history and who experience racism and classism when they are able to access these institutions. While faculty at large research institutions are juggling many demands on their time and resources (particularly adjuncts and non-tenure track faculty), this study suggests that making an effort to engage with poor and working-class students may be worth devoting a little extra time to, as the results show these students benefit from the positive interactions, support, letters of recommendation, and time spent in office hours.

Implications for Institutional Policy

Thanks in large part to the work of scholars, K-12 teachers and staff, and higher education administrators, working-class students have increasingly been able to access institutions of higher education over the last several decades (Cahalan et al., 2019). However, findings from this study offer insights into how institutions can support growing populations of poor and working-class students once they have been admitted. At the most basic level, results from this study suggest the need for institutions to consider students' social class identity as a useful and generative category of analysis in institutional research projects and in designing policies and programs for students. While gender identity and race/ethnicity are common identity categories faculty and staff think of when they measure compositional diversity and examine inequality on campus, social class is less often included in these analyses (Ardoin & martinez, 2019; Soria, 2015). This is due in large part to both the invisibility of social class and to the ways in which the realities of social class hierarchy are incompatible with American ideals of meritocracy and social mobility (Ardoin & martinez, 2019; Bettencourt, 2019; hooks, 2000; K. M. Soria, 2018). However, the SERU survey used in this study provides one example for how information about student social class can be collected so that these identities can be made visible to institutional stakeholders. Much has been written about social class or income disparities in student success, however faculty and administrators cannot expect to address these disparities if we do not collect data on these identities and put that data to work in diversity initiatives, professional development for faculty, and training for staff across campus, among other areas.

Further, once institutions have access to information about multiple facets of student identity, the findings of this study demonstrate the unique insights that can be gained by

examining students' experience through the lens of race, gender, social class, and other categories collectively. That is, when students' multiple identities were accounted for it became clear that initiatives to bolster interaction between students and faculty might be focused specifically on poor and working-class Women of Color, first-generation students, and other groups who reported the least frequent interactions with faculty despite these interactions being beneficial to their learning and development.

Leveraging data and insights to design targeted initiatives or even to train faculty and staff to pay attention to and reach out to specific students who could benefit most is more efficient and cost effective, however I recognize the organizational and political challenges therein for public institutions. The erosion of affirmative action policies throughout the public sector over the last 30 years has made it challenging (or even illegal) for institutions of higher education to meaningfully address racial and gender inequality. For example, the passage of Proposition 209 banned affirmative action in the state of California in 1996 and California voters failed to repeal the measure in the November 2020 election. In addition to having far-reaching consequences on the diversity of students admitted to and graduating from public institutions in the state, Prop 209 also prohibits any targeted racial or gender programming *unless* it is also open to all other students as well (University of California Office of the General Council, 2015). While social class and/or income are identity categories that institutions can program around, prior research on undergraduate admissions suggests that using specific class- or socioeconomic-based initiatives have been insufficient in addressing racial disparities (Kidder, 2013; Reardon et al., 2015).

Thus, in order to best address students' unique needs and improve outcomes going forward, it will be insufficient to focus only on social class or income. Accordingly, institutional

stakeholders should focus their programming and initiatives, such as summer bridge programs, mentoring programs, and undergraduate research opportunities, to specific populations of students who might stand to benefit most to the extent they are legally able to do so (e.g., first-generation students are not a protected category). But faculty, administrators, and researchers would also do well to lobby for the repeal of anti-affirmative action laws and policies so that they might more efficiently tailor programming and resources to students.

Lastly, to the extent possible, institutions might address some of the disparities in cultural capital with financial capital. That is, institutions should aim to provide paid opportunities that facilitate student-faculty interaction. Poor and working-class students in this study reported low rates of assisting faculty in creative or research projects, and participation was even more disparate among Black and Latinx students. Prior research has shown that poor and working-class students are more likely to participate in research when they are paid to do so (Kim & Sax, 2009; Walpole, 2003) and faculty, departments, and programs should prioritize this expense. Evidence suggests there are myriad benefits to doing so. Not only would properly funding these opportunities provide students with much needed financial support, but would also equip poor and working-class students with valuable faculty mentorship, disciplinary skills, and knowledge that would be useful throughout their educational trajectory.

Relatedly, much of the research on addressing racial/ethnic, first-generation, and gender disparities in education encourages institutions to recruit and retain more racially/ethnically, gender, and social class-diverse faculty, suggesting the presence of more diverse faculty might support more diverse student populations (Ardoin, 2018; Lee, 2010; Llamas et al., 2021; Milem et al., 2005; Stout et al., 2018). While this study was unable to ascertain the identities of the faculty with whom students are more likely to interact, the findings around research and poor and

working-class students' social capital in some ways serve as a canary in the coal mine. If institutions are serious about recruiting and retaining a more diverse professoriate, it would behoove faculty and administrators to look into their own labs and libraries at the population of undergraduates getting the hands-on training and mentorship necessary to access graduate school. Today's undergraduate research assistants and faculty mentees are tomorrow's faculty hires, and findings from this study suggest poor and working-class students—and especially poor and working-class Students of Color—remain in the minority of students who can access the human, cultural, and social capital to be successful in academia.

Limitations & Future Research

In addition to the findings, the limitations of this study described in detail in Chapter Three point to how researchers may generate new and necessary knowledge on the college experiences of poor and working-class college students. First and foremost, the data used for this study were cross-sectional and thus I do not know the order of events and accordingly cannot prove the extent to which specific variables/characteristics *cause* more student-faculty interaction, nor whether student-faculty interaction *causes* the outcomes I observed. Future research that uses longitudinal data, as well as that which incorporates non-recursive modeling to test the feedback loops of variables (i.e., student-faculty interaction is associated with higher cognitive skills self-ratings but do higher cognitive skills self-ratings portend to more frequent student-faculty interactions?) (see Kim, 2010) would address this limitation. Further, centering the voices and experiences of poor and working-class students themselves through qualitative research would generate insights about what the students report mattering most in promoting more interaction with faculty and whether they attribute faculty support to their success.

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Secondly, the variables accounted for in my structural equation model are in no way an exhaustive of the identities, background characteristics, and experiences that might shape the extent to which poor and working-class students interact with faculty. For example, additional measures representing students' high school experiences and homelife might provide insights into the social and cultural capital with which poor and working-class students arrive to college and point to earlier opportunities to develop and socialize students to be successful in college and beyond.

Further, in an effort to keep the model parsimonious and because survey respondents' institutions were anonymized in the dataset, I was unable to account for institutional or department-level variables or factors that may foster or inhibit student-faculty interaction. While evidence exists about the impact of institutional size and type on promoting student-faculty interaction (Pascarella, 1980; Scherer, 2020; Umbach & Wawrzynski, 2005; Wang et al., 2015), future research might look at other aspects of the institution. For instance examining the effect of the racial/ethnic, gender, or social class composition of faculty on campus or in specific departments on the frequency of interaction among poor and working-class students may be worthwhile. Additionally, examining the impact of fellowships and financial aid, structured institutional summer bridge programs, research experiences, and living-learning programs may offer suggestions about *how* certain campuses foster more interaction among faculty and poor and working-class students.

Next, while this study examined the relationship between student-faculty interaction and students' self-rated cognitive skills, exploring the impact of interacting with faculty on other meaningful outcomes of interest among poor and working-class students might broaden our understanding of the scope and limitations of the benefits of interacting with faculty. Given

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ample evidence on the conditional effects of faculty interaction based on race/ethnicity, gender, and other identities (Cole & Griffin, 2013; Kim & Sax, 2017; Mayhew et al., 2016), scholars would do well to account for students' multiple identities in this work in order to clarify not just whether and how student-faculty interaction is associated with students' sense of belonging, skill development, GPA, or graduate school aspiration or admission, but who benefits most or at all.

Finally, this study aimed to account for and illustrate racial/ethnic heterogeneity among poor and working-class students, has much of the existing literature looked only at poor and working-class white students or does not address race/ethnicity at all (Martin, 2015; Moschetti & Hudley, 2008; Mullen, 2011; Soria, 2013; Stuber, 2011. While the findings of this study make a small contribution in this effort, I was limited by the federally provided race/ethnicity categories used on the SERU survey, which asked respondents to indicate whether they are Hispanic or Latinx, and then to indicate their identification with separate aggregated race categories: American Indian/Alaska Native, Asian American, Black/African American, Pacific Islander, white, and unknown. This high-level aggregation obscures much of the ethnic diversity within specific racial groups, disguising inequalities that might otherwise be addressed by policy and programs. The use of more nuanced racial/ethnic categories in survey design would allow for more nuanced assertions to be made. Better yet, qualitative research that can dig into the specificity of diverse poor and working-class students' lived experiences can address student populations that have yet to be considered or seen in existing research.

Conclusion

While recent improvements to college access for poor and working-class students are remarkable, socioeconomic disparities in important higher education outcomes including persistence and completion remain (Cahalan et al., 2019; NCES, 2019; Oseguera & Hwang,

2014). While much of the research on poor and working-class students in higher education is focused on college access or these critical educational attainment outcomes, less is known about the features of poor and working-class students' *experiences in the college environment*, nor about a host of other important outcomes like the development of these students' attitudes and values, self-concept, leadership skills, and cognitive/intellectual skills.

Further, much of the research that *does* examine the social and academic facets of poor and working-class students' experiences is limited in its analysis, often featuring only to white poor and working-class students (Longwell-Grice & Longwell-Grice, 2008; Martin, 2015; Mullen, 2011; Stuber, 2011) and/or exploring how low-income students experience Ivy League institutions (Jack, 2016, 2019; Mullen, 2011). I contend that such consistently color-evasive analyses, often restricted further to exploring institutions that admit only a fraction of a fraction of a percent of all students (let alone those who are low-income/poor or working-class), has limited our understanding of this growing student population and how a broader swath of institutions might support their success. In other words, the institutions that get the most attention in research and in the media for serving and supporting poor and working-class college students, enroll these students as an *exception* and not as a *rule*. In reality, most of the work in expanding access and educational opportunity for most of the population—and most poor and working-class college aspirants—is not being done behind the ivy covered fences of Harvard or Yale but is happening quietly at thousands of institutions across the country. Community colleges, public regional comprehensive colleges and universities, small private colleges, minority serving institutions, and flagship public research universities like the ones respondents in this study attend are the places that make the dream of higher education possible for racially and ethnically diverse poor and working-class college students. As such we must focus our attention on what

goes on in these places and spaces to better understand poor and working-class students'

experiences and outcomes.

Accordingly, the purpose of this study was to explore a widely studied aspect of the

college experience—student-faculty interaction—and its role in the cognitive skills development

of racially/ethnically diverse poor and working-class students who attended 19 large public

research universities in the United States. In so doing, my goal was both to understand whether

and how a facet of the student experience that has been commonly linked to positive student

outcomes was also beneficial to poor and working-class students, *and* to examine racial/ethnic

heterogeneity among poor and working-class students' experiences and outcomes. Overall, the

findings suggest that, regardless of race, student-faculty interaction was positively associated

with poor and working-class students' self-rated cognitive skills, as well as their perceptions of

campus racial climate and increased academic effort. This is good news and suggests that

faculty, staff, and administrators should do what we can to cultivate classroom and

extracurricular environments that promotes more frequent interactions between faculty and

students. In doing so, we would do well to consider whether and how faculty are working in

environments that best equip them to support students academically and otherwise. As Maria

Maisto, President of the New Faculty Majority noted, "Faculty working conditions are student

learning conditions…" (June, August 23, n.p.). As such, it is likely that the last several decades

of public defunding of higher education in the U.S., which has resulted in a stagnation in the

number of faculty positions and faculty wages, the erosion (or in some cases elimination) of

tenure protections, and a reliance on underpaid and under-supported adjunct instructors has

played a role in some of the disparate outcomes we see among poor and working-class students

who attend public institutions. Thus, in order to see the positive effects of faculty support

observed in this study, public research institutions might dedicate more time and resources to supporting faculty themselves.

However, it's important to point out that this study's findings also suggest that the proclivity to interact with faculty was not equally distributed among all poor and working-class students. For example, first-generation students, Women of Color, and first-time students (relative to a transfer students) interacted with faculty at far lower rates than some of their other peers. Accordingly, these students not only were less likely to form important relationships with faculty, which is beneficial in and of itself, but there were also consequences to their academic effort, perceptions of campus climate, and their cognitive skills. This heterogeneity among poor and working-class students suggests we need to do more work to understand the microdynamics and specifics of how and why these students interact with faculty in and out of class. Furthering this understanding is imperative for institutional stakeholders aiming to cultivate college experiences that bring the benefits of student-faculty interaction to all students admitted to college.

Further, while such disparities among poor and working-class students are reason for concern, they also provide insights about how to improve students' experiences and to address longstanding inequalities. For instance, poor and working-class students benefit from their interactions with faculty, but they may be less likely than their wealthier peers to explicitly ask for the time and attention of their instructors. Thus, faculty might need to take the lead by inviting poor and working-class students to office hours, affirming their skills and identities, or sharing opportunities for research or other collaboration. The results of this study suggest certain subpopulations of poor and working-class students who faculty might be especially mindful of as they aim to develop relationships with students that are impactful.

Further, scholars have also recently recommended staff development and trainings focus on social class as an aspect of diversity that faculty, administrators, resident assistants, and others are trained to see and recognize (G. Martin & Ardoin, 2021; K. M. Soria, 2015). To be sure, in order to address longstanding inequalities, we have to be willing to see where poor and working-class students are actually being educated. We have to be willing to see students' race and class and gender, and the many other facets of their identity. We have to be willing to see differences in students' engagement and seek to understand these differences. We cannot improve the outcomes of poor and working-class students if we refuse or fail to see them, and the results of this study aim to direct our sights.

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