Spatial Preference And Spatial Choice: Class-Based Differences In How U.s. High School Students Choose College

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Abstract
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Degree Type
Dissertation

Degree Name
Doctor of Philosophy (PhD)

Graduate Group
Education

First Advisor
Laura W. Perna

Keywords
College Choice, Geography, Higher Education, Social Class

Subject Categories
Geography | Higher Education Administration | Higher Education and Teaching | Liberal Studies | Other Education

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SPATIAL PREFERENCE AND SPATIAL CHOICE: CLASS-BASED DIFFERENCES IN HOW U.S. HIGH SCHOOL STUDENTS CHOOSE COLLEGE

Roman Ruiz

A DISSERTATION

in

Education

Presented to the Faculties of the University of Pennsylvania

in

Partial Fulfillment of the Requirements for the

Degree of Doctor of Philosophy

2020

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SPATIAL PREFERENCE AND SPATIAL CHOICE: CLASS-BASED DIFFERENCES IN HOW U.S. HIGH SCHOOL STUDENTS CHOOSE COLLEGE

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Roman Ruiz
DEDICATION

Selecting a research topic for this dissertation was, for me, a deeply personal decision. This dissertation centers on themes that reflect my own narrative: social class, educational opportunity, and college choice. But the genesis of my narrative is rooted in one person, my grandmother.

From birth into early adulthood, my grandmother was my anchor. Forced by circumstance to play many critical roles in my life, she was my parent, mentor, and friend. As a child, I did not possess the vocabulary nor the rhetoric necessary to verbalize what I intuitively knew her to be. She was the sun, a boundless source of life-giving warmth. Her generous heart, full of seemingly limitless love and empathy, was complemented by her iron forged mettle to persevere through challenging times. She was a strong woman, perhaps the strongest woman, born in the wrong era. Quick-witted, bold, and fiercely independent, she existed at a time when women were expected to be anything else.

My grandmother had dreams; she had goals. One of my grandmother’s goals was to write a book, to become a published author, though the exact details of what her book would be were never clearly stated. It was common to find her scribbling notes into the many yellow legal pads she had lying around. For her, writing was a vehicle to exercise her ideas and put them to paper, to move them from the abstract to the concrete.

But writing for my grandmother was not an easy task. She had dyslexia. Always accompanied by her heavy grey dictionary when writing, she often looked up words to ensure their correct spelling and usage. And always writing in pencil, she cycled through iterations of drafts: writing, erasing, rewriting. Through this painstaking process, my grandmother found creative and intellectual release. Through words she found a kind of
private power, even within the reality of social and economic precariousness. She was, as I said, the strongest woman.

Through my grandmother, I developed a sensitivity to language, a curiosity for ideas, and a love for reading. My grandmother was never able to achieve her goal of writing a book, but she was immensely successful in instilling the requisite love and confidence that allowed her grandson to forge a divergent path, to seize opportunity, and to realize mobility.

I dedicate this dissertation to my grandmother Christine Herbert. It is not a book, but it is a dissertation. It is not hers, but it is ours.
ACKNOWLEDGMENT

I extend my sincerest appreciation to Dr. Laura W. Perna, who not only served as my committee chair but also as my dissertation advisor and research mentor during my entire doctoral program. Laura’s commitment to her students, academically and personally, is unparalleled. The work presented in this dissertation is a direct reflection of Laura’s investment in me as a researcher and would not have been possible without her rigorous training, critical feedback, and unwavering support.

I also wish to thank Dr. Manuel S. González Canché and Dr. Rebecca A. Maynard for serving as committee members. During my time at Penn, Becka was instrumental in providing me with research and professional developmental opportunities. Similarly, Manuel and his research have been formative in developing my own research interests and adopting a spatially oriented point of view to the study of higher education.

More broadly, I thank the University of Pennsylvania and the Graduate School of Education for granting me access to a world-class educational institution. Penn and Penn GSE are replete with resources, human and physical. Having access to premier scholars, a deep research infrastructure including vast library collections and technology, professional networking, and seemingly endless amenities has proven to be life- and career-changing for me. Penn and Penn GSE are paragons of the highest-quality postsecondary education available, but too few students, particularly those who stand to benefit the most, have access to such institutions. Through my future professional and personal work in higher education, I wish to extend the same educational opportunities that have been afforded to me to other students, regardless of their social class background, race/ethnicity, or even geography.
Finally, I thank my doctoral program colleagues Dr. Wendy Castillo and soon-to-be Dr. Elaine W. Leigh. Wendy and Elaine are tremendous academic colleagues, but more importantly sincere friends. Having developed strong connections with such brilliant and insightful women has enriched me intellectually and personally. I am forever grateful for our time shared together learning, growing, and supporting each other during our doctoral studies.
ABSTRACT

SPATIAL PREFERENCE AND SPATIAL CHOICE: CLASS-BASED DIFFERENCES IN HOW U.S. HIGH SCHOOL STUDENTS CHOOSE COLLEGE

Roman Ruiz
Laura W. Perna

The observed class-based stratification of postsecondary destinations in the U.S. raises questions as to the determinants of college choice, particularly for students from lower-SES backgrounds. The purpose of this study is to explore students’ spatial preferences and behaviors as they relate to their aspirational college choices and postsecondary institutions of enrollment. Descriptive, spatial, and regression analyses of data from the High School Longitudinal Study of 2009 (HSLS:09) consistently find strong associations between students’ social class and their college choices, with lower-SES students more spatially sensitive than higher-SES students. Findings from this study hold implications for educational practices and policies and for researchers to advance the study of student college choice as a spatial process.
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CHAPTER 1: INTRODUCTION

Selecting and attending the postsecondary institution that yields the greatest benefits is a challenging proposition, particularly for students from low-socioeconomic status (SES) families. Even though low-SES high school graduates have made gains in overall college enrollment rates over time, their enrollment growth is largely confined to two-year and less selective four-year sectors, perpetuating social class stratification in the U.S. higher education system (Bastedo & Jaquette, 2011). For example, among 2013 high school graduates only four percent from the lowest-SES quintile enrolled in a highly selective four-year postsecondary institution (based on Barron’s classifications), compared to one-third of their peers from the highest-SES quintile (Cahalan et al., 2017). An estimated two-fifths of high school graduates commit academic undermatch by either failing to enroll in at least a two-year college or by attending a four-year college less selective than their academic achievement presumably would allow them to attend (Smith et al., 2013), with low-SES students more likely to academically undermatch compared to their higher-SES peers (Bastedo & Jaquette, 2011; Smith et al., 2013).

Stratified U.S. college enrollments serve to disproportionally mete out benefits to those who are already relatively more socially and economically advantaged. With even marginal improvement in their academic match with an institution, students from low-income families would realize a significant increase in their likelihood of completing a bachelor’s degree (Howell & Pender, 2016). Causal evidence suggests that attending a four-year institution over a community college improves the likelihood of bachelor’s degree attainment (Goodman et al., 2015; Long & Kurlaender, 2009). And attending institutions of higher quality (e.g., with higher mean SAT score of entering class, lower student-to-faculty ratio) yields higher earnings upon completion (Black & Smith, 2006; Long, 2010; Ovink et al., 2017).
The observed stratification of postsecondary destinations raises questions as to the determinants of college choice, particularly for students from low-SES backgrounds. Understanding the value prospective students assign to myriad institutional attributes when weighing their college choice options can offer insight into class-based differences in college-going. A robust body of conceptual and empirical literature documents the institutional characteristics that are related to postsecondary destinations including price, institutional quality and prestige, consumption amenities (e.g., residence halls, student dining), and academic offerings (Alter & Reback, 2014; Chapman, 1981; Kinsler & Pavan, 2011; Long, 2004; McDuff, 2007; Manski & Wise, 1983; Niu et al., 2006; Nora, 2004; Perna, 2006). Research also demonstrates the heterogeneous effects of institutional attributes on postsecondary destinations across student subgroups (Jacob et al., 2018; Kinsler & Pavan, 2011; Long, 2004; McDuff, 2007). Noticeably absent from the extant literature is an orientation toward the spatial dimension of college choice, operationalized as where students attend college relative to their geographic origins. Turley (2009) implores researchers to “stop treating the college-choice process as though it were independent of location and start situating this process within the geographic context in which it occurs” (p. 127). Adopting a spatial perspective involves “the consideration of the relative locations of social phenomena, the causes of the locational pattern, and the pattern’s consequences” (Logan, 2012, p. 509).

This study positions college choice as an inherently spatial process by considering the broader spatial context as an institutional characteristic that influences students’ college-related decisions. The purpose of this study is to document students’ spatial preferences and behaviors as they relate to their aspirational college choice and postsecondary institutions of enrollment. In addition, this study models the college-choice process to understand the relative importance students ascribe to an institution’s
spatial accessibility, or geographic distance, when selecting among college alternatives. Undergirding all analyses is the consideration of class-based differences in spatial preferences and college-choice behaviors.

Descriptive evidence suggests that students from families with lower levels of income and parental education attend college closer to home than peers from higher-income and college-educated families (Mattern & Wyatt, 2009; Sallie Mae, 2016). If low-SES students show greater preference for local college options, this preference may help explain observed differences across SES groups in the postsecondary institutions they attend (Bastedo & Jaquette, 2011). As Hillman (2016) points out, as the median household income within a commuting zone (a geographic unit of analysis consisting of aggregated U.S. counties) increases, the number of non-selective four-year institutions (operationalized as institutions with large shares of admitted applicants) within that commuting zone decreases. Commuting zones with lower levels of bachelor’s degree attainment tend to contain a greater number of two-year colleges, but fewer four-year options (Hillman, 2016). And sensitivity to an institution’s spatial accessibility, particularly among low-SES students, has ramifications for expected educational and labor market outcomes (González Canché, 2017a; Hillman, 2016). For example, in an analyses of federal survey data using matching and control function techniques, González Canché (2017a) finds that four-year college enrollees who exhibit nearby college enrollment have a lower probability of completing a bachelor’s degree and lower self-reported annual salaries than comparable students who enrolled beyond their nearest 20 college options.

Building on a small body of research that explicitly posits college choice as a spatial choice (e.g., Hillman, 2016; Niu & Tienda, 2008; Stoering, 2000; Turley, 2009),
this study investigates students’ spatial preferences at two points in the longitudinal college-going process. This study addresses the following sets of research questions:

RQ1. What affective spatial preferences do U.S. high school students hold regarding their aspirational and enrolled college choices? Do these spatial preferences vary by students’ socioeconomic status?

RQ2. How near or far are college-intending high school students’ aspirational college choices? Does distance to aspirational college choice vary by students’ socioeconomic status?

RQ3. Contingent on enrollment, how near or far do high school graduates travel to attend their postsecondary institutions? Does distance to enrolled college vary by students’ socioeconomic status?

RQ4. How does an institution’s spatial accessibility (i.e., geographic distance) affect the likelihood students select it for enrollment among college alternatives? Does the importance of spatial accessibility in college choice vary by students’ socioeconomic status?
CHAPTER 2: REVIEW OF THE LITERATURE

Location is an intrinsic attribute of all postsecondary institutions, one which students consider and give preference to when making college-related decisions (Chapman, 1981; Ingels & Dalton, 2013; McDonough, 1997; Nora, 2004; Perna, 2006; Somers et al. 2006; Turley, 2006). Contingent on enrollment, students must decide where to attend college relative to their own location. Because nearly nine of 10 undergraduates enroll in campus-based courses, an institution’s physical location is an important feature for most students (U.S. Department of Education, 2019, Table 311.15). Spatial college choice is influenced by the broader geographic distribution of the U.S. higher education network, situating students at variable distances from postsecondary institutions.

Spatial Distribution of U.S. Postsecondary Institutions

Do (2004) finds that approximately half of college enrollees from the 1980 sophomore cohort of the High School and Beyond (HS&B) national study had at least one public or private university located in the same county as their high school (Table 1, p. 251). More recently, Hillman (2016) reports that the average number of two- and four-year public and private, not-for-profit degree-granting institutions is 5.2 per commuting zone (an aggregate geographic unit of analysis consisting of U.S. counties that share economic activity and labor markets). Masked within this average statistic is variation in the number and sector of postsecondary institutions within commuting zones.

U.S. postsecondary institutions are not distributed equally across space (De Oliver, 1998; Hillman, 2016; Jones & Kauffman, 1994; Klasik et al., 2018; Turley, 2009), suggesting spatial accessibility as a possible barrier to college-going for some. For the purposes of this study, spatial accessibility is conceptualized broadly to mean geographic proximity. Proximity, a function of distance, implies a relatively short distance
between origin and destination points (in this case, a student’s high school location and postsecondary institution location). As an illustration, a local community college and a four-year university within the home county are spatially accessible options, whereas institutions located in a different U.S. region or opposite side of the state from a student’s home (in a geographically large state) would be less spatially accessible. Spatial accessibility is one dimension of an institution’s overall accessibility. For example, students may not be able to access certain institutions due to insufficient academic preparation or financial constraints even if it is geographically proximal.

The availability of spatially accessible postsecondary options in the U.S. varies by region and level of urbanicity (e.g., urban, suburban, town, or rural). Descriptive analyses of data from the National Educational Longitudinal Study of 1988 (NELS:88) show that only 20 percent of high school seniors in the South had a four-year institution within commuting distance (operationalized as 12 miles for urban areas and 24 miles for suburban and rural areas), whereas nearly all seniors (96 percent) in the Mid-Atlantic region had at least one four-year institution within community distance (Turley, 2009). Students in rural communities also face geographic barriers in accessing four-year postsecondary institutions due to the limited local availability (Burke et al., 2015; Hillman, 2016; Koricich, 2014; McDonough et al., 2010). Commuting zones with greater population shares residing in rural counties (defined by the USDA’s Rural-Urban Continuum) are less likely to have broad and open access four-year institutions, but marginally more likely have two-year colleges (Hillman, 2016).

The quality and selectivity of postsecondary institutions also vary by geography, creating a spatial (dis)advantage depending on students' locations. Research consistently highlights the geographic clustering of highly selective colleges and universities in the Northeast (Griffith & Rothstein, 2009; Hill & Winston; 2010; Kilgore,
Nationally, highly selective institutions remain more spatially inaccessible compared to less selective four-year and two-year colleges. In terms of distance, community colleges are the most spatially accessible postsecondary options. By design, community colleges are generally non-selective, open access institutions that serve their local communities (Dougherty & Townsend, 2007). Descriptive analyses of data from the Education Longitudinal Study of 2002 (ELS:2002) show that nearly all U.S. high school students (92 percent) live within 50 miles of a two-year postsecondary institution, but only half (53 percent) live within the same proximity to a highly selective four-year institution (operationalized by Barron’s classifications; Ovink et al., 2017, Table 1). The median home-to-college distance for U.S. high school students is seven miles to the nearest two-year college, 14 miles to a somewhat selective four-year college, and 45 miles to a highly selective four-year college (Ovink et al., 2017).

Even within the same state, inequities in spatial accessibility exist. In a study on spatial accessibility to comprehensive public universities (operationalized as institutions that award at least 20 Ph.D. degrees annually) in Texas, Jones and Kauffman (1994) find that 15 percent of Texas residents lived more than 150 miles from a comprehensive public university, compared to seven percent of the total U.S. population. Residents in Texas’s Border Region had especially limited spatial access, as the closest in-state public comprehensive university was 225 miles away, compared to an average distance of 45 miles for all other Texas residents (Jones & Kauffman, 1994). De Oliver (1998), in a case study on the creation of the University of Texas at San Antonio (UTSA), finds that final site selection on the northwestern suburban fringe of the city (one of 10 sites considered) disproportionately disadvantaged Latinx communities in San Antonio by limiting their spatial accessibility to the institution. Given their distance from campus and...
the city’s limited public transportation infrastructure, the predominantly low-income, “non-Anglo” urban core would incur greater commuting costs and travel time to attend.

More recent quantitative research bolsters De Oliver’s (1998) findings by highlighting the spatial disadvantage certain sociodemographic groups face regarding their proximal college options. Hillman (2016) finds that communities of color and lower-income communities have significantly fewer postsecondary institutions within their commuting zones compared to White and more affluent communities. The inequitable spatial distribution of U.S. postsecondary institutions serves as background to, and consequently shapes, students’ spatial preferences and college destinations.

Spatial Preferences

Qualitative research suggests that students prefer in-state and, more specifically, geographically proximal college options (e.g., McDonough, 1997; McDonough et al., 2010, Somers et al. 2006). Through case study research, McDonough (1997) finds that traditional-age students typically prefer colleges that are within commuting distance to home in case they experience feelings of loneliness or instances of illness or injury (p. 132). Analyzing focus group transcripts of more than 200 community college students at five geographically diverse institutions in Texas, Somers and colleagues (2006) find that location is a primary institutional characteristic (along with published price) students weigh when choosing to attend. The authors summarize this thematic finding by stating that students “preferred to work, live, and attend school in the same community or section of town” (p. 62). However, transferability of findings to the broader undergraduate population may be limited, given that the study’s sample consists entirely of community college enrollees.

Quantitative research on students’ affective spatial preferences a priori is scant in the literature, but the limited descriptive evidence available suggests that sizeable
shares of students are orientated toward localized postsecondary options. Nationally representative survey data show that, among students in the 1992 graduating high school class, 44 percent rated living at home during college as either important or very important, which would presumably limit the geographic range of their college choices (Turley, 2009). More recent data from the national High School Longitudinal Study of 2009 (HSLS:09) show that one-quarter (26 percent) of high school juniors in 2012 rated institutional location “close to home” as very important for their top college choice, whereas half as many (13 percent) rated institutional location “far away from home” as very important (Ingels & Dalton, 2013).

**Distance-to-College**

Hoxby (2009) asserts that the growing ubiquity of telecommunications and transportation options has led the U.S. higher education system to a state of “college market integration” (p. 106). She hypothesizes that, because the costs associated with gathering college-related information and traveling to institutions have decreased over time, students are now able to exercise greater geographic mobility. She speculates that the attenuation of the “disutility generated by distance” has led students to consider and preference other institutional attributes when making college choices (Hoxby, 2009, p. 102).

While advancements in technology and transportation certainly improve college access and expand choice, spatial considerations remain an influential force shaping postsecondary destinations (Hillman, 2016). Hoxby’s (2009) assertion of geographically unbounded college choice is not supported by the largely localized nature of college enrollment among most U.S. undergraduates (ACT, 2016; Eagan et al., 2017; Mattern & Wyatt, 2009).
In-state or out-of-state enrollment is a crude measure by which to understand student migration to college. Federal statistics show that in fall 2016 nearly four-fifths (79 percent) of first-time, degree-seeking undergraduates enrolled in a postsecondary institution located in their state of residence (U.S. Department of Education, 2019, Table 309.10). While instructive, this dichotomous measure may not accurately reflect the distance traveled to attend college (González Canché, 2018). For example, in-state enrollment in geographically large states such as California or Texas could still engender long travel distances, while out-of-state enrollment for a student in a geographically small state to a bordering state (e.g., Delaware to Pennsylvania) could require minimal travel distance.

Distance as a spatial measure provides a more nuanced picture of the localized nature of college enrollments. Among college-bound high school seniors in the class of 1999 who had taken any College Board examination (e.g., SAT, AP) and attended a four-year U.S. postsecondary institution (in any state), the median home-to-college distance traveled was 94 miles (Mattern & Wyatt, 2009). More recent data among ACT test-takers in the high school graduating class of 2015 show that the median distance traveled to attend an in-state college (two- or four-year option) was 28 miles (ACT, 2016). The CIRP Freshman Survey, a nationally representative annual survey of first-time, full-time U.S. college freshmen who attend four-year institutions, shows that in fall 2016 approximately 38 percent of college enrollees attended an institution within 50 miles from their permanent residence, and more than half (53 percent) attended college within 100 miles (Eagan et al., 2017).

The preceding statistics regarding students’ distance-to-college are instructive, but limited. The extant research is devoid of nationally representative distance-based estimates for the full range of postsecondary destinations (e.g., two-year and four-year
institutions) for all enrollees (e.g., not restricted to SAT or ACT test-takers) from a contemporary cohort of U.S. undergraduates. Also unclear is the relationship between students’ socioeconomic status and their spatial preferences for both aspirational college and enrolled college choices.

**Variation in Distance-to-College by Student Characteristics**

Despite generally localized college enrollments, students of differing academic and sociodemographic backgrounds exhibit variation in distance traveled to attend college. Descriptive analyses of data from the Educational Longitudinal Study of 2002 (ELS:2002) show that students who enroll in a nearby college (operationalized as any of the 20 nearest four-year public or private not-for-profit institutions regardless of state) are qualitatively different than those who attend college beyond their 20 closest institutions. Those who attend a nearby four-year college typically come from lower-SES families, take fewer Advanced Placement (AP) courses, and exhibit lower math and reading achievement on standardized exams (González Canché, 2017a).

Though not nationally representative, other descriptive studies relying on proprietary data from ACT and College Board yield similar conclusions regarding student attributes and postsecondary destinations (ACT, 2016; Mattern & Wyatt, 2009). Achievement measures such as high school GPA and college entrance exam scores are positively associated with distance traveled to attend college. Among ACT test-takers enrolling in four-year colleges in fall 2015, students meeting more college readiness benchmarks (i.e., specified subject test scores predictive of college success) were more likely to attend college out-of-state and travel greater distances if enrolling in-state (ACT, 2016). Among college-bound SAT test-takers in 1999, those who scored in the lowest range (400–490) traveled a median distance of 42 miles to attend a four-year institution, whereas those who scored in the highest range (1500–1600) traveled five times farther.
(234 miles). Similarly, those who self-reported grade point averages of A or A+ traveled greater median distances (over 100 miles) to four-year colleges than their peers who reported lower GPAs (Mattern & Wyatt, 2009).

Multivariate studies corroborate descriptive evidence that academically high-achieving students are less deterred by distance when making college-choice decisions (Faggian & Franklin, 2014; McDuff, 2007). Using enrollment count data from the federal Integrated Postsecondary Education Data System (IPEDS) to model interstate student migration, Faggian and Franklin (2014) find that “students of different academic quality [operationalized by Barron’s classification of receiving institution] differ in their decision process of where to attend college and assign a different value to different migration determinants” including geographic proximity (e.g., neighboring state and distance, p. 392). Subgroup analyses by student academic quality reveal that “high-quality students are more focused on the type of HEIs [higher education institutions] they want to attend and less on the location of their preferred institution” than students with lower academic credentials (p. 392). Probit analyses of student-level data from College Board and ACT testing companies reveal that four-year college aspirants in the highest SAT score band (or ACT equivalent) are approximately 20 percentage points less likely to attend an in-state college compared to test-takers scoring near the national average (McDuff, 2007). Presumably, students with the highest academic credentials are less constrained in their college choices (i.e., able to gain admission to selective institutions and merit-based aid) and are therefore able to exercise greater geographic mobility when choosing colleges.

Indicators of socioeconomic status such as family income and parental education also are positively associated with distance-to-college (Ovink & Kalogrides, 2015). Among SAT test-takers who reported a family income of less than $30,000, the median home-to-college distance traveled was just 63 miles, whereas students from families
earning more than $100,000 traveled a median distance of 150 miles (Mattern & Wyatt, 2009). For students whose parents held only a high school diploma, the median distance traveled to attend a four-year college was 68 miles, roughly half the distance traveled by students whose parents held a graduate or professional degree (130 miles; Mattern & Wyatt, 2009). Beyond bivariate descriptive evidence, Mulder and Clark (2002), in a two-level event-history analyses of data from the Panel Study of Income Dynamics, find that father’s education and parental income are positively associated with the probability college-age children leave home to reside on a college campus (ostensibly at a greater distance than if staying at home, though distance measures are not derivable from the dataset).

A small body of research documents racial/ethnic differences in observed distance-to-college and distance-related preferences (e.g., living at home). Mattern and Wyatt (2009) report that Hispanic/Latino SAT test-takers traveled the shortest median distance to attend four-year colleges (39 miles) among all racial/ethnic groups, followed by Asian American students (60 miles). Black and White test-takers traveled comparable median distances (98 and 102 miles, respectively). Native American students traveled the farthest median distance (103 miles), which could be the result of limited local postsecondary options. In their analyses of nationally representative data from the Education Longitudinal Study of 2002 (ELS:2002), Ovink and Kalogrides (2015) find similar trends. Hispanic/Latino students traveled the shortest median distance to attend college (14 miles), followed by Asian (17 miles), Black (27 miles), and White students (42 miles).

Observed racial/ethnic differences in distance traveled to college are likely influenced by students’ preferences to reside at home (or not) during college (Ovink & Kalogrides, 2015). Analyzing statewide survey data from high school seniors in Texas,
Desmond and Turley (2009) report that while 59 percent of all respondents rated the “ability to attend school [college] while living at home” as somewhat or very important, only half (46 percent) of White students held this living-at-home preference. By contrast, nearly three-quarters (74 percent) of Hispanic seniors felt that living at home while attending college was important. Logit analyses of data from ELS:2002 reveal that, compared to White students, Hispanic/Latino and Asian students remain more likely to prefer living at home during college even after statistically controlling for high school academic achievement and socioeconomic status (Ovink & Kalogrides, 2015).

Unsurprisingly, students who are locally oriented toward college choice identify their top choice institutions as ones that are geographically closer. Among high school seniors who valued living at home during college, the median distance to their first-choice college was 12 miles for urban students and 24 miles for suburban and rural students. By contrast, top choice colleges for those who did not consider living at home during college to be important were relatively farther away: a median distance of 145 miles for urban students, 110 miles for suburban, and 87 miles for rural students (Turley, 2009). Internal ACT research finds a strong correlation between student score sending behavior and in- and out-of-state college enrollment (ACT, 2013). Students who send score reports to out-of-state institutions (exhibiting an out-of-state college orientation) are more likely to attend college out-of-state. By contrast, students who limit score sending to in-state colleges are unlikely to attend an out-of-state institution. ACT derives a “mobility index” for each test-taker, which predicts the likelihood of out-of-state college enrollment, and finds that out-of-state score sending “carries a predictive power that far outweighs other variables” (p. 3).
Distance Effects and College Choice Among Alternatives

A robust body of literature across disciplinary perspectives and national contexts finds that spatial accessibility (or geographic proximity to postsecondary institutions) is a strong determinant of college choice among alternatives (Gibbons & Vignoles, 2012; Jacob et al., 2018; Jepsen & Montgomery, 2009; Kohn, Manski, & Mundel, 1976; Long, 2004; Montgomery, 2002; Ordovensky, 1995). Proximity also is positively associated with the educational milestones required to arrive at the college-choice decision including: years of secondary schooling (Card, 1995; Dickerson & McIntosh, 2013; Do, 2004; Kling, 2001), college applications made (Griffith & Rothstein, 2009; Turley, 2009), and college enrollment (Alm & Winters, 2009; Cullinan et al., 2013; Do, 2004; Frenette, 2006; Long, 2004; Kjellström & Regnér, 1999; Spiess & Wrohlich, 2010; Turley, 2009).

The econometric college-choice literature operates under the assumption that choosing a college from among a set of feasible alternatives reveals internalized preferences about the institutional attributes that maximize one’s utility (Manski & Wise, 1983) and that “taste for college may vary by individual background” (Kohn et al., 1976, p. 392).

When choosing from a set of college alternatives, students are typically less likely to select more geographically distant (or spatially inaccessible) institutions, net of other factors. This negative distance effect on college choice holds across a variety of student populations including traditional-age undergraduates (Jacob et al., 2018; Kohn et al., 1976; Long, 2004; Ordovensky, 1995; Shah, 2014), graduate students (Montgomery, 2002), adult-learners (Jepsen & Montgomery, 2009), and in international contexts (e.g., Gibbons & Vignoles, 2012).

In a foundational study in this genre, Kohn and colleagues (1976) model college choice behaviors among Illinois high school graduates and find that for commuting students distance is a negative predictor of college choice. The authors proxy straight-
line distance between high school and college for commuting costs and include a distance measure only for those they predict will reside at home during college. In a follow-up study that advances their college choice model, Fuller and colleagues (1982) analyze data from the National Longitudinal Study of 1972 (NLS-72) and arrive at similar conclusions: distance generates a disutility, but the effect on college choice is modest in size. While informative, these early studies use a narrow conceptualization of distance (i.e., equating it with commuting cost) and do not include distance measures for all students and institutional choices.

Using data from the High School & Beyond (HS&B) Longitudinal Study of 1980 to model college choice among alternatives, Ordovensky (1995) finds a negative distance effect on college choice. The modest effect, however, may be underestimated due to choice set specification. Ordovensky includes distance measures only for each of the nearest vocational/trade school, community college, and four-year college or university. Restricting analyses to include only nearest institutions fails to account for the broader geographic context in which students make college-related decisions (Turley, 2009).

In their analyses of survey data from the College Admissions Project, Avery and Hoxby (2004) find no effect of distance on college choice from the pool of admitting institutions. The absence of a relationship in this study likely stems from the survey’s target population: academically high-achieving students who are likely to gain admission and merit scholarships from selective institutions. For example, the mean SAT score of survey respondents falls at the 90th percentile of the overall score distribution. A more recent econometric study of college choice among cohorts of high school graduates in New Jersey finds that students are 27% less likely to enroll in a college that is 100 miles farther from their home, net of other factors (Shah, 2014).
Long (2004) provides a comprehensive treatment of U.S. college choice modeling by analyzing enrollment behaviors of three undergraduate cohorts from the 1970s through 1990s. Conditional logit analyses reveal that home-to-college distance is a significant determinant of choosing a particular college, with students preferring to enroll in geographically closer options in three nationally representative longitudinal studies (National Longitudinal Study of 1972 [NLS-72], High School & Beyond [HS&B], National Education Longitudinal Study of 1988 [NELS:88]). Long also provides quantitative evidence of a marginal decline in the role distance has played in shaping college destinations over time, which lends support to Hoxby’s (2009) assertion that distance effects have abated over time. Long estimates that a 1972 high school graduate would be 83% less likely to choose a four-year college were that college located 100 miles farther away, whereas a 1982 graduate would be 80% less likely, and a 1992 graduate would be 73% less likely (Long, 2004, p. 285, Table 3).

Extending Long’s work, Jacob and colleagues (2018) pool student cohorts from NELS:88 and the Education Longitudinal Study of 2002 (ELS:2002) to model the choice decisions of four-year college enrollees. Consistent with prior literature (e.g., Fuller et al., 1982; Long, 2004; Ordovensky, 1995), the authors find a significant negative distance effect in choosing a college among alternatives. Descriptive statistics of the NELS:88 and ELS:2002 analytic samples also show a marginal increase in the average home-to-college distance traveled between cohorts (196 and 220 miles, respectively; Jacob et al., 2018, Table 3). The mean home-to-college distance of institutions in students’ college choice sets (those ultimately not chosen for attendance) also increased between cohorts, from 955 miles in 1992 to 1,002 miles in 2004, suggesting that over time students considered more geographically distant colleges.
While the empirical college-choice literature typically focuses on traditional undergraduate populations (e.g., recent high school completers), a limited number of studies find that distance is negatively related to institutional choice for graduate students (Montgomery, 2002) and adult-learners (Jepsen & Montgomery, 2009). In an analysis of survey data from registrants of the Graduate Management Admission Test (GMAT), Montgomery (2002) finds that business school students are significantly less likely to rank a business school as their top choice and enroll if the institution is outside their home region (with the U.S. divided into 13 regions). Net of controls, the odds of choosing a business school are reduced by 98% if it is outside the student’s home region (Montgomery, 2002). Adult-learners, many of whom carry work and family obligations, may be particularly sensitive to distance when choosing a college. In a study of adult-learners in Baltimore, Jepsen and Montgomery (2009) find that a one-mile increase in home-to-college travel distance reduces the likelihood of choosing a Baltimore-area community college by approximately three percent.

One identified study within this genre in a different national context (Gibbons & Vignoles, 2012) finds that home-to-college distance is a significant determinant of college choice for secondary school leavers in England. In an analysis of federal administrative records, Gibbons and Vignoles estimate a general negative distance elasticity of approximately minus one. This finding suggests that “halving the distance between a student’s parental home and an institution picked at random doubles the probability of the student attending that institution” (p. 107). While studies of college choice in other national contexts may not be directly generalizable to the U.S. context due to myriad demographic and structural differences, Gibbons and Vignoles’ findings are striking precisely because of context. At the time of the study, “direct tuition and fees [were] constant across institutions” in England and there was “very little institutional
geographical discrimination in university admissions processes” (Gibbons & Vignoles, 2012, p. 99). The presence of a distance effect even with homogeneity of college costs and admissions practices illustrates the important role that spatial accessibility plays in the college-choice process.

**Variation in Distance Effects and College Choice Among Alternatives by Student Socioeconomic Status**

Framing proximity to college in economic terms, choosing to attend a local college is one mechanism to reduce costs (Sallie Mae, 2016). Following this reasoning, low-income students may be most sensitive to the presence (or absence) of nearby college options when making postsecondary decisions (Card, 1995; Turley, 2009). While generally not the primary focus, a limited number of multivariate studies have tested for differential effects of spatial distance on college-related outcomes for students from different social class backgrounds. Even with inconsistent operationalizations of socioeconomic status and its constituent parts (e.g., parental income and education), the extant research generally finds a more pronounced negative distance effect on college-going behaviors for students from lower social and economic classes (Card 1995; Do, 2004; Kling; 2001; Jacob et al., 2018; Long, 2004; Turley, 2009), a phenomenon also observed in other national contexts (Cullinan et al., 2011; Frenette, 2004, 2006, 2009; Gibbons & Vignoles, 2009).

A handful of econometric studies explicitly test for class-based differences of distance on college choice (e.g., Avery & Hoxby, 2004; Jacob et al., 2018; Long, 2004). Long (2004) restricts nationally representative analytic samples to include only low-income students (operationalized as those with family incomes less than $25,000) and finds that distance has a more negative effect on low-income students’ likelihood of choosing a particular college, compared to all students. Avery and Hoxby (2004) arrive
at a similar conclusion when they conduct subgroup analyses. Their findings show that high school seniors from the lowest of four family income bands (less than $40,000 annual income) are significantly less likely to choose a college as its distance from their high school increases. Students from higher-income families experience no significant distance effect. From a policy perspective, these findings are particularly problematic because the study sample consists exclusively of academically high-achieving students, and college-choice alternatives include only institutions to which they were admitted. Jacob and colleagues (2018) use a composite measure of socioeconomic status, derived from parental education, parental occupation, and family income, and find that higher-SES students are less sensitive to distance when choosing their college of enrollment.

Other research shows that students from lower-SES backgrounds are particularly sensitive to distance effects on other college-related outcomes including enrollment (e.g., Long, 2004) and attainment (e.g., Do, 2004). Conducting multi-level modeling of college application and enrollment behaviors with data from the National Education Longitudinal Study of 1988 (NELS:88), Turley (2009) finds no differential distance effects by parental income on the number of college applications made, but does find that lower-income students are marginally, yet significantly, less likely to enroll in college as the number of two- and four-year colleges within commuting distance decreases. Long (2004) models the binary college enrollment decision for “marginal students” (operationalized as those from low-income families, students who scored relatively low on the SAT test, or have parents who did not attend college) and finds that these students have significantly lower odds of enrolling in higher education as the distance to the nearest two-year college and the distance to the predicted college of enrollment increase.
A series of interrelated studies utilizing different nationally representative survey data (Card, 1995; Kling, 2001, Do, 2004) examine differential effects of proximity to four-year colleges on educational attainment. These studies find that residing in the same county as a four-year college is associated with additional years of secondary and postsecondary schooling, but only for students from the lowest “family background” quartile (an index based on a linear prediction model of expected educational attainment driven primarily by parental education). Analyzing data from the National Longitudinal Survey of Young Men (NLSYM66), Card (1995) finds that youth from the lowest family background quartile are predicted to complete, on average, 1.1 additional years of schooling with the presence of a four-year college nearby. Kling’s (2001) replication study with a newer iteration of the National Longitudinal Study of Youth (NLSY79) finds similar effects of college proximity on years of schooling for youth whose parents have lower levels of education, although the effects are smaller in magnitude than in Card’s study. Using data from the High School and Beyond (HS&B) Longitudinal Study, Do (2004) replaces years of schooling with ordinal education degree levels (e.g., “high school graduate,” “some college,” “BA degree”) and finds that having a four-year college in the county of residence is a significant positive predictor of higher educational attainment.

While useful for documenting differences in distance effects based primarily on parental education, these studies are limited in important ways. Adopting a single in-county indicator may be too crude a measure to capture the full range of proximal postsecondary options students encounter when making college-related decisions. The studies also exclude women from their samples, as Card's (1995) data source included only young men and Kling (2001) and Do (2004) treated newer data to replicate Card’s original analyses.
Differential distance effects based on measures of socioeconomic status also are observed in other national contexts. A group of studies by Frenette (2004, 2006, 2009) suggest that students in Canada from low-income families are particularly sensitive to the spatial dimension of the higher education infrastructure. Multinomial logit analyses with interactions between distance and family income show that students from low-income families are less likely to enroll in a university (over a community college) if only the community college option is within commuting distance (operationalized at 80 kilometers, or approximately 50 miles; Frenette, 2004). The distance effect trends negative for middle- and high-income students, but is smaller in magnitude and not statistically significant. Using probit models to examine university enrollment in Canada, Frenette (2006) interacts three tiers of family income with three distance ranges and finds that youth from the lowest-income families who live farther than 40 kilometers (approximately 25 miles) from the nearest university are significantly less likely to attend a university, compared to higher-income peers who live closer to a university. Interacting parental education with distance, Frenette (2006) also finds a significant negative effect on university enrollment for students who live beyond 80 kilometers (approximately 50 miles) from the nearest university and whose parents do not hold a university degree. Findings suggest that students from varying levels of family income and parental education (both principal components of socioeconomic status) experience the effects of spatial accessibility on university enrollment differently. Because Frenette (2006) models interaction effects for family income and parental education separately, it is unclear if these relationships hold when using a composite measure such as socioeconomic status.

In a related study, Frenette (2009) uses aggregated census data to examine the relationship between the presence of new universities in Canada and the university
participation rates among youth within the same metropolitan areas. Multinomial logit analyses with interactions show that students from the lowest-income families ($25,000 to $50,000 in 2000 Canadian dollars) benefit more in terms of university participation by the presence of a local university than students from higher-income families. The predicted probability of university attendance for the lowest-income youth was 71% higher with the creation of a local university, but only 25% higher for youth from the highest-income families (greater than $100,000 in 2000 Canadian dollars; Frenette, 2009).

Within the European context, there is limited and contradictory evidence regarding differential effects of distance on college-related outcomes by measures of socioeconomic status. Gibbons and Vignoles (2012) find that English secondary school leavers who received free school meals (a proxy for low-income status) are particularly sensitive to home-to-college distance and are significantly more likely to choose geographically closer options. While Cullinan and colleagues (2013) find no distance effect on college enrollment, on average, for college-eligible Irish high school leavers, interacting network distance to nearest postsecondary institution with father’s “social class” (operationalized by occupational prestige) reveals a significant negative distance effect for youth from the lowest social class. By contrast, in a study of university enrollment in Germany, Spiess and Wrohlich (2010) interact distance to nearest university with parental education and income, but find no significant differential effects.

**Institutional Characteristics and College Choice Among Alternatives**

While distance is a well-documented determinant of college choice among alternatives, research demonstrates that other institutional characteristics also influence students’ choice of which college to attend (Chapman, 1981; Ingels & Dalton, 2013; Jacob et al., 2018; Long, 2004). Moreover, descriptive and multivariate evidence
suggest that institutional characteristics including sector, selectivity, and academic program offerings may moderate distance effects (e.g., Alm & Winters, 2009, Ovink et al., 2017). Students are likely drawn to institutions they perceive to be of higher quality or prestige, while location may play a subordinate role (Hoxby, 2009; Lowe & Viterito, 1989). González Canché (2017a) finds that students who enroll in nearby four-year colleges are more likely to attend public, master’s level, and less selective institutions, whereas those who attend college beyond their 20 nearest options are more likely to attend private, doctoral-granting, and selective institutions. Broader institutional admissions policies can mitigate distance effects by expanding other aspects of accessibility (e.g., Niu et al., 2006; Waddell & Singell, 2011).

**Sector and Selectivity.**

The effect of distance on college choice varies by sector, with two-year college enrollees more distance-sensitive than four-year enrollees (Alm & Winters, 2009; Ordovensky, 1995; Rouse, 1995). Logit analyses of data from the High School & Beyond (HS&B) Longitudinal Study show the likelihood of enrolling in both community colleges and four-year colleges decreases as nearest distance to each type increases, but that the effect is larger in absolute magnitude for two-year institutions (Ordovensky, 1995). Analyzing the same dataset, Rouse (1995) arrives at a similar conclusion. As the first stage of an instrumental variables (IV) analysis, Rouse finds a more pronounced distance effect on two-year enrollment compared to four-year enrollment, although both remain negative. Alm and Winters (2009) use a gravity model approach to understand in-state student flows from school districts into University System of Georgia (USG) institutions and find that institution-specific distance elasticities are generally most negative for two-year colleges, suggesting distance is a greater deterrent to two-year
over four-year USG enrollments. Conversely, the state’s leading research universities (e.g., Georgia Institute of Technology) had the least negative distance elasticities.

This sectoral difference also is observed in other national contexts. In the Netherlands, Sá and colleagues (2006) find that “geographical accessibility” (a derived distance-based measure) is a significant determinant in Dutch high school graduates’ choosing both vocational training and university postsecondary options, but the decision to participate in vocational-focused institutions is more sensitive to distance than university options.

In addition to sector, institutional selectivity likely moderates distance effects. Descriptive estimates from the Education Longitudinal Study of 2002 (ELS:2002) document the positive association between institutional selectivity (based on Barron’s classifications) and distance traveled to attend college (Ovink et al., 2017). Students who attended highly selective four-year institutions traveled a median distance of 151 miles, two times farther than those attending selective institutions (73 miles). Median distance-to-college fell to 52 miles and 25 miles for students attending somewhat selective and non-selective four-year institutions, respectively. Community college enrollees traveled the shortest distance, just 12 miles from home to attend college (Ovink et al., 2017). Analyses of more recent data from ACT (2012) find the same positive association between distance and an institution’s admissions selectivity. Among 2011 ACT-tested college enrollees, the median distance traveled to attend a two- or four-year college ranged from 13 miles for institutions with open admission policies to 142 miles for highly selective institutions (ACT, 2012, Table 10).

Even among relatively selective four-year institutions, there exists a hierarchy of prestige that appears to mitigate distance effects, at least for those who can gain admission. Using colleges reported annually in The Princeton Review’s Best Colleges
guidebooks as their sample, Alter and Reback (2014) conduct fixed-effects analyses on panel data and find that colleges ranked by *U.S. News & World Report* experience a 10% increase in the share of out-of-state enrollments and a 1.5% increase for each 10 spots the institution moves up the *USNWR* rankings. These findings suggest that admissions-competitive prospective students may value an institution’s public reputation over its geographic proximity.

**Academic Program Offerings.**

Students also preference institutions’ academic program offerings when making college-choice decisions (Chapman, 1981; Ingels & Dalton, 2013; Somers et al., 2006). Approximately 75% of college-bound high school students rate an institution’s “offer[ing] a particular program of study” as very important in determining their top college choice (Ingels & Dalton, 2013). Ordovensky (1995) finds that within the two-year sector, students pursuing academic programs are more deterred by distance than those pursuing vocational programs, which implies that the specific nature of the vocational training programs is more influential in college choice than distance. Suhonen (2014) examines the role of distance as it relates to Finnish university graduates’ field of study and finds a heterogeneous distance effect across disciplines. Distance from the nearest university offering programs in their selected field is a greater deterrent for majoring in natural sciences and law, for example, than for medicine, the arts, and education (fields not affected by distance). Differences in distance effects by academic discipline could reflect students’ competing preferences as well as the geographic proximity of institutions that offer their desired programs.

**Admission Policies.**

Admission policies can also serve to attenuate geographic barriers to college choice. In response to Texas’s adoption of the “Top 10 Percent Rule,” which provides
automatic admission at state flagship universities to students ranking in the top 10 percent of their graduating senior class, Niu and colleagues (2006) find that high school-to-college distance is a negative predictor of students' rating an institution as a top choice, but that distance is not predictive of observed enrollment. These findings suggest Texas's percent plan ameliorated the effect of distance, at least for relatively high-achieving Texas students. In a related study, Long and colleagues (2010) analyze longitudinal state administrative records and find that after the “Top 10 Percent” policy was implemented, the sociodemographic profile of enrolled students at the University of Texas at Austin (UT) changed. Concentrated enrollments from a small number of mostly suburban Texas high schools declined as greater numbers of students enrolled from rural high schools and high schools located in towns and smaller cities. The researchers also find that the share of enrollees from high-poverty schools (measured as the percentage of students receiving free or reduced-price lunches) inched upward, displacing enrollees from low-poverty schools (Long et al., 2010). The expanding geographic and economic diversity experienced under the percent plan at UT was not realized at Texas A&M University (the state’s other flagship university), suggesting differential effects of the policy.

**Knowledge Gaps in Extant Literature**

A robust body of literature across academic disciplines and national contexts adopts a spatial lens to examine aspects of college choice. Yet gaps remain in our understanding of the spatial preferences U.S. high school students hold and exercise when choosing their aspirational and enrolled colleges. Descriptive evidence from a recent national cohort of U.S. high school students (HSLS:09) documents the generalized spatial preferences (i.e., “close to home” or “far away from home”) students have regarding college choice (Ingels & Dalton, 2013), but does not disaggregate
preferences by socioeconomic status or provide spatial distance measures. Using now decades-old federal data (NELS:88), Turley (2009) provides spatial distance measures for students’ aspirational college choice. Ovink and colleagues (2017) provide nationally representative measures of distance-to-college, but use outdated federal data (ELS:2002). Using the same dataset, Ovink and Kalogrides (2015) report median distances to applied and attended colleges by racial/ethnic group and immigrant status, but make meaningful comparisons between these distances difficult by using two different samples: the population of students who apply to at least one college and the population of those who attend at least one college. No identified study has yet to examine affective and empirically-derived spatial preferences at the aspirational and enrollment stages with a contemporary national cohort of students, let alone disaggregated findings by socioeconomic status for comparison.

The econometric college-choice literature is similarly limited. While Long’s (2004) study remains the most in-depth treatment of U.S. college choice, the most recent national cohort examined in her study entered college in the early 1990s (NELS:88). Jacob and colleagues (2018) advance the literature by analyzing a more recent national cohort (ELS:2002), but combine this sample with the NELS:88 sample, thus confounding the distance effect with time. Given significant changes in technology, college affordability, student demographics, and higher education infrastructure in the intervening decades, the role of spatial distance as a determinant of aspirational and enrolled college choices also may have shifted (Hoxby, 2009; Long, 2004).

While Long (2004) provides an empirical study that uses nationally representative student cohorts and tests for differential distance effects, analyses are limited to low-income status without consideration of other social class markers such as parental education or occupation. Jacob and colleagues (2018) address this limitation by
utilizing a composite measure of socioeconomic status and by interacting SES, as a standardized continuous variable, with distance. Having a contemporary understanding of the spatial preferences students hold and the role spatial accessibility plays in shaping college aspirations and destinations (with explicit consideration of social-class differences) can illuminate how geography and space may contribute to the stratification of student college choice in the U.S. context.

Conceptual Frameworks

This study is guided primarily by Perna’s (2006) conceptual model of student college choice, which integrates both economic and sociological frameworks to explain college-related behaviors. While comprehensive in its review and synthesis of the extant college-choice literature available at the time, Perna’s conceptual model does not thoroughly interrogate the spatial dimension of student college choice. Recognizing the locational patterns of college enrollments and the spatial distribution of U.S. postsecondary institutions, this study augments Perna’s college-choice model with additional conceptual lenses and empirical research that acknowledge and explain the spatial dimension inherent in student college choice.

At the core of Perna’s (2006) hierarchical model is the individual student who weighs the perceived costs and benefits associated with the decisions to enroll in college and which college to choose. Informed by human capital theory (Becker, 1993; Toutkoushian & Paulsen, 2016), the model posits that prospective students are willing to invest in their human capital (e.g., attend college to build their knowledge and skills) if the perceived benefits (e.g., greater labor market returns) outweigh the direct (e.g., tuition) and indirect (e.g., forgone earnings) costs of attending. These internalized cost-benefit comparisons are conditioned on the availability of financial capital (e.g., family
income, student financial aid) and students' likelihood of completing higher education and receiving the expected benefits (e.g., academic preparation and achievement).

Consistent with the cost-benefit framework at the core of Perna’s (2006) model, the real and perceived costs of attending geographically distant colleges may influence students with limited financial resources to enroll locally as a mechanism to reduce college costs. Distance effects studies generally assume this distance-cost paradigm in explaining how spatial distance shapes college-related behaviors (e.g., Spiess & Wrohlich, 2010; Turley, 2009). Distance and cost are so intertwined that early econometric college-choice studies proxy commuting costs with home-to-college distance (Fuller et al., 1982; Manski & Wise, 1983), a perspective still found in more recent literature. For example, Jacob and colleagues (2018) explicitly state that distance is “a proxy for nonmonetary commuting costs” (p. 314). And Long (2004), in the most exhaustive econometric treatment of U.S. college choice, uses distance (along with tuition price) to operationalize college costs.

Turley (2009) conceptualizes proximity (i.e., short distance) to function as a “convenience mechanism” by which having nearby college options makes college enrollment “logistically, financially, and emotionally” more convenient for students (p. 129). Spiess and Wrohlich (2010) reframe Turley’s sentiment through an economic lens and propose a “transaction cost argument” in that “the larger the distance to a university, the higher the transaction costs of higher education” (p. 471). Human geographers offer the related concept of ‘friction distance,’ which frames distance as a barrier to geographic mobility due to the effort (e.g., financial and temporal costs) required for travel (Castree et al., 2013).

Myriad costs are associated with geographically distant college choices. Financial costs can include startup costs of establishing a new residence, rent and
utilities, room and board, transportation, and higher tuition and fees for those who enroll
as an out-of-state student in a public four-year institution or out-of-district student in a
community college (Falch et al., 2013; Frenette, 2006; Spiess & Wrohlich, 2010; Turley,
2006). In 2018, average published in-state tuition and fees for public, four-year colleges
was less than half ($10,210 vs. $26,200) the average published out-of-state tuition and
fees at these institutions (College Board, 2019, Table 1). Students who travel greater
distances to attend college also can face the emotional costs associated with losing
familial ties and social networks created within their home communities (Johnson et al.,
2005; McDonough, 2007; McDonough et al., 2010; Ovink & Kalogrides, 2015; Radford,
2013; Shields, 2004; Spiess & Wrohlich, 2010; Turley, 2006). For students who do not
reside on campus, non-monetary costs might include the temporal cost of commuting
and the psychic cost of an unpleasant commute (Dickerson & McIntosh, 2013).

Given the many costs associated with spatially distant college choices, low-
income students may be particularly amenable to choosing local postsecondary options
to reduce college-related costs (Card, 1995; Griffith & Rothstein, 2009). In a
comprehensive review of econometric college-enrollment literature from the 1980s and
1990s, Heller (1997) concludes that low-income students are more price-sensitive to
tuition and financial aid than peers from higher-income families. More recent descriptive
market research (Seltzer, 2017) finds that lower-income students (operationalized by
lower Expected Family Contribution [EFC]) are more likely than higher-income students
to decline enrollment at their top-choice admitting institution due to cost.

Residing in the familial home while attending college, which presumably limits the
geographic range of college choices, is one strategy adopted by students and families to
reduce some college costs (Sallie Mae, 2016). Living at home during college can
eliminate on-campus room and board charges, which averaged approximately $11,500
(in 2019 dollars) at public four-year institutions in academic year 2019–20; this average cost was more than the average published tuition and fees for full-time undergraduates (College Board, 2019).

Data from a nationally representative survey of traditional-age undergraduates and their parents reveal that half (49 percent) of students lived at home during the 2015–2016 academic year to make college more affordable (Sallie Mae, 2016). Students and parents in the highest income bracket (greater than $100,000 in 2016 dollars) were the least likely to engage in this cost-saving measure (41 percent). Middle-income families ($35,000 to $100,000) were more likely to report a student living at home to decrease college costs, compared to the lowest-income families earning less than $35,000 (54 percent vs. 46 percent, respectively). This counterintuitive finding could be the result of increased need-based financial aid available for the lowest-income students, which could allow the lowest-income students to afford an on-campus housing option, or this finding may reflect the tendency of lower-income students to attend less expensive postsecondary institutions. Living at home as a cost-reduction strategy also varies by the institutional sector in which students enroll. Seventy-one percent of community college enrollees reported living at home to reduce college costs. Smaller shares of four-year public and private, not-for-profit enrollees adopted this strategy (39 percent and 37 percent, respectively; Sallie Mae, 2016). Living at home may be an effective cost-saving strategy, as causal research suggests that students who initially enroll in a nearby four-year college average substantially less undergraduate student loan debt than those who choose more distant four-year colleges (González Canché, 2017a).

Perna (2006) asserts that college choice is not the perfunctory result of a simple economic calculation, but rather is embedded in and shaped by four outwardly expanding layers of context: an individual’s habitus; the school and community context;
the higher education context; and the broader economic, social, and policy context. The first layer of influence is one's *habitus*, characterized by Bourdieu (1977) as “a system of durable and transposable dispositions which, integrating all past experiences, functions at every moment as a matrix of perceptions, appreciations, and actions” (p. 261). This “internalized set of experiences, outlooks, and beliefs that individuals accumulate from their immediate environment” inform students’ college-related preferences and behaviors and can explain class-based differences in how students choose colleges (Hossler et al., 1999, p. 152). Indeed, empirical research highlights the salient role socioeconomic status and its component parts play in shaping students’ college-related behaviors including applications made (Hoxby & Avery, 2013) and enrollment destinations (McDonough, 1997; Radford, 2013).

Related to habitus are the theoretical constructs of cultural capital and social capital. While the literature includes varying conceptualizations of cultural capital (Lamont & Lareau, 1988), as developed by Bourdieu and Passeron (1990) cultural capital refers to a system of social and cultural norms (e.g., language, academic expectations) transmitted through one’s family that reinforce class stratification, even in educational contexts. For example, cultural knowledge and value of college attainment can advantage those who possess (or can access) the manifestations of cultural capital that are valued by the dominant social class. Social capital refers to the social connections and group memberships one has, which can be leveraged to navigate and gain access to social institutions including colleges (Bourdieu, 1986). With these sociocultural constructs, Perna (2006) builds on the traditional human capital investment model to more fully explain college-choice decisions. Incorporating these additional sociocultural constructs provides a rationale for observed differences in college-choice preferences and behaviors across social classes, a prime focus of this study. Individuals
of different social class backgrounds make college-choice decisions within their unique sociocultural contexts and that are informed by their worldviews and the structures in which they are embedded.

Additional theoretical literature from the subfield of behavioral geography can extend Perna’s (2006) conceptual model by explicitly recognizing the spatial features of postsecondary educational institutions that influence choice (e.g., location, density, and distribution). Golledge and Stimson (1997) provide a generalized individual choice model that backgrounds the decision-making process with varying contextual influences (a similar approach to Perna [2006]), but which includes physical and psychological spatial components. Under this perspective, students’ geographic locations in relation to postsecondary institutions is an essential component of the choice process. Beyond including static spatial variables (e.g., physical location), Golledge and Stimson’s model recognizes an individual’s spatial perception as a cognitive influence on decision-making. When confronted with the need to make a decision (e.g., a college choice) individuals internally organize a list of potential alternatives that satisfy a desired criterion (a non-spatial context) or activate mental imagery of alternatives in spatial form (e.g., a cartographic map). Informed by an individual’s behavior-space perception, “potential objectives [college choices] can be located and ordered, and the process of comparing one with another can be initiated” with the outcome being “selection of one or more potential destinations” (Golledge & Stimson, 1997, p. 33). When making spatial choices, individuals can also adopt selection criteria that minimize distance, time, and effort to access destinations, which is consistent with the economic principle of reducing transaction costs.

Focusing on college-going decisions of traditional-age students, Perna’s (2006) model assumes that individuals are embedded within family units. Family composition
and parents’ own spatial preferences likely have implications for their children’s college choices. Data from the High School Longitudinal Study of 2009 (HSLS:09) reveal that one-third (32 percent) of parents of college-bound high school juniors believed it was “very important” that their students' top college choice be “close to home” (Ingels & Dalton, 2013). Descriptive data from the National Education Longitudinal Study of 1988 (NELS:88) show that more than half (54 percent) of parents felt it important that their children “attend school [college] while living at home,” what Turley (2006) characterizes as “college-at-home” parents (p. 830). Parents who hold a “college-at-home” preference are significantly more likely to be non-White and single head of household, but less likely to be college-educated and to have saved for their children’s college expenses, compared to parents who do not hold this preference.

Descriptive and ordered logit analyses of ELS:2002 data also reveal racial/ethnic group differences in parents’ residential preferences for their children (Ovink & Kalogrides, 2015). Latinx parents hold the strongest college-at-home preferences, with two-thirds (66 percent) reporting that it is “very important” for their children to live at home during college. Sizable shares of Black and Asian parents also hold strong “college-at-home” preferences (41 percent of each group), whereas White parents are the least likely racial/ethnic group to prefer their children live at home during college (22 percent). Parents’ residential preferences appear to affect children’s college-going behaviors (Turley, 2006). Net of other factors, children of “college-at-home” parents are 30% to 50% less likely to apply to any college, and, if applications are made, generally apply to only one. Turley hypothesizes that “college-at-home” parents influence their children’s spatial college choices by “directing them to a local college or by forbidding them to apply to a more distant college” (p. 841).
Familial obligations such as providing financial support to the household or childcare for younger siblings also can limit students’ geographic range of college choices. Students from households with more siblings or headed by a single parent are less likely to leave the parental home and reside on campus during college (Mulder & Clark, 2002; Turley, 2006). Students’ obligation to their family is captured by the concept of familism, defined as “a social pattern whereby individual interests, decisions, and actions are conditioned by a network of relatives thought in many ways to take priority over the individual” (Desmond & Turley, 2009, p. 314). Familism can manifest itself through students’ attitudinal dispositions (e.g., values and preferences) and behaviors (e.g., ordinary and consequential decisions). Familistic obligations may lead to suboptimal student college choice, whereby “self-imposed restrictions, conditioned by family relations, could force students to attend mediocre institutions close to home rather than top-notch institutions further [sic] away” (Desmond & Turley, 2009, p. 315).

Outside the family, students are most immediately embedded within a school and community context, the second layer of influence in Perna’s (2006) conceptual model. High schools play a critical role in shaping college choice though preparing students academically, fostering a college-going climate, and providing navigational assistance with college-going processes (McDonough, 1997; Perna & Titus, 2005; Perna et al., 2008; Roderick, 2011; Tierney et al., 2009). For example, measurable proxies for high school quality (operationalized as lower student-to-teacher ratio, higher proportion of teachers with advanced degrees) improve students’ likelihood of attending four-year over two-year and non-college options (Strayer, 2002). Students’ community context also exerts influence over college aspirations and behaviors. For example, experimental research suggests that residing in low-poverty neighborhoods during childhood increases the likelihood of college attendance in young adulthood (Chetty et al., 2016).
One component of community context not explored in Perna’s (2006) conceptual model is the degree of urbanization. The urbanicity (or rurality) of an individual’s place of residence likely influences the distance traveled to attend college (Burke et al., 2015; Klasik et al., 2018; Mulder & Clark, 2002). Residing in an urban locale with myriad postsecondary options necessarily minimizes the need to travel greater distances to satisfy one’s college-choice preferences (Goldscheider & Goldscheider, 1999). By contrast, rural students may be more used to traveling greater distances to access public amenities including educational institutions, and therefore less sensitive to absolute distance (Dickerson & McIntosh, 2013). Controlling for a robust set of individual, family, and community characteristics, Mulder and Clark (2002) find that college-age students are more likely to leave home to reside on a college campus if they come from less populous cities, which suggests that college enrollees from more rural locales may find it necessary to establish an on-campus residence due to fewer local postsecondary options and an impractical daily commute. Survey data from the Iowa Youth and Families Project, a longitudinal study of white rural adolescents in that state, reveal that among college enrollees the average distance traveled to attend college was 151 miles from home (Johnson et al., 2005), a relatively long distance. More recent state administrative data from Indiana show that rural high school graduates enrolling at in-state postsecondary institutions traveled farther, on average, than non-rural graduates to attend community colleges (46 vs. 39 miles) and non-selective four-year institutions (54 vs. 45 miles; Burke et al., 2015). Somers and colleagues (2006) provide qualitative evidence that institutional location is a prime determinant of community college choice regardless of urbanicity among their sample of adult-learners in the greater Baltimore region. Distance as a concept (and not an absolute value) is equally important for “an
urban campus located ‘down the street’ from home or work and the rural campus a 45-minute drive from home on country roads’” (p. 62).

The higher education context, the third layer of influence in Perna’s (2006) model, consists of institutional characteristics and behaviors that shape students’ college-related decisions. Perna identifies “location and geographic proximity to students’ homes” (p. 118) as salient features of the higher education context, but largely frames institutional location as a means of passively transmitting college-related information to localized populations. Education researchers who adopt an explicitly spatial perspective describe this phenomenon in terms of geographic spillover effects (e.g., Do, 2004; Hillman, 2016; Spiess & Wrohlich, 2010). Consistent with Perna’s conceptual model, Do (2004) characterizes postsecondary institutions as “reservoirs of information and of role models” (p. 249) and suggests that colleges influence local students’ affective dispositions toward postsecondary options and ultimately their college-going behaviors. Beyond providing access to information, postsecondary institutions can become integrated into the cultural identity of the communities in which they are located. Griffith and Rothstein (2009) hypothesize that “living close to a college may raise awareness of opportunities available at post-secondary institutions and help create a college-going expectation of nearby youth” (p. 621). Similarly, Turley (2009) characterizes this geographic spillover as a “predisposition mechanism,” which is an essential first step in the longitudinal college-going process (Hossler & Gallagher, 1987).

The broader social, economic, and policy context (the outermost layer of Perna’s model) captures the macrostructural forces that influence college choice (e.g., demographic shifts, economic recession, P-20 alignment policies). Regional tuition reciprocity agreements are one policy that can influence students’ geographic mobility by providing tuition discounts for out-of-state college enrollment under certain conditions.
(NASFAA, n.d.). For example, students residing in one of the Southern Regional Education Board’s 15 member states could benefit from the organization’s Academic Common Market program. Under this agreement, students can pursue approved degree programs at eligible out-of-state colleges at the in-state tuition rate if their degree program is not offered in their home state (SREB, n.d.). Regression analyses of 2006 fall enrollment data from the IPEDS Residency and Migration Survey show that, net of other factors, tuition reciprocity agreements predict interstate student migration between participating states (Medwick, 2010). Other state policies, however, may hinder college student migration. For example, state law can limit the share of nonresidents that a state’s public institutions, particularly flagship universities, may enroll (Powell, 2016).
CHAPTER 3: RESEARCH METHODOLOGY

This study employs descriptive, spatial, and regression analyses to interrogate the relationships between students’ socioeconomic status and their college-choice attitudes and behaviors. Analyses of affective survey responses and derived distance-based measures allow for a comprehensive understanding of students’ spatial college preferences at the aspirational and enrollment stages. Undergirding all analyses is a focus on class-based variation in students’ spatial college choices.

Data Sources

The primary data source for this study is the High School Longitudinal Study of 2009 (HSLS:09), a federal survey study sponsored by the National Center for Education Statistics (NCES). The survey study follows the educational and workforce trajectories of a nationally representative cohort of U.S. ninth-graders in 2009 into early adulthood. HSLS:09 employs a two-stage stratified random sample design with high schools as the primary sampling unit—stratified by sector, geographic region, and locale (e.g., suburban, rural)—and ninth-graders randomly sampled within the selected schools (Ingels et al., 2011). A total of 944 of the 1,889 eligible high schools participated in the study for a weighted response rate of 55%. More than 21,000 study-eligible ninth-graders from the 944 schools participated for a weighted response rate of approximately 86% (Ingels et al., 2011).

As a longitudinal study, HSLS:09 follows the same base-year cohort over time with periodic follow-up data collections. Unlike prior federal secondary longitudinal studies (e.g., NELS:88, ELS:2002), HSLS:09 does not refresh the base-year ninth-grade cohort to maintain nationally representative eleventh- or twelfth-grade cohorts. Therefore, HSLS:09 is strictly a study of U.S. ninth-graders in fall 2009 (Ingels et al., 2013, p. 7). NCES began data collection in the 2009–10 academic year with a web-
based student survey and an algebra assessment administered in school. Parents, principals, lead counselors, and mathematics and science teachers also were surveyed online or via telephone to provide contextual information on schools, classrooms, and home life (Ingels et al., 2011). The study’s first follow-up was conducted in spring 2012, when most students were in their junior year of high school. Students provided information on their postsecondary planning; parents, school administrators, and counselors again were surveyed (Ingles et al., 2015). The next data collection wave, known as the “2013 Update,” occurred between June and December 2013 (when most participants had completed high school) and gathered information on students’ postsecondary, military, and workforce transitions. High school transcripts also were collected in academic year 2013–2014. The second follow-up was conducted in 2016, approximately three years after anticipated on-time high school completion. The timing of any subsequent follow-ups is uncertain, with final data collection (e.g., student surveys and postsecondary transcripts) expected in 2025, when base-year study participants will be approximately 30 years of age.

To derive distance-based measures and conduct college-choice modeling, I merged additional ancillary data sources with the HSLS:09 student data file. I utilized the federal administrative datasets Common Core of Data (CCD) and the Private School Universe Survey (PSS) to identify the geographic coordinates of students’ enrolled high schools. CCD and PSS are universe surveys of U.S. public and private secondary schools, respectively. The Integrated Postsecondary Education Data System (IPEDS) provides data on many of the institutional characteristics utilized in this study (e.g., sector, state). Administered annually by NCES in a series of 12 interrelated surveys, IPEDS provides comprehensive institution-level data including institutional classifications, admissions and enrollment, student financial aid, completions and
degrees awarded, staffing, and finance, among others. Because survey compliance is mandatory for institutions to remain eligible to participate in Title IV federal student aid programs, survey response rates are near universal (Ginder et al., 2017). I utilized IPEDS data reflecting the 2012–2013 academic year, as this is the year that temporally aligns with the HSLS:09 cohort members’ college-going decisions (i.e., their senior year). The restricted-use 2014 NCES-Barron’s Admissions Competitiveness Index data file provides a measure of institutional selectivity. Barron’s, a proprietary company, categorizes U.S. four-year colleges and universities by their admissions selectivity (e.g., “most competitive,” “highly competitive”), based largely on college entrance examination scores and high school class standing of an institution’s freshman class. Institutional price (i.e., tuition and required fees) and expenditure data come from the Delta Cost Project Database, which provides institutional finance variables, derived from IPEDS, that are cleaned, sometimes imputed, and harmonized to allow for longitudinal analyses (Hurlburt et al., 2017).

**Analytic Samples**

This study relies on three different analytic samples that correspond to the data collection period (i.e., eleventh grade or post-high school) and analytic method employed (i.e., descriptive, spatial, and OLS analyses or conditional logit analyses). For RQ1 and RQ2 (i.e., aspirational college choice) a cross-sectional analytic sample reflects the cohort of U.S. ninth-graders in 2009 who in spring 2012 (i.e., junior year) indicated their intent to pursue postsecondary education following high school completion (variable S2CLG2013). This ‘college-intending’ subgroup reflects 85.2 percent of the 2009 ninth-grade cohort. For RQ1 and RQ3 (i.e., enrolled college choice) a cross-sectional analytic sample reflects the 2009 ninth-grade cohort who in summer/fall 2013 self-reported postsecondary enrollment (either anticipated enrollment if surveyed in the summer or
realized enrollment if surveyed in the fall; variable S3CLASSES). This ‘college-going’ subgroup reflects 68.2 percent of the 2009 ninth-grade cohort. Because analyses are contingent upon students making a college choice, students who are not college-intending in spring 2012 and/or those who do not self-report postsecondary enrollment by November 2013 are not included in analyses.

For RQ4 (i.e., college choice among alternatives), the analytic sample reflects a non-nationally representative subsample of U.S. ninth-graders in 2009 who self-reported admission to more than one postsecondary institution by fall 2013. Due to limitations in the functionality of commercial statistical software to incorporate complex sample survey weights into already computationally taxing conditional logit analyses, this ‘college choice among alternatives’ subsample may not exactly reflect the 2009 U.S. ninth-grade cohort. However, the subsample includes more than 6,000 U.S. ninth-graders in 2009 who attained a high school credential, were admitted to two or most postsecondary institutions, and enrolled in college by fall 2013. For context, among U.S. ninth-graders in 2009 who self-reported postsecondary enrollment by fall 2013, more than two-fifths (42.2 percent) gained admission to two or more postsecondary institutions. The ‘college choice among alternatives’ subsample does not reflect all college-goers’ experiences including those who do not have the opportunity to exercise a true college choice among alternatives due to either self-selection or structural barriers that impeded prior college preparation and application behaviors, for example.

**Analytic Weighting**

Because HSLS:09 employs a complex sample survey design, as opposed to a simple random sample, analytic weights are employed when possible to accurately estimate statistics and model parameters (Thomas & Heck, 2001). Descriptive (RQ1, RQ2, RQ3) and OLS (RQ2, RQ3) analyses incorporate appropriate analytic base
weights (Ingels et al., 2015, Table 27, p. 86) and corresponding balanced repeated replication (BRR) weights (200 total) to estimate variance and standard errors, the recommended method by NCES (Ingels et al., 2015, p. 124). Analytic base weights and BRR weights are included to account for potential nonresponse bias and to calibrate the sample to remain nationally representative. All descriptive and OLS analyses are conducted with Stata statistical software using the suite of ‘svy’ (survey) commands appropriate for analyzing complex sample survey data (StataCorp, 2013).

Given the longitudinal nature of the sample (i.e., multiple waves of data collection) I did not adopt a temporally fixed multilevel model for regression analyses. A key challenge of analyzing HSLS:09 data is that students migrated between high schools in subsequent waves of data collection. Secondary schools in the base-year (and their associated school-level characteristics) are nationally representative of U.S. high schools only in the 2009–2010 academic year. As students migrated between high schools in follow-up periods and new high schools were introduced into the sample, school-level characteristics were no longer representative, and retrospective base-year high school information was not collected. For context, the base-year high school (variable X1NCESID) and last attended high school as of 2013 (variable X3NCESID) were the same for 83% of the 2009 ninth-grade cohort. While school-level covariates are not estimated given the inherent challenges of utilizing longitudinal data with students migrating between schools, the employed analytic weights account for the clustered nature of students within schools even in subsequent waves (Ingels et al., 2015, p. 124) and therefore produce valid standard errors and statistical tests for descriptive and OLS regression models. Given that cohorts from follow-up periods—and not the 2009 base-year cohort—are the focus of this study, cross-sectional single-level analyses with appropriate weighting is an appropriate analytic approach (Hahs-Vaughn et al., 2011).
For conditional logit analyses (RQ4), I did not employ analytic weighting due to computational limitations of commercial statistical software, an approach common in similar college-choice literature (e.g., Long, 2004; Skinner, 2018). However, I estimated robust standard errors with a cluster adjustment to account for multiple observations per student (i.e., two or three college alternatives per chooser). This standard error adjustment accounts for the clustered nature of the data and attenuates against potential bias in significance testing by taking a more conservative approach (i.e., larger standard errors).

**Descriptive Analysis (RQ1, RQ2, RQ3)**

RQ1 is answered through descriptive analysis of attitudinal survey items from two waves of HSLS:09 data collection. The HSLS:09 first follow-up student survey, administered in spring 2012, includes two Likert scale questions measuring students’ consideration of a postsecondary institution’s geographic location relative to their home (i.e., “close to home” and “far away from home”) when making their aspirational college choice (variables S2CLOSEHOME and S2FARHOME). The 2013 Update survey instrument, administered in summer/fall 2013, asked students who self-reported postsecondary enrollment by November 2013 to rate a series of institutional characteristics on the level of importance ascribed when choosing their enrolled college choice. The institutional characteristic “distance from home” was one of 12 characteristics included (variable S3DISTANCE).

Augmenting analyses of affective survey responses, RQ2 and RQ3 are answered through descriptive analysis of derived high school-to-college distance measures at both the aspirational and enrollment stages. Aspirational college choice is operationalized as the postsecondary institution indicated from the HSLS:09 first follow-up survey when students responded to the following question: “If cost were not a
consideration, what school or college would be your first choice?” (NCES, 2012, p. 18; variable S2CHOICECLGID). Self-reported postsecondary enrollment was collected during the HSLS:09 2013 Update when students or their parents/guardians identified the postsecondary institution in which the student enrolled by fall 2013 (NCES, 2014, p. 14; variable S3CLGID).

I derived high school-to-college distance measures from geographic coordinate information for high schools found in the Common Core of Data (CCD) and the Private School Universe Survey (PSS) and for postsecondary institutions found in the Integrated Postsecondary Education Data System (IPEDS). I linked location information from CCD/PSS and IPEDS to students’ high schools and college choices, respectively, as recorded in the HSLS:09 student data file using institutional identification numbers shared across federal data sets. I generated straight-line distance measures for each student’s unique high school/college matched pairs using the ‘geosphere’ package in the open source statistical software R (Hijmans, 2019).

Because distance-to-college (the variable of interest for RQ2 and RQ3) exhibits a highly right-skewed distribution (see Figures 1 and 2), descriptive findings rely on the median as a measure of central tendency, a “more interesting or appropriate measure of location” for skewed distributions (Price & Bonett, 2002, p. 119). To estimate percentiles, while accounting for the complex survey design and incorporating analytic weights, I used the user-written ‘epctile’ package for Stata statistical software (Kolenikov, 2011), a similar analytic approach adopted by Goedemé (2012). In addition to reporting median statistics for high school-to-college distance measures, I conducted a significance test of medians by students’ socioeconomic status quintile group (variable X4X2SESQ5_U) using the user-written ‘test.quan’ package in R (Pan et al., 2014). As advanced by Pan and colleagues (2014), this analytic technique utilizes a nonparametric rank test and
appropriately accounts for the HSLS:09 “clustered, stratified and weighted survey design” (p. 294).

**Exploratory Spatial Analysis (RQ2, RQ3)**

The descriptive analyses employed to answer RQ2 (i.e., aspirational college choice) and RQ3 (i.e., enrolled college choice) are extended with exploratory spatial analyses. Utilizing spatial methods is a warranted analytic approach given the subject of this study: spatial college choice. Framing college choice from the perceptive of “origin-destination flow” acknowledges the geographic location of students' high schools and college choices, distinguishing spatial data from aspatial data (Fischer & Wang, 2011). As Fotheringham and Rogerson (1993) note: “aspatial forms of analysis are simply not suitable for spatial applications” (p. 3).

Using flow maps, a type of thematic map that displays the movement of objects or migration of people from one location to another (Phan et al., 2005), this study examines the geographic mobility patterns implied by college-intending high school students and the actualized flow of graduates from their credential-awarding secondary schools to their self-reported enrolled colleges. Mapping students' spatial migration allows for an alternative method (i.e., visual inspection) to understand self-reported college-choice preferences and behaviors. Rios-Aguilar and Titus (2019) advance that such spatial methods “offer a way to visualize and to analyze spatial relationships that can have important consequences for how we serve students, particularly those that are most vulnerable” (p. 6).

College-choice flow maps disaggregated by students' socioeconomic status quintile group (i.e., lowest- and highest-SES groups) and institutional level of college choice (e.g., four-year) are presented to illustrate variation in spatial college choice by
social class and institution type. I created flow maps using the Geographic Information System (GIS) software ArcMap.

**Multiple Linear Regression Analysis (RQ2, RQ3)**

In addition to descriptive univariate and cross tabulation analyses, I employed multiple linear regression to isolate the relationship between students’ socioeconomic status (primary independent variable) and distance (dependent variable) to their aspirational (RQ2) and self-reported enrolled college (RQ3) choices, while holding constant key covariates. To account for the highly right-skewed distribution of distance-to-college (see Figures 1 and 2), the outcome under investigation, I applied a natural logarithmic transformation to the dependent variable and implemented ordinary least squares (OLS) regression analysis (Allison, 1999). Formally, the OLS model follows the equation

$$\log Y_i = \alpha + \beta + \epsilon_i$$

where $Y$ is the natural log transformation of the outcome variable, $\alpha$ is a constant term, $\beta$ represents a vector of individual student characteristics, and $\epsilon_i$ is an idiosyncratic error term. Model parameters are reported as exponentiated coefficients to assist with interpretation (i.e., percentage increase/decrease in distance-to-college).

Following Perna and Titus (2004), I utilized a composite measure of SES in regression analyses (over component parts) because “SES may reflect an individual’s *habitus*, or preferences and tastes for college” (p. 508). The HSLS:09 student data file provides multiple measures of students’ SES corresponding with different waves of data collection (i.e., base-year and subsequent follow-ups). SES is a composite index value constructed from item responses from the parental survey, including highest educational attainment among parents/guardians, highest occupational prestige among
parents/guardians, and family income. HSLS:09 provides standardized SES measures that incorporate imputed values as necessary to mitigate survey nonresponse (Ingels et al., 2013, section 7.4.2) and are adjusted for high school urbanicity (e.g., urban/rural). Regression analyses utilize the revised measure of SES (variable X4X2SES) corresponding with the HSLS:09 second follow-up data release that incorporates prestige scores for occupational category codes (Hout et al., n.d.) not available in the study’s base-year (Duprey et al., 2018, p. 165).

In addition to SES as the primary predictor variable, regression models include a robust set of key covariates to serve as statistical controls. Standard demographic markers such as race/ethnicity and gender are included. As previously discussed, prior descriptive research (e.g., Mattern & Wyatt, 2009; Ovink & Kalogrides, 2015) finds that students from differing racial/ethnic groups exhibit variation in their spatial college preferences and distance-to-college.

I included a measure of prior academic achievement in modeling distance-to-college, as students with higher academic achievement typically travel farther distances to attend college (ACT, 2016; Mattern & Wyatt, 2009). Models include a standardized mathematics achievement score (variable X2TXMTSCOR) derived from a computer-administered 73-item assessment on key algebraic concepts and skills given to study participants during the first follow-up data collection period (Ingels et al., 2013). The variable is a norm-referenced measure of mathematics achievement that allows for standardized comparison across all students nationally.

Finally, I included a binary indicator for rural location (based on students’ respective high school locale code) in OLS models. I formed the indicator by collapsing the range of locale codes (e.g., “City, Large”, “Town, Fringe”) common to federal education and Census Bureau data collections into mutually exclusive rural and non-
rural binary categories. Rural locales are operationalized as geographic areas with low population density and distant from urban centers (Geverdt, 2015). As previously discussed, rurality may influence students’ college-choice behaviors in at least two ways: through a community context that enculturates a close-to-home college disposition (Johnson et al., 2005; McDonough et al., 2010) and through a spatial infrastructure that lacks myriad local postsecondary options (Burke et al., 2015; Hillman, 2016; Klasik et al., 2018).

**Conditional Logit Analysis (RQ4)**

The final research question employs conditional logit analysis to model the effect of distance (primary independent variable) on college choice among alternatives (dependent variable). The conditional logit model is a common analytic approach to understand how individuals make discrete choices among alternatives, as the model’s parameter estimates “could be interpreted as the conditional distribution of demand given the feasible set of choice alternatives” (McFadden, 2001, p. 333). This approach adopts the economic framing that individuals, as rational actors, choose from a set of alternatives the option that best maximizes their utility (or satisfies their preferences). The conditional logit model operates under a ‘revealed preferences’ framework, in which the attributes most valued by individuals are revealed through their observed choices. In this study, college-going high school graduates consider more than one postsecondary institution, weigh its institutional characteristics, and select the one institution for initial college enrollment that most satisfies their tastes and preferences.

To conduct conditional logit analyses, I created a new analytic dataset structured ‘long’ into pairwise combinations representing each individual $i$ and postsecondary institution $j$ from a broader choice set $J$ of admitting colleges. Postsecondary options are
nested within individuals and reflect a student-specific choice set; a dummy indicator identifies the selected college from the alternatives present in the choice set. Through maximum likelihood estimation, the conditional logit model maximizes the similarity of the estimated likelihood and observed choice (Avery & Hoxby, 2004). Model estimates can be interpreted as “how the attributes of a college affect the likelihood that an average individual will choose to enroll at the school” (Long, 2004, p. 278). The functional form of the probabilistic conditional logit model is:

$$\Pr(E_{ij}) = \frac{e^{Z_{ij}\beta}}{e^{Z_{ij1}\beta} + e^{Z_{ij2}\beta} + \cdots + e^{Z_{ijg}\beta}}$$

where $Z_{ij}\beta = \beta_1(X_{i1}Y_{j1}) + \beta_2(X_{i2}Y_{j2}) + \cdots + \epsilon_{ij}$ (Long, 2004). The probability of student $i$ choosing college $j$ is a function of student-specific regressors included in vector $X_i$ and college-specific regressors included in vector $Y_j$ represented by $Z_{ij}$ in the above formula (Cameron & Trivedi, 2010; Long, 2004; Wooldridge, 2002). The unobserved error term $\epsilon_{ij}$ represents individuals’ idiosyncratic taste preference for institution $j$, and are assumed to be statistically independent and share the same distribution (the $i.i.d.$ assumption; McFadden, 2001).

In using the conditional logit model, the assumption of independence of irrelevant alternatives (IIA) is required. Within the context of this study, the IIA assumption implies that the probability of a student choosing one college relative to another would not change with the addition or exclusion of other college options in their respective choice sets (Wooldridge, 2002). The IIA assumption is reasonable given this study’s student-specific and preferred choice set specification (i.e., including only the enrolled college and up to two most-considered alternatives to which students were admitted). Despite
the statistical assumptions required of the conditional logit model, this analytic approach has a longstanding precedence in the econometric college-choice literature (e.g., Avery & Hoxby, 2004; Jacob et al., 2018; Kohn et al., 1976; Long, 2004; Niu et al., 2006; Shah, 2014; Skinner, 2019) and aligns with conceptual understandings of student college choice. For example, Chapman (1981) frames the college-choice process as the “combined and interactive effects” of individual student characteristics and external influences, which includes “characteristics of the college” (p. 499). Similarly, Nora (2004) asserts that “students’ college choices . . . are the result of a complex interplay among personal and institutional factors” (p. 198).

Conditional logit model estimation is derived from variation within the choice set, which includes institutional characteristics (e.g., admissions selectivity, tuition and fees) and student-specific differences (e.g., distance). I conducted all conditional logit analyses with Stata statistical software using the ‘clogit’ (conditional logistic regression) command and options (StataCorp, 2017).

**Choice Set Specification.**

Inherent in modeling discrete choice is the so-called “choice set problem,” in that across academic disciplines there is no consensus on what constitutes an appropriate choice set (Pagliara & Timmermans, 2009). Within the college-choice literature, there is variation in how researchers specify college choice sets depending on study sample and specific application (e.g., Avery & Hoxby, 2004; Gibbons & Vignoles, 2012; Jepsen & Montgomery, 2009; Long, 2004; Ordovensky, 1995; Shah, 2014; Skinner, 2019). Niu and Tienda (2008) find that altering choice set specification has the potential to affect consistency of model coefficients. Kohn and colleagues (1976) articulate the college choice set problem, writing:
The inclusion of colleges absent from the true choice set but inferior to the chosen college will have no adverse effect on estimation since the choice would have been the same even if they had been present. On the other hand, the inclusion of superior or preferred colleges that do not appear in the true choice set [emphasis added] will make it seem that a college with less of the desired qualities is chosen over one with more; this will impart a negative bias to the coefficients of these qualities. (p. 401)

Students’ aspirational college-choice preferences may not be realized, particularly their taste for selective colleges that grant admission to relatively few applicants (Jacob et al., 2018; Kohn et al., 1976; Long, 2004). Not accounting for the likelihood of admission “creates a specific form of omitted-variable bias by misspecifying students’ choice sets” if choice models include postsecondary options that students could not realistically attend (Jacob et al., 2018, p. 316). Model estimates could be biased by assigning choices never actually considered (either through nonapplication or denied admission) a non-zero probability of selection (Pagliara & Timmermans, 2009).

To address this potential form of bias, the analytic sample I utilize in this study is limited to students who self-report admission to more than one postsecondary institution (i.e., those with the opportunity to exercise college choice among alternatives). The choice set specification in this study deviates from related studies utilizing national data sets (e.g., Jacob et al., 2018; Long, 2004; Skinner, 2019), which include thousands of college alternatives in each student’s choice set. In practice, students do not consider the universe of postsecondary options when choosing college. For example, among the HSLS:09 ninth-grade cohort in 2009 who applied to any college by 2013, the average number of applications made was 2.9 (median 2.0). And as Iloh (2018) theorizes, students with fewer social and economic resources may be “limited by their location, work and family needs, and income, so their choice set is considerably narrower than is someone’s with greater resources” (p. 239).
For this study, students’ unique choice sets include only the postsecondary institutions at which they gained admission, a similar empirical strategy utilized by Avery and Hoxby (2004) in their College Admissions Project college-choice study. A potential drawback to this approach is that the loss of “all information contained in students’ application decisions, which may bias preference estimates if attributes vary in importance between the application and enrollment stages” (Jacob et al., 2019, p. 316, footnote 12).

For this study, I empirically derived student-specific college choice sets from the HSLS:09 student data file. During the second follow-up data collection period, study participants identified up to three postsecondary institutions to which they had applied/registered including the college of enrollment (S3CLGID) and two alternatives (variables S3CLGAPPID1 and S3CLGAPPID2). In addition to enrolled and considered colleges, information about admission statuses (self-reported) for students’ alternative college choices was also collected (variables S3APPSTATUS1 and S3APPSTATUS2). Students’ enrolled colleges are logically assumed to have granted admission. Among the ‘college choice among alternatives’ analytic sample of 6,020 unique college choosers admitted to more than one postsecondary institution, 2,900 (48.2 percent) have two postsecondary institutions within their college choice sets and the remaining 3,120 (51.8 percent) have three options from which to choose.

**Conditional Logit Model Specification.**

For RQ4, the primary institutional characteristic under investigation is distance-to-college (a proxy for ‘spatial accessibility’), measured as the straight-line distance between students’ respective credential-awarding high schools and admitting postsecondary institutions. Distance-to-college is an alternative-specific characteristic in that it varies by college choice. Geographic location is an institutional characteristic
students consider and even prioritize when making college-related decisions (Chapman, 1981; Ingels & Dalton, 2013; McDonough; 1997; Perna, 2006; Somers et al. 2006; Turley, 2006). Theoretically fixed individual characteristics (e.g., race/ethnicity, gender) cannot be independently estimated, as they remain constant across all college choice alternatives and essentially difference out across equations (Avery & Hoxby, 2004; Long & Freese, 2014). To include individual characteristics of interest (i.e., SES) within a conditional logit framework, I included the interaction between SES and distance, allowing for the heterogeneous effects to be estimated, a similar approach adopted by Jacob and colleagues (2018).

In addition to a continuous distance measure and its interaction with SES, I also included an indicator for in-state colleges relative to the student, an analytic approach adopted by other researchers (e.g., Jacob et al., 2018; Montgomery, 2002). As González Canché (2018) states, continuous and binary spatial distance measures are not equivalent measures, particularly for states that are large or small in land area and for students who reside near state borders. Descriptive research finds that most first-time college enrollees attend in-state institutions (ACT, 2016; Ruiz, 2019). Additionally, an indicator for an in-state or out-of-state college may capture broader macro forces that shape postsecondary destinations for a state’s residents such as tuition-setting and P-20 alignment policies (Perna & Finney, 2014; Perna & Titus, 2004) and other “hard-to-observe factors, such as family connections, that will influence a student’s college choice” (Jacob et al., 2018, p. 317).

I also included variables that reflect various aspects of institutional selectivity or prestige. Admissions selectivity (a categorical classification by Barron’s) is commonly advertised and considered by students when making college choices (Long, 2004; Manski & Wise, 1983). For model specification, the eight selectivity categories (seven
Barron’s categories plus a catch-all category for colleges not rated by Barron’s) were collapsed into five categories to preserve model parsimony and eliminate small cell sizes for selectivity categories not well represented in students’ choice sets (i.e., “Special” and “Most Competitive” colleges were combined and “Less Competitive”, “Noncompetitive” and the remaining unrated colleges were combined).

In addition to Barron’s selectivity categories, which rates approximately 1,400 four-year colleges, I included a dummy indicator for institutions that are less-than-four-year institutions (and therefore not rated by Barron’s). I also included a dummy indicator for special focus institution as a proxy for specialized academic program offerings, as prior research suggests that students are willing to travel greater distances to attend postsecondary institutions with specialized program offerings (e.g., Ordovensky, 1995; Suhonen, 2014). I derived this binary variable from the 2010 Carnegie Basic Classification in the Delta Cost Project Database. This subset of special focus institutions includes two- and four-year colleges that specialize in a single field or highly related fields of study including health and medicine, art and design, and engineering and technology, among others. The remaining institutions that are non-special focus institutions have more mixed academic program offerings.

Beyond spatial characteristics and institutional classifications, I utilized finance and cost variables for conditional logit analyses. In related college-choice studies (e.g., Jacob et al., 2018; Long, 2004) researchers proxy educational ‘quality’ and campus amenities through institutional expenditures. Similarly, I included spending data from the Delta Cost Project Database on institutional expenditures for instruction, academic support, and student services per full-time equivalent (FTE) student. Reflecting the human capital investment model, I also included a measure of institutional price. The institutional sticker price, or the advertised price of tuition and fees for full-time students,
was included. Although in practice most students do not pay the full sticker price (College Board, 2019), this is the value commonly reported in popular media (e.g., Powell & Kerr, 2019), and case study research finds that lower-SES students and community college enrollees may use sticker price as a frame for their perceived college choices and eliminate from consideration institutions that exceed an established threshold (Radford, 2013; Somers et al., 2006). For constructing the analytic dataset for conditional logit analyses, I assigned high school completers in the same state as admitting public colleges the institution’s in-state tuition rate and the out-of-state rate for all other cases.

Limitations

While the HSLS:09 study provides a rich data source for understanding U.S. student college choice, the data are limited in several ways. First, postsecondary enrollment outcomes are self-reported with either the sampled student or their parent/guardian providing such information (Ingels et al., 2015). College enrollment could be verified by the anticipated Postsecondary Education Transcript Study (PETS) that links postsecondary administrative records with student surveys to verify college course-taking, transfer, and attainment. However, at the time of conducting this study, PETS data were not yet available to researchers.

Second, the study’s 2013 Update data collection was administered in the “summer-fall after the normative high school graduation” (Ingels et al., 2015, p. 10) and therefore captures anticipated college enrollment among those students surveyed in the summer. Castleman and Page (2014) find that sizeable shares of college-intending high school graduates who have successfully completed the college admissions and financial aid processes fail to matriculate in the fall term, with low-income students more likely than higher-income students to experience this “summer melt” phenomenon. Therefore,
there is the potential that at least some sampled students made a college enrollment decision in the summer yet failed to follow through with fall enrollment.

Third, analytic samples used in this study include U.S. high school completers who enrolled immediately in postsecondary education, while typically in their late teens (often referred to as “traditional” students). Findings from this study may not generalize to other college student populations, including working adult learners who may be even more distance-sensitive (Somers et al., 2006). Estimates from the National Postsecondary Student Aid Study (NPSAS:16) show that approximately one-half of U.S. undergraduates meet federal legislative criteria (e.g., age; marital, parental, or veteran statuses) to be classified as independent for federal financial aid purposes (often referred to as “nontraditional” students; Congressional Research Service, 2019). While this study’s analytic samples do not reflect all segments of the U.S. undergraduate population, its focus on traditional-age college students with immediate postsecondary enrollment after high school offers insights into college-goers who are ostensibly the most geographically mobile and more fully able to exercise spatial choice (i.e., less place-bound by professional or parental obligations).

Finally, derived distance-to-college measures reflect the straight-line distance between the geographic coordinates of students’ respective high schools and college choices. Unlike prior federal longitudinal studies that provided students’ residential ZIP Code information (Ingels et al., 2004), HSLS:09 does not include residential location information. I used high school geographic location as a proxy for student location, recognizing that students reside at varying distances from the high schools they attend.
CHAPTER 4: FINDINGS

Findings from descriptive, spatial, OLS, and conditional logit analyses are mutually reinforcing and suggest strong relationships between students’ socioeconomic status and their spatial college choices. Affective spatial preferences correspond with quantitative distance-to-college measures and suggest that students, particularly those from lower-SES backgrounds, are spatially aware and distance-sensitive when aspiring to and enrolling in college. Findings also highlight variation in spatial preferences and behaviors, particularly between four-year and less-than-four-year college choosers.

Descriptive Analysis of Spatial Attitudes (RQ1)

Attitudinal survey responses reveal that proximity to college is an important consideration for most U.S. high school students at both the aspirational and enrollment stages. Table 1 presents the proportions of college-intending high school juniors holding varying attitudes toward a “close to home” college preference, overall and by SES quintile group. Among the cohort of U.S. ninth-graders in 2009 who were college-intending in spring 2012, nearly three-quarters reported that when “choosing a school or college to attend after high school” its location “close to home” was either “very important” (26.3 percent) or “somewhat important” (46.4 percent). For approximately one-quarter of college-intending students (27.4 percent), a college’s proximal location was “not at all important” in their postsecondary planning.

Survey responses indicate that students from lower-SES backgrounds hold a stronger “close to home” college preference than their higher-SES peers. For example, approximately one-third (32.4 percent) of students from the lowest-SES quintile background considered a college’s geographic proximity “very important,” whereas fewer than one-fifth (17.3 percent) of students from the highest-SES quintile background held the same attitude. By contrast, more than one-third (36.5 percent) of the highest-SES
students reported that a college’s geographic proximity was “not at all important,”
whereas fewer than one-quarter (22.2 percent) of the lowest-SES students held the
same attitude. Approximately one-half of students within each SES quintile group held a
moderate (i.e., “somewhat important”) attitude toward a college’s geographic proximity,
demonstrating that class-based differences in students’ “close to home” college
preferences are observed on polar ends of the Likert scale (i.e., “very important” and
“not at all important”).

Table 1. Proportion of college-intending high school juniors holding a “close to home”
college-choice attitude, by student SES quintile: Spring 2012

<table>
<thead>
<tr>
<th>SES Quintile</th>
<th>Very important</th>
<th>Somewhat important</th>
<th>Not at all important</th>
</tr>
</thead>
<tbody>
<tr>
<td>First quintile (lowest)</td>
<td>0.324</td>
<td>0.454</td>
<td>0.222</td>
</tr>
<tr>
<td>(0.014)</td>
<td>(0.014)</td>
<td>(0.014)</td>
<td></td>
</tr>
<tr>
<td>Second quintile</td>
<td>0.303</td>
<td>0.455</td>
<td>0.242</td>
</tr>
<tr>
<td>(0.012)</td>
<td>(0.013)</td>
<td>(0.011)</td>
<td></td>
</tr>
<tr>
<td>Third quintile</td>
<td>0.285</td>
<td>0.484</td>
<td>0.231</td>
</tr>
<tr>
<td>(0.013)</td>
<td>(0.013)</td>
<td>(0.010)</td>
<td></td>
</tr>
<tr>
<td>Fourth quintile</td>
<td>0.236</td>
<td>0.462</td>
<td>0.302</td>
</tr>
<tr>
<td>(0.010)</td>
<td>(0.011)</td>
<td>(0.011)</td>
<td></td>
</tr>
<tr>
<td>Fifth quintile (highest)</td>
<td>0.173</td>
<td>0.463</td>
<td>0.365</td>
</tr>
<tr>
<td>(0.009)</td>
<td>(0.010)</td>
<td>(0.012)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>0.263</td>
<td>0.464</td>
<td>0.274</td>
</tr>
<tr>
<td>(0.005)</td>
<td>(0.006)</td>
<td>(0.005)</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>4,940</td>
<td>9,150</td>
<td>5,630</td>
</tr>
</tbody>
</table>

Notes: SES = socioeconomic status. BRR standard errors in parentheses. Row totals
may not add to one due to rounding. Weight variable used in this table is W2STUDENT. Unweighted sample size numbers are rounded to the nearest ten to comply with NCES
restricted-use data security protocol.
Source: U.S. Department of Education, National Center for Education Statistics, High

Although most college-intending students held a “close to home” college
preference, their attitudes toward choosing colleges located “far away from home” were
less emphatic. Table 2 presents the proportions of students holding varying preferences toward a “far away from home” college choice, overall and by SES quintile group. A plurality (46.8 percent) of college-intending students reported that a college located “far away from home” was “not at all important” when choosing their aspirational postsecondary destinations. Approximately two-fifths (41.0 percent) held a moderate (i.e., “somewhat important”) “far away from home” college preference, and the remaining share (12.2 percent) held a strong (i.e., “very important”) preference for geographically distant colleges. A larger share of the lowest-SES students (15.0 percent) held a “far away from home” college preference compared to their highest-SES peers (9.3 percent).

Attitudinal survey responses from the lowest-SES quintile group suggest seemingly contradictory spatial preferences. As a group, they held stronger attitudes (i.e., “very important”) compared to their highest-SES peers toward both “close to home” (32.4 percent vs. 17.3 percent) and “far away from home” (15.0 percent vs. 9.3 percent) college preferences. Attitudinal survey responses at the college-intending stage suggest that the lowest-SES students are relatively more distance-sensitive (at both ends of the spatial spectrum) when contemplating their future postsecondary choices.

Table 2. Proportion of college-intending high school juniors holding a “far away from home” college-choice attitude, by student SES quintile: Spring 2012

<table>
<thead>
<tr>
<th>SES Quintile</th>
<th>Very important</th>
<th>Somewhat important</th>
<th>Not at all important</th>
</tr>
</thead>
<tbody>
<tr>
<td>First quintile (lowest)</td>
<td>0.150</td>
<td>0.421</td>
<td>0.430</td>
</tr>
<tr>
<td></td>
<td>(0.013)</td>
<td>(0.014)</td>
<td>(0.014)</td>
</tr>
<tr>
<td>Second quintile</td>
<td>0.142</td>
<td>0.423</td>
<td>0.435</td>
</tr>
<tr>
<td></td>
<td>(0.010)</td>
<td>(0.015)</td>
<td>(0.013)</td>
</tr>
<tr>
<td>Third quintile</td>
<td>0.113</td>
<td>0.401</td>
<td>0.486</td>
</tr>
<tr>
<td></td>
<td>(0.009)</td>
<td>(0.017)</td>
<td>(0.016)</td>
</tr>
<tr>
<td>Fourth quintile</td>
<td>0.115</td>
<td>0.409</td>
<td>0.475</td>
</tr>
<tr>
<td></td>
<td>(0.008)</td>
<td>(0.013)</td>
<td>(0.014)</td>
</tr>
<tr>
<td>Fifth quintile</td>
<td>0.093</td>
<td>0.395</td>
<td>0.512</td>
</tr>
</tbody>
</table>
Notes: SES = socioeconomic status. BRR standard errors in parentheses. Row totals may not add to one due to rounding. Weight variable used in this table is W2STUDENT. Unweighted sample size numbers are rounded to the nearest ten to comply with NCES restricted-use data security protocol.


The HSLS:09 data collection in summer/fall 2013 surveyed students’ about their attitudes on the relative importance of “distance from home” at the point when most high school completers had selected and/or enrolled in their final college choices (Table 3). Approximately three-quarters of U.S. ninth-graders in 2009 who self-reported postsecondary enrollment by fall 2013 rated “distance from home” as either a “very important” (36.0 percent) or “somewhat important” (37.5 percent) institutional characteristic when selecting their enrolled college choice. By contrast, fewer than one-quarter (23.3 percent) rated “distance from home” as “not at all important.”

College-goers’ attitudes toward “distance from home” varied by socioeconomic status. For example, more than two-fifths (44.2 percent) of students from the lowest-SES quintile background rated “distance from home” as a “very important” institutional characteristic when choosing their enrolled college. By contrast, approximately one-quarter (27.5 percent) of the highest-SES students held the same attitude. Although the highest-SES students were less emphatic in their “distance from home” attitudes relative to their lowest-SES peers, a plurality (45.1 percent) still held moderate (i.e., “somewhat important”) attitudes toward distance-to-college. Comparable shares of college-goers across all SES quintile groups (in the low- to mid-20 percent range) rated “distance from
home” as “not at all important,” highlighting that for most college-goers distance was at least a somewhat important institutional characteristic. Table 2a shows class-based variation in degree of importance (i.e., “somewhat” vs. “very”) not absolute importance.

Table 3. Proportion of college-going high school completers holding a “distance from home” college-choice attitude, by student SES quintile: Fall 2013

<table>
<thead>
<tr>
<th>SES Quintile</th>
<th>Very important</th>
<th>Somewhat important</th>
<th>Not at all important</th>
<th>Don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>First quintile</td>
<td>0.442</td>
<td>0.295</td>
<td>0.219</td>
<td>0.043††</td>
</tr>
<tr>
<td>(lowest)</td>
<td>(0.026)</td>
<td>(0.022)</td>
<td>(0.018)</td>
<td>(0.025)</td>
</tr>
<tr>
<td>Second quintile</td>
<td>0.401</td>
<td>0.342</td>
<td>0.203</td>
<td>0.054††</td>
</tr>
<tr>
<td></td>
<td>(0.019)</td>
<td>(0.019)</td>
<td>(0.014)</td>
<td>(0.027)</td>
</tr>
<tr>
<td>Third quintile</td>
<td>0.398</td>
<td>0.350</td>
<td>0.216</td>
<td>0.035††</td>
</tr>
<tr>
<td></td>
<td>(0.023)</td>
<td>(0.022)</td>
<td>(0.015)</td>
<td>(0.020)</td>
</tr>
<tr>
<td>Fourth quintile</td>
<td>0.350</td>
<td>0.380</td>
<td>0.244</td>
<td>0.026††</td>
</tr>
<tr>
<td></td>
<td>(0.016)</td>
<td>(0.015)</td>
<td>(0.013)</td>
<td>(0.016)</td>
</tr>
<tr>
<td>Fifth quintile (highest)</td>
<td>0.275</td>
<td>0.451</td>
<td>0.263</td>
<td>0.012††</td>
</tr>
<tr>
<td></td>
<td>(0.012)</td>
<td>(0.013)</td>
<td>(0.009)</td>
<td>(0.008)</td>
</tr>
<tr>
<td>Total</td>
<td>0.360</td>
<td>0.375</td>
<td>0.233</td>
<td>0.031</td>
</tr>
<tr>
<td></td>
<td>(0.008)</td>
<td>(0.007)</td>
<td>(0.006)</td>
<td>(0.004)</td>
</tr>
<tr>
<td>Observations</td>
<td>4,300</td>
<td>4,850</td>
<td>2,920</td>
<td>280</td>
</tr>
</tbody>
</table>

Notes: SES = socioeconomic status. BRR standard errors in parentheses. ††Interpret data with caution; estimate is unstable because standard error is more than 50 percent of the estimate. Row totals may not add to one due to rounding. Weight variable used in this table is W3W2STU. Unweighted sample size numbers are rounded to the nearest ten to comply with NCES restricted-use data security protocol.

Table 4 shows varying attitudes toward “distance from home” by institutional level and student SES quintile. Overall, less-than-four-year college enrollees more commonly reported that “distance from college” was “very important” compared to four-year enrollees (44.6 percent vs. 30.7 percent), suggesting greater spatial sensitivity for students who enroll in two-year and less-than-two-year sectors (i.e., community and technical college enrollees). Class-based variation in college-goers’ attitudes toward
“distance from home” were largely confined to those selecting four-year postsecondary institutions. Among four-year college enrollees, a plurality (44.0 percent) of the lowest-SES students rated “distance from home” as a “very important” institutional characteristic, whereas fewer than one-quarter (23.3 percent) of the highest-SES students reported the same attitude. By contrast, among less-than-four-year college enrollees, students across all SES quintile groups reported similar “distance to college” attitudes (i.e., comparable shares of students within each Likert rating).

Table 4. Proportion of college-going high school completers holding a “distance from home” college-choice attitude, by institutional level and student SES quintile: Fall 2013

<table>
<thead>
<tr>
<th>SES Quintile</th>
<th>Very important</th>
<th>Somewhat important</th>
<th>Not at all important</th>
<th>Don't know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Four-year</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First quintile</td>
<td>0.440</td>
<td>0.306</td>
<td>0.217</td>
<td>0.036†</td>
</tr>
<tr>
<td>(lowest)</td>
<td>(0.040)</td>
<td>(0.030)</td>
<td>(0.026)</td>
<td>(0.012)</td>
</tr>
<tr>
<td>Second quintile</td>
<td>0.392</td>
<td>0.371</td>
<td>0.216</td>
<td>0.02††</td>
</tr>
<tr>
<td>(0.023)</td>
<td>(0.024)</td>
<td>(0.024)</td>
<td>(0.010)</td>
<td></td>
</tr>
<tr>
<td>Third quintile</td>
<td>0.325</td>
<td>0.372</td>
<td>0.266</td>
<td>0.037†</td>
</tr>
<tr>
<td>(0.023)</td>
<td>(0.024)</td>
<td>(0.021)</td>
<td>(0.012)</td>
<td></td>
</tr>
<tr>
<td>Fourth quintile</td>
<td>0.300</td>
<td>0.395</td>
<td>0.288</td>
<td>0.016</td>
</tr>
<tr>
<td>(0.017)</td>
<td>(0.016)</td>
<td>(0.017)</td>
<td>(0.004)</td>
<td></td>
</tr>
<tr>
<td>Fifth quintile</td>
<td>0.233</td>
<td>0.467</td>
<td>0.287</td>
<td>0.013</td>
</tr>
<tr>
<td>(highest)</td>
<td>(0.012)</td>
<td>(0.013)</td>
<td>(0.010)</td>
<td>(0.003)</td>
</tr>
<tr>
<td>Total</td>
<td>0.307</td>
<td>0.405</td>
<td>0.267</td>
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<tr>
<td></td>
<td>(0.008)</td>
<td>(0.008)</td>
<td>(0.008)</td>
<td>(0.003)</td>
</tr>
<tr>
<td>Observations</td>
<td>2,440</td>
<td>3,560</td>
<td>2,220</td>
<td>150</td>
</tr>
<tr>
<td>Less-than-four-year</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First quintile</td>
<td>0.452</td>
<td>0.289</td>
<td>0.215</td>
<td>0.044†</td>
</tr>
<tr>
<td>(lowest)</td>
<td>(0.036)</td>
<td>(0.033)</td>
<td>(0.028)</td>
<td>(0.015)</td>
</tr>
<tr>
<td>Second quintile</td>
<td>0.404</td>
<td>0.312</td>
<td>0.192</td>
<td>0.092†</td>
</tr>
<tr>
<td>(0.036)</td>
<td>(0.031)</td>
<td>(0.024)</td>
<td>(0.029)</td>
<td></td>
</tr>
<tr>
<td>Third quintile</td>
<td>0.498</td>
<td>0.329</td>
<td>0.145</td>
<td>0.028†</td>
</tr>
<tr>
<td>(0.035)</td>
<td>(0.037)</td>
<td>(0.019)</td>
<td>(0.010)</td>
<td></td>
</tr>
<tr>
<td>Fourth quintile</td>
<td>0.440</td>
<td>0.346</td>
<td>0.172</td>
<td>0.042</td>
</tr>
</tbody>
</table>
Students from varying socioeconomic backgrounds are unevenly distributed across postsecondary institutional sectors in the U.S. (i.e., class-based stratification).

For example, among U.S. ninth-graders in 2009 who enrolled in postsecondary education by fall 2013, 41.1 percent of students from the lowest-SES quintile enrolled in a four-year college whereas nearly double the proportion (81.1 percent) of their highest-SES peers enrolled within the same sector. By contrast, the majority (57.4 percent) of the lowest-SES college-goers enrolled in a two-year college, three times the proportion (18.6 percent) of their highest-SES peers. Therefore, while “distance from home” college-choice attitudes may be comparable among less-than-two-year college enrollees regardless of their socioeconomic status, the representation of students from varying SES backgrounds within this sector is not comparable. Understanding the relative concentration or underrepresentedness of students from low- and high-SES backgrounds by institutional level provides additional context for interpreting descriptive findings. Refer to Appendix A for additional information on the distribution of the
HSLS:09 college-intending and college-going cohorts’ postsecondary choices by institutional level.

**Descriptive Analysis of Distance-to-College (RQ2, RQ3)**

A limitation of the HSLS:09 2013 Update survey instrument’s spatial preference question is the wording “distance from home,” as the phrase does not offer a definition of ‘distance’ nor indicate geographic nearness or farness. Subjective interpretation of the term is likely, given that experimental research finds variation in how individuals perceive spatial relationships (Norman et al., 2005) and qualitative research finds that low- and high-SES students perceive travel distance differently due to inferred mode of transportation (i.e., automobile vs. airplane; McDonough, 1997).

Nonetheless, this study’s analyses of empirically derived distance-to-college measures largely reinforce the findings presented above about attitudinal survey responses related to spatial college choice. Operationalizing spatial preferences as straight-line distance (in miles) to college choices, U.S. high school students demonstrate largely localized college-choice preferences, with variation by socioeconomic status. Figures 1 and 2 display the distribution of distance-to-college for college-intending high school juniors and college-going high school completers, respectively. For visual presentation purposes, both figures are right-censored at 500 miles on the x-axis, which excludes 17.3 percent of total aspirational college choices and only 6.8 percent of total enrolled college choices (suggesting that students’ spatial aspirations are typically greater than their realized spatial enrollment behaviors).

Among the cohort of U.S. ninth-graders in 2009 who indicated their intent to pursue postsecondary education in spring 2012 (i.e., while in eleventh grade), the distribution of distance to aspirational college choice is right skewed (Figure 1), with large proportions of college choices clustered at closer distances. Smaller shares of
college choices extend to farther distances, visualized as long right tails. Visually disaggregating the distribution of distance-to-college by SES quintile background suggests class-based differences in students’ spatial college-choice preferences, even at this aspirational stage (i.e., variation in the sharp peaks and thick tails of the distributions).

Figure 1. Distribution of distance to aspirational college choice among college-intending high school juniors, by student SES quintile: Spring 2012

Notes: SES = socioeconomic status. Distance is straight-line distance, calculated using R package ‘geosphere’, from the location of students’ high school attended in the 2011–12 academic year (variable X2NCESID) to the location of their aspirational first-choice college (variable S2CHOICECLGID). For presentation purposes, the distance range of this figure is right censored at 500 miles, which excludes 17.3% of all aspirational college choices. Weight variable used in this figure is W2STUDENT.

Source: U.S. Department of Education, National Center for Education Statistics, High School Longitudinal Study of 2009 (HSLS:09); Integrated Postsecondary Education Data System (IPEDS); Common Core of Data (CCD); Private School Universe Survey (PSS). Author’s analysis.
Among the cohort of U.S. ninth-graders in 2009 who self-reported postsecondary enrollment by fall 2013, distance to enrolled college exhibits an even more pronounced right skewed distribution (Figure 2) compared to aspirational college choice (Figure 1). Among college-goers, most college choices are concentrated tightly around closer distances, particularly for students from the lowest-SES quintile group (i.e., a sharp peak near zero). By contrast, students from higher-SES backgrounds exhibit less pronounced right skewed distributions, with relatively rounder peaks near shorter distances and fatter right tails extending to farther distances.

Figure 2. Distribution of distance to self-reported enrolled college choice among college-going high school completers, by student SES quintile: Fall 2013

Notes: SES = socioeconomic status. Distance is straight-line distance, calculated using R package ‘geosphere’, from the location of students' last attended high school (variable X3TLASTHS) to the location of their self-reported postsecondary institution of enrollment as of November 1, 2013 (variable S3CLGID). Student or parent may have reported college enrollment. For presentation purposes, the distance range of this figure is right censored at 500 miles, which excludes 6.8% of all college enrollment choices. Weight variable used in this figure is W3W2STU.
Sources: U.S. Department of Education, National Center for Education Statistics, High School Longitudinal Study of 2009 (HSLS:09); Integrated Postsecondary Education Data
System (IPEDS); Common Core of Data (CCD); Private School Universe Survey (PSS). Author’s analysis.

Beyond the visual shape of the distance-to-college distributions, quantitative measures of central tendency provide additional information on students’ spatial college-choice preferences. Due to the highly right skewed distributions, the median statistic is presented, as it is less influenced by geographic outliers (i.e., students traveling uncharacteristically far distances).

Table 5 presents the median distance-to-college for students’ aspirational college choices, overall and by SES quintile and institutional sector. Among the cohort of U.S. ninth-graders in 2009 who were college-intending in spring 2012, the median distance to their aspirational college choices was 103 miles (28 miles at the 25th percentile and 311 miles at the 75th percentile). Descriptive findings suggest an overall positive association between distance-to-college and SES at the college-intending stage. The lowest-SES students aspired to attend a college at a median distance of 74 miles from their high schools, approximately one-half the distance (138 miles) of the highest-SES students.

Table 5. Median distance to aspirational college choice among college-intending high school juniors, by student SES quintile and institutional sector: Spring 2012

<table>
<thead>
<tr>
<th>SES Quintile</th>
<th>Any PSI</th>
<th>Public, 4-year PSI</th>
<th>Private Non-profit, 4-year PSI</th>
<th>Public, 2-year PSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>First quintile (lowest)</td>
<td>74</td>
<td>82</td>
<td>272†</td>
<td>14†</td>
</tr>
<tr>
<td></td>
<td>(9)</td>
<td>(7)</td>
<td>(82)</td>
<td>(4)</td>
</tr>
<tr>
<td>Second quintile</td>
<td>76</td>
<td>91</td>
<td>120†</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>(7)</td>
<td>(7)</td>
<td>(46)</td>
<td>(2)</td>
</tr>
<tr>
<td>Third quintile</td>
<td>69</td>
<td>85</td>
<td>115</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>(8)</td>
<td>(12)</td>
<td>(20)</td>
<td>(2)</td>
</tr>
<tr>
<td>Fourth quintile</td>
<td>106</td>
<td>109</td>
<td>175</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>(7)</td>
<td>(7)</td>
<td>(33)</td>
<td>(3)</td>
</tr>
<tr>
<td>Fifth quintile (highest)</td>
<td>138</td>
<td>132</td>
<td>223</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>(7)</td>
<td>(4)</td>
<td>(21)</td>
<td>(2)</td>
</tr>
</tbody>
</table>
Students’ spatial college-choice preferences varied by institutional sector. A majority (57.5 percent) of college-intending students aspired to attend public, four-year colleges (at a median distance of 101 miles). By contrast, approximately one-quarter (27.6 percent) aspired to attend more geographically distant private non-profit, four-year colleges (at median distance of 170 miles). Among public, four-year college aspirants, SES is positively associated with distance-to-college, with the lowest-SES students aspiring to attend colleges at a median distance of 82 miles and the highest-SES students aspiring to attend colleges at a median distance of 132 miles.

Among private non-profit, four-year college aspirants, however, the lowest-SES students stand out for their geographically distant college choices. Students from the lowest-SES quintile who aspired to attend private non-profit, four-year colleges (24.1 percent of the lowest-SES group) selected institutions at a median distance of 272 miles, farther than the highest-SES students (223 miles) who selected colleges within the same sector (35.5 percent of the highest-SES group). Examination of the most geographically
ambitious lowest-SES students (i.e., those who aspired to attend private non-profit, four-year colleges greater than 1,000 miles away) finds that admissions-competitive institutions were preferred. Examples include sampled high school juniors from California and Arizona who chose Harvard University in Massachusetts, students in New Jersey and Ohio who chose Stanford University in California, and students in California and Massachusetts who chose the University of Miami in Florida. Descriptive findings suggest that, at the college-intending stage, the nation’s lowest-SES high school students tend to aspire for elite higher education at a greater relative distance than even their highest-SES peers. However, this observed difference does not consider the availability of elite postsecondary institutions within students’ geographic proximity.

Public, two-year college aspirants have geographically uniform spatial preferences regardless of their socioeconomic status, but only a small minority of college-intending students (10.0 percent) aspired to attend a public, two-year college. For these students, the median distance to their preferred public two-year institution is 10 miles and does not vary substantively by SES. While community colleges are not most college-intending students’ preferred institutional sector, among the minority of students who choose them, geographically proximal options were selected.

Beyond aspirational college choices made in the eleventh grade, high school completers who pursue postsecondary education must make an enrollment choice. Table 6 presents the median distance-to-college for college-goers, overall and by SES quintile background and institutional sector. Among the cohort of U.S. ninth-graders in 2009 who self-reported college enrollment by fall 2013, the median distance to their enrolled college choices was 29 miles (8 miles at the 25th percentile and 115 miles at the 75th percentile), a sharp contrast with college-intending students’ median distance of 103 miles (see Table 5).
As observed with aspirational college choice, socioeconomic status is positively associated with distance-to-college among college enrollees overall and within the public, four-year sector. Similarly, SES is not associated with distance-to-college among two-year college enrollees who exhibit uniformly hyperlocal enrollment within this sector. Unlike aspirational college choice, students from the lowest-SES background who enrolled at a private non-profit, four-year college typically traveled shorter distances than their higher-SES peers who enrolled within the same sector, suggesting a class-based difference at the enrollment stage that was not present at the aspirational stage. Class-based differences in distance-to-college are stark between the lowest- and highest-SES students at the enrollment stage. For example, college-going students from the lowest-SES quintile enrolled in postsecondary institutions at a median distance of just 14 miles from their respective high schools, less than one-fifth the median distance of the highest-SES students (75 miles).

Table 6. Median distance to self-reported enrolled college choice among college-going high school completers, by student SES quintile and institutional sector: Fall 2013

<table>
<thead>
<tr>
<th>SES Quintile</th>
<th>Any PSI</th>
<th>Public, 4-year PSI</th>
<th>Private Non-profit, 4-year PSI</th>
<th>Public, 2-year PSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>First quintile (lowest)</td>
<td>14</td>
<td>33</td>
<td>37</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>(1)</td>
<td>(6)</td>
<td>(8)</td>
<td>(1)</td>
</tr>
<tr>
<td>Second quintile</td>
<td>17</td>
<td>40</td>
<td>43</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>(2)</td>
<td>(4)</td>
<td>(5)</td>
<td>(1)</td>
</tr>
<tr>
<td>Third quintile</td>
<td>20</td>
<td>40</td>
<td>72</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>(2)</td>
<td>(5)</td>
<td>(19)</td>
<td>(1)</td>
</tr>
<tr>
<td>Fourth quintile</td>
<td>32</td>
<td>64</td>
<td>88</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>(3)</td>
<td>(5)</td>
<td>(17)</td>
<td>(1)</td>
</tr>
<tr>
<td>Fifth quintile (highest)</td>
<td>75</td>
<td>93</td>
<td>145</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>(5)</td>
<td>(5)</td>
<td>(13)</td>
<td>(1)</td>
</tr>
<tr>
<td>Total</td>
<td>29*</td>
<td>61*</td>
<td>87*</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>(2)</td>
<td>(3)</td>
<td>(9)</td>
<td>(1)</td>
</tr>
<tr>
<td>Observations</td>
<td>12,840</td>
<td>6,070</td>
<td>2,610</td>
<td>3,720</td>
</tr>
</tbody>
</table>
Proportion (weighted) 1.00  .434  .175  .351

Notes: SES = socioeconomic status. PSI = Postsecondary Institution. BRR standard errors in parentheses. *Indicates a statistically significant ($p < 0.001$) difference in the equality of quantile values (i.e., median distance) by SES quintile subgroup (refer to Pan et al., 2014). Distance is straight-line distance, calculated using R package ‘geosphere’, from the location of students’ last attended high school (variable X3TLASTHS) to the location of their self-reported postsecondary institution of enrollment as of November 1, 2013 (variable S3CLGID). Student or parent may have reported enrolled college choice. Analytic sample is limited to high school completers as verified by high school transcript (variable X3HSCOMPSTAT). Weight variable used in this table is W3W2STU. Unweighted sample size numbers are rounded to the nearest ten to comply with NCES restricted-use data security protocol.

Sources: U.S. Department of Education, National Center for Education Statistics, High School Longitudinal Study of 2009 (HSLS:09); Integrated Postsecondary Education Data System (IPEDS); Common Core of Data (CCD); Private School Universe Survey (PSS). Author’s analysis.

Class-based differences in distance-to-college are likely influenced by the distributional differences by SES in the postsecondary institutions that students attend. Among college-goers, a majority (53.5 percent) of students from the lowest-SES quintile background enrolled in public, two-year colleges, whereas less than one-fifth (18.1 percent) of their highest-SES peer enrolled within this sector. As students from lower-SES backgrounds are largely concentrated at public, two-year colleges (with uniformly shorter distance-to-college) and higher-SES students are more represented within the four-year sector (with typically farther distance-to-college), spatial differentials in students’ college choices manifest.

Even within the same four-year sectors, however, lower-SES students traveled shorter distances to attend college than higher-SES students. Among students from the lowest-SES quintile who enrolled at public, four-year colleges (31.9 percent of all lowest-SES college-goers) the median distance-to-college was 33 miles, approximately one-third the distance (93 miles) of students from the highest-SES quintile who enrolled within the same sector (54.7 percent of all highest-SES college-goers). Among students
from the lowest-SES quintile background who enrolled at private non-profit, four-year colleges (7.5 percent of all lowest-SES college-goers) the median distance-to-college was 37 miles, approximately one-quarter the distance (145 miles) of students from the highest-SES quintile background who enrolled within the same sector (26.0 percent of all highest-SES college-goers).

Among public, two-year college enrollees (i.e., community college enrollees) distance-to-college was typically about 9 miles from students’ high schools, with minimal variation by SES. The uniformly short distances—regardless of SES—suggest that among community college enrollees proximity is a priority and that geographically distant two-year college choices are not preferred, a finding bolstered by prior research on community college students (e.g., Jepsen & Montgomery, 2009; Somers et al., 2006). Localized community college enrollment is unsurprising given the community-serving mission of such institutions (Dougherty & Townsend, 2007) and the tiered pricing structure that provides an ‘in-district’ tuition rate (typically defined by county or school district boundaries) that is even lower than an ‘in-state’ rate (College Board, 2019).

Alternative spatial measures beyond median distance-to-college reinforce the mainline finding of class-based difference in students’ spatial college-choice preferences. For example, compared to lower-SES students, larger shares of higher-SES students aspire to attend and enroll in out-of-state postsecondary institutions (see Appendix B). Similarly, compared to higher-SES students, larger shares of lower-SES students aspire to attend and enroll in their geographically closest postsecondary options (see Appendix C).

**Exploratory Spatial Analysis of Distance-to-College (RQ2, RQ3)**

Flow maps provide additional insights into descriptive findings of class-based differences in students’ spatial college-choice preferences. Operationalizing high school
location as the origin point and college location as the destination point, flow lines visually link each high school and college dyad (flow direction is not presented to preserve visual clarity). Flow lines are color-coded by distance band (e.g., less than 25 miles, greater than 150 miles) and their length is proportional to high school-to-college spherical distance. To facilitate interpretation, corresponding bar charts display the proportion of college choices falling within specified distance bands.

Figure 3 displays the implied geographic mobility patterns of college-intending high school juniors from the lowest-SES quintile background. Distance to aspirational college choice, as binned in the corresponding bar chart, shows comparable proportions (30.6 percent and 33.5 percent) of the lowest-SES students choosing geographically near (less than 25 miles) and far (greater than 150 miles) college choices. The flow map visually suggests regional variation in distance to aspirational college choice, with short- and medium-range flow lines in the Southeast and Midwest regions and longer-range flow lines between major metropolitan areas on the coasts, including Southern California and the San Francisco Bay Area on the West Coast and New York City and Boston on the East Coast.
Figure 3. Distance to aspirational college choice among college-intending high school juniors, lowest-SES quintile: Spring 2012

Notes: SES = socioeconomic status. Visualized origin-destination flow lines are not weighted, but rather reflect individual records in the HSLS:09 student data file that indicated a college choice (variable S2CHOICECLGID). Bar chart proportions are weighted using W2STUDENT base weight. Percent totals may not sum to 100 due to rounding.
Sources: U.S. Department of Education, National Center for Education Statistics, High School Longitudinal Study of 2009 (HSLS:09); Integrated Postsecondary Education Data System (IPEDS); Common Core of Data (CCD); Private School Universe Survey (PSS). Author’s analysis.

Compared to their lowest-SES peers (Figure 3), the highest-SES students’ aspirational college choices imply greater geographic mobility (Figure 4). Approximately one-half (47.7 percent) of college-intending high school juniors from the highest-SES quintile group aspire to attend a postsecondary institution greater than 150 miles from their high schools. The corresponding flow map displays geographic hyperactivity with
clusters of long-range flow lines between major American cities including Seattle, San Francisco, Los Angeles, Boston, and Miami, among others. By contrast, relatively few students (15.8 percent) from the highest-SES quintile background aspire to attend local postsecondary options (visualized as short red lines).

Figure 4. Distance to aspirational college choice among college-intending high school juniors, highest-SES quintile: Spring 2012

Notes: SES = socioeconomic status. Visualized origin-destination flow lines are not weighted, but rather reflect individual records in the HSLS:09 student data file that indicated a college choice (variable S2CHOICECLGID). Bar chart proportions are weighted using W2STUDENT base weight. Proportion totals may not sum to 100 due to rounding.
Sources: U.S. Department of Education, National Center for Education Statistics, High School Longitudinal Study of 2009 (HSLS:09); Integrated Postsecondary Education Data System (IPEDS); Common Core of Data (CCD); Private School Universe Survey (PSS). Author’s analysis.
At the college enrollment stage, students’ realized geographic mobility patterns are more localized than at the aspirational stage, particularly those from lower-SES backgrounds. Figure 5 displays the hyperlocal college enrollment choices among college-going high school completers from the lowest-SES quintile (visualized as myriad dark red staccato lines). Approximately three-fifths (62.0 percent) of college-going students from the lowest-SES quintile enrolled in a postsecondary institution within 25 miles from their respective high schools. The relatively few students who traveled longer distances to their enrolled colleges stand out as geographic outliers (visualized as sparse light green lines). Only approximately 13 percent of the lowest-SES students traveled more than 100 miles from their respective high schools to attend college.

Figure 5. Distance to self-reported enrolled college choice among college-going high school completers, lowest-SES quintile: Fall 2013

Notes: SES = socioeconomic status. Visualized origin-destination flow lines are not weighted, but rather reflect individual records in the HSLS:09 student data file that
indicated a college choice (variable S3CLGID). Bar chart proportions are weighted using W3W2STU base weight. Proportion totals may not sum to 100 due to rounding. Source: U.S. Department of Education, National Center for Education Statistics, High School Longitudinal Study of 2009 (HSLS:09); Integrated Postsecondary Education Data System (IPEDS); Common Core of Data (CCD); Private School Universe Survey (PSS). Author’s analysis.

While students from the highest-SES quintile exhibited less geographic mobility at the enrollment stage than at the aspirational stage, they exercised greater geographic mobility than their lowest-SES peers (Figure 5). Figure 6 displays high school-to-college flows among the highest-SES students. At the enrollment stage, their spatial college choices are visually balanced with a mix of farther distances (green lines) and short distances (red and yellow lines). Distance to self-reported enrolled college choice, as binned in the corresponding bar chart, reveals equivalent shares (30.5 percent) of the students enrolling in geographically near (less than 25 miles) and far (greater than 150 miles) postsecondary institutions.
Figure 6. Distance to self-reported enrolled college choice among college-going high school completers, highest-SES quintile: Fall 2013

Notes: SES = socioeconomic status. Visualized origin-destination flow lines are not weighted, but rather reflect individual records in the HSLS:09 student data file that indicated a college choice (variable S3CLGID). Bar chart proportions are weighted using W3W2STU base weight. Proportion totals may not sum to 100 due to rounding.
Sources: U.S. Department of Education, National Center for Education Statistics, High School Longitudinal Study of 2009 (HSLS:09); Integrated Postsecondary Education Data System (IPEDS); Common Core of Data (CCD); Private School Universe Survey (PSS). Author’s analysis.

Limiting analytic samples to students who selected four-year postsecondary options (87.5 percent of college-intending students and 62.2 percent of self-reported college-goers), class-based differences remain but are less pronounced due to removing two-year postsecondary options (with uniformly short distance-to-college) that disproportionally enroll students from lower-SES backgrounds. Among college-intending
students, 80.4 percent of students from the lowest-SES quintile and 94.0 percent from the highest-SES quintile aspired to attend four-year postsecondary institutions. At the college-enrolment stage, class-based differences widened, with 41.4 percent of college-goers from the lowest-SES quintile and 81.1 percent of college-goers from the highest-SES quintile enrolling in four-year postsecondary institutions.

Figure 7 displays the implied geographic mobility patterns of college-intending high school juniors from the lowest-SES quintile background who aspired to attend a four-year postsecondary institution. Approximately one-quarter (24.4 percent) selected a four-year college located within 25 miles from their respective high schools and a plurality (39.4 percent) selected a four-year college greater than 150 miles away.
Figure 7. Distance to aspirational four-year college choice among college-intending high school juniors, lowest-SES quintile: Spring 2012

Notes: SES = socioeconomic status. Visualized origin-destination flow lines are not weighted, but rather reflect individuals in the HSLS:09 student data file that indicated a college choice (variable S2CHOICECLGID). Bar chart proportions are weighted using W2STUDENT base weight. Proportion totals may not sum to 100 due to rounding.
Sources: U.S. Department of Education, National Center for Education Statistics, High School Longitudinal Study of 2009 (HSLS:09); Integrated Postsecondary Education Data System (IPEDS); Common Core of Data (CCD); Private School Universe Survey (PSS). Author’s analysis.

Figure 8, reflecting college-intending students from the highest-SES quintile group who selected a four-year college, largely mirrors Figure 4 (as only 6 percent of the highest-SES students aspired to attend a less-than-four-year postsecondary institution). Compared to their lowest-SES peers who aspired to attend a four-year college (Figure 7), the highest-SES students (Figure 8) generally aspired to attend more geographically
distant four-year college options. Approximately one-half (49.4 percent) aspired to attend a four-year college greater than 150 miles away from their respective high schools. By contrast, only 13.3 percent of the highest-SES students aspired to attend a four-year college within 25 miles.

Figure 8. Distance to aspirational four-year college choice among college-intending high school juniors, highest-SES quintile: Spring 2012

Notes: SES = socioeconomic status. Visualized origin-destination flow lines are not weighted, but rather reflect individuals in the HSLS:09 student data file that indicated a college choice (variable S2CHOICECLGID). Bar chart proportions are weighted using W2STUDENT base weight. Proportion totals may not sum to 100 due to rounding.
Source: U.S. Department of Education, National Center for Education Statistics, High School Longitudinal Study of 2009 (HSLS:09); Integrated Postsecondary Education Data System (IPEDS); Common Core of Data (CCD); Private School Universe Survey (PSS). Author’s analysis.
Class-based differences in realized geographic mobility patterns remain among high school completers who enrolled in four-year colleges (i.e., after excluding short-range two-year enrollments that shift downward lower-SES students’ overall distance-to-college estimates). Figure 9 reinforces the observed hyperlocal college enrollment choices among students from the lowest-SES quintile. Among low-SES students who enrolled in a four-year postsecondary institution, more than two-fifths (42.4 percent) traveled less than 25 miles from their respective high schools to attend college. By contrast, fewer than one-fifth (18.4 percent) traveled more than 150 miles to attend a four-year college.

Figure 9. Distance to self-reported enrolled four-year college choice among college-going high school completers, lowest-SES quintile: Fall 2013

Notes: SES = socioeconomic status. Visualized origin-destination flow lines are not weighted, but rather reflect individuals in the HSLS:09 student data file that indicated a college choice (variable S3CLGID). Bar chart proportions are weighted using W3W2STU base weight. Proportion totals may not sum to 100 due to rounding.
Sources: U.S. Department of Education, National Center for Education Statistics, High School Longitudinal Study of 2009 (HSLS:09); Integrated Postsecondary Education Data System (IPEDS); Common Core of Data (CCD); Private School Universe Survey (PSS). Author’s analysis.

Figure 10 displays high school-to-college flows among the highest-SES students who enrolled in a four-year college. While their realized geographic mobility is relatively more localized at the enrollment stage than at the aspirational stage (Figure 8), the highest-SES four-year enrollees still demonstrated greater geographic mobility than their lowest-SES peers (Figure 9). Among the highest-SES four-year enrollees, a plurality (36.1 percent) attended a college more than 150 miles away from their respective high schools, whereas approximately one-fifth (19.5 percent) attended a college within 25 miles.
Figure 10. Distance to self-reported enrolled four-year college choice among college-going high school completers, highest-SES quintile: Fall 2013

Sources: SES = socioeconomic status. U.S. Department of Education, National Center for Education Statistics, High School Longitudinal Study of 2009 (HSLS:09); Integrated Postsecondary Education Data System (IPEDS); Common Core of Data (CCD); Private School Universe Survey (PSS). Author’s analysis.

Notes: Visualized origin-destination flow lines are not weighted, but rather reflect individuals in the HSLS:09 student data file that indicated a college choice (variable S3CLGID). Bar chart proportions are weighted using W3W2STU base weight. Proportion totals may not sum to 100 due to rounding.

Multiple Linear Regression Analysis of Distance-to-College (RQ2, RQ3)

Multiple linear regression analyses reveal a strong association between socioeconomic status (primary independent variable) and distance-to-college (log-transformed dependent variable) even after controlling for other key covariates. Table 7 presents multiple linear regression coefficient estimates for predictors of distance-to-
college for college-intending high school juniors’ aspirational college choices, for all choosers and disaggregated by institutional level (i.e., four-year vs. two-year colleges). Regression coefficients are exponentiated for ease of interpretation allowing them to be understood as the percentage increase/decrease in high school-to-college distance associated with a one unit increase in the predictor variable, holding all other covariates constant.

Among the cohort of U.S. ninth-graders in 2009 who were college-intending in spring 2012, socioeconomic status (variable X4X2SES) was a statistically significant ($p < 0.001$) positive predictor of distance-to-college. Net of other factors, a one standard deviation increase in SES was associated with a 27.6% increase in distance to aspirational college choice. Academic achievement also was a statistically significant ($p < 0.001$) positive predictor, but smaller in magnitude. A one standard deviation increase on a norm-referenced algebra assessment was associated with a 3.1% increase in distance to aspirational college.

Students from different racial/ethnic backgrounds and rurality exhibited variation in their aspirational spatial college-choice preferences. Asian, non-Hispanic and Hispanic (any race) students aspired to attend colleges that were 41.7% and 19.3% closer to their high schools, compared to their White, non-Hispanic peers. By contrast, Black/African American, non-Hispanic students aspired to attend colleges at greater distances (28.3% farther, on average) compared to their White, non-Hispanic peers. In addition, rural students aspired to attend colleges that were 21.3% farther, on average, compared to their non-rural peers.
Table 7. OLS regression estimates (exponentiated): Predictors of distance to aspirational college choice among college-intending high school juniors: Spring 2012

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All college choices</td>
<td>4-year college choices</td>
<td>2-year college choices</td>
</tr>
<tr>
<td>SES Composite</td>
<td>1.276***</td>
<td>1.246***</td>
<td>1.073</td>
</tr>
<tr>
<td></td>
<td>(0.05)</td>
<td>(0.05)</td>
<td>(0.19)</td>
</tr>
<tr>
<td>Mathematics Achievement</td>
<td>1.031***</td>
<td>1.020***</td>
<td>1.005</td>
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<tr>
<td></td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.01)</td>
</tr>
<tr>
<td>Race/Ethnicity (ref: White, NH)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Asian, NH</td>
<td>0.583**</td>
<td>0.535**</td>
<td>1.808</td>
</tr>
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<td></td>
<td>(0.11)</td>
<td>(0.11)</td>
<td>(1.01)</td>
</tr>
<tr>
<td>Black/Afr.-Amer., NH</td>
<td>1.283*</td>
<td>1.270*</td>
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<td>(0.15)</td>
<td>(0.15)</td>
<td>(0.21)</td>
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<tr>
<td>Hispanic, any race</td>
<td>0.807*</td>
<td>0.836</td>
<td>0.693</td>
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<td>(0.08)</td>
<td>(0.10)</td>
<td>(0.19)</td>
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<tr>
<td>Other, NH</td>
<td>1.573***</td>
<td>1.599***</td>
<td>1.128</td>
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<td>(0.18)</td>
<td>(0.18)</td>
<td>(0.32)</td>
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<tr>
<td>Female (ref: Male)</td>
<td>0.979</td>
<td>1.008</td>
<td>0.645*</td>
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<td>(0.06)</td>
<td>(0.07)</td>
<td>(0.11)</td>
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<tr>
<td>Rural (ref: Non-Rural)</td>
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<td>1.134</td>
<td>2.615***</td>
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<td>(0.08)</td>
<td>(0.08)</td>
<td>(0.45)</td>
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<td>Constant</td>
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<td>33.976***</td>
<td>15.494***</td>
</tr>
<tr>
<td></td>
<td>(3.33)</td>
<td>(8.02)</td>
<td>(8.99)</td>
</tr>
</tbody>
</table>

Observations       | 13,520    | 8,170     | 900       |
Population Size     | 1,757,096 | 1,535,640 | 201,890   |
Adjusted $R^2$      | 0.062     | 0.045     | 0.109     |

Notes: SES = socioeconomic status. NH = Non-Hispanic. Regression coefficients and standard errors are presented in exponentiated form (i.e., ‘eform’ option in Stata) because the dependent variable (i.e., distance-to-college) was log transformed prior to model estimation. Coefficients can be interpreted as the relative percent change in distance-to-college. BRR standard errors in parentheses. Models are weighted using variable W2STUDENT. Race category "Other, NH" includes Amer. Indian/Alaskan Native, Native Hawaiian/Pacific Islander, and multiracial. Unweighted sample size numbers are rounded to the nearest ten to comply with NCES restricted-use data security protocol.

* $p<0.05$ ** $p<0.01$ *** $p<0.001$

Restricting the analytic sample to students who aspired to attend four-year colleges (Model 2) yielded similar results to the full analytic sample (Model 1), unsurprising given that most (87.2 percent) of college-intending students aspired to attend four-year colleges. Among four-year college aspirants, those from higher-SES backgrounds and those who demonstrated higher academic achievement desired to attend colleges at greater distances compared to their peers from lower-SES backgrounds and with lower academic achievement, respectively. Similar relationships among students from different racial/ethnic backgrounds and rurality were also observed between the full and four-year analytic samples. Compared to White, non-Hispanic students, Asian, non-Hispanic students aspired to attend four-year colleges that were geographically closer, whereas Black/African-American, non-Hispanic students selected four-year colleges that were geographically farther away. Rural students selected four-year colleges that were at greater distances (13.4% farther, on average) compared to non-rural students, but the regression coefficient was not statistically different ($p > 0.05$) among the four-year analytic sample.

Restricting the analytic sample to students who aspired to attend two-year colleges (Model 3) yielded markedly different results from the full and four-year analytic samples (Models 1 and 2). For context, only a small share (11.7 percent) of college-intending students aspired to attend two-year postsecondary institutions. Students’ SES, academic achievement, and race/ethnicity were not statistically significant ($p > 0.05$) predictors of distance-to-college among two-year college aspirants. The lack of statistically significant predictive ability of SES and academic achievement for distance-to-college is likely related to the hyperlocal nature of two-year college choice (e.g., Ovink & Kalogrides, 2015; Somers et al., 2006). For example, among college-intending
students who aspired to attend a two-year postsecondary institution, the median high school-to-college distance was just 14 miles with minimal variation.

Among two-year college aspirants, women were more likely than men to choose geographically closer postsecondary institutions (35.5% closer, on average). And rural students were more likely than non-rural students to choose geographically farther two-year colleges, typically more than twice the distance. Despite the seemingly large differential in distance-to-college among women and rural students compared to men and non-rural students, respectively, the median distance to aspirational two-year colleges (public and private institutional controls) was only 14 miles. Therefore, relative differences in distance to two-year college choice translate into practically short distances. Rural students’ choosing geographically farther colleges is likely related to the spatial distribution of U.S. postsecondary institutions, with rural communities having a limited number of geographically proximal postsecondary options (Burke et al., 2015; Hillman, 2016; Klasik et al., 2018; McDonough et al., 2010).

Replicating multiple linear regression analyses on the cohort of U.S. ninth-graders in 2009 who self-reported postsecondary enrollment by fall 2013 (Table 8) yielded largely similar results to the cohort of college-intending students in spring 2012 (Table 7). Among college-goers, socioeconomic status remained a statistically significant ($p < 0.001$) positive predictor of distance-to-college. Net of other factors, a one standard deviation increase in SES was associated with a 52.5% increase in distance to enrolled college choice. Mathematics achievement also remained a statistically significant ($p < 0.001$) positive predictor, though smaller in magnitude. A one standard deviation increase in mathematics achievement was associated with a 4.3% increase in distance-to-college.
Examining racial/ethnic group differences, Asian, non-Hispanic students travelled shorter distances ($p < 0.01$) to their enrolled college choices compared to White, non-
Hispanic students (41.3% closer, on average). Asian students’ geographically closer
college destinations are likely influenced by their espoused preferences to remain living
at home during college (Ovink & Kalogrides, 2015). Prior descriptive research also finds
a similar Asian/White differential in distance-to-college (Mattern & Wyatt, 2009). Among
all college-goers, those from rural communities traveled greater distances to attend
college (58.1% farther, on average) compared to their non-rural peers, after controlling
for other covariates in the model.

Table 8. OLS regression estimates (exponentiated): Predictors of distance to self-
reported enrolled college choice among college-going high school completers: Fall 2013

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Model 1 All College Choices</th>
<th>Model 2 4-year College Choices</th>
<th>Model 3 2-year College Choices</th>
</tr>
</thead>
<tbody>
<tr>
<td>SES Composite</td>
<td>1.525***</td>
<td>1.437***</td>
<td>1.062</td>
</tr>
<tr>
<td>Mathematics Achievement</td>
<td>1.043***</td>
<td>1.027***</td>
<td>0.996</td>
</tr>
<tr>
<td>Race/Ethnicity (ref: White, NH)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian, NH</td>
<td>0.583***</td>
<td>0.602***</td>
<td>0.625*</td>
</tr>
<tr>
<td>Black/Afr.-Amer., NH</td>
<td>1.118</td>
<td>1.241</td>
<td>0.643*</td>
</tr>
<tr>
<td>Hispanic, any race</td>
<td>0.812*</td>
<td>0.972</td>
<td>0.785</td>
</tr>
<tr>
<td>Other, NH</td>
<td>0.896</td>
<td>0.959</td>
<td>0.903</td>
</tr>
<tr>
<td>Female (ref: Male)</td>
<td>1.029</td>
<td>1.011</td>
<td>0.872</td>
</tr>
<tr>
<td>Rural (ref: Non-Rural)</td>
<td>1.581***</td>
<td>1.223*</td>
<td>2.529***</td>
</tr>
<tr>
<td>Constant</td>
<td>2.856***</td>
<td>11.418***</td>
<td>13.040***</td>
</tr>
</tbody>
</table>

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$
Observations 15,960  9,210  4,000
Population Size 2,733,386  1,710,870  992,032
Adjusted R² 0.128  0.065  0.094

Notes: SES = socioeconomic status. NH = Non-Hispanic. Regression coefficients and standard errors are presented in exponentiated form (i.e., ‘eform’ option in Stata) because the dependent variable (i.e., distance-to-college) was log transformed prior to model estimation. Coefficients can be interpreted as the relative percent change in distance-to-college. BRR standard errors in parentheses. Models are weighted using variable W3W2STUTR. Race category "Other, NH" includes Amer. Indian/Alaskan Native, Native Hawaiian/Pacific Islander, and multiracial. Unweighted sample size numbers are rounded to the nearest ten to comply with NCES restricted-use data security protocol.

* p < 0.05 ** p < 0.01 *** p < 0.001

Restricting the analytic sample to students who enrolled in four-year colleges (Model 2) yielded largely similar results to the full analytic sample (Model 1). A majority (61.2 percent) of U.S. ninth-graders in 2009 who pursued postsecondary education by fall 2013 selected a four-year college. Net of other covariates, students from higher-SES backgrounds and who demonstrated higher mathematics achievement were significantly more likely (p < 0.001) to travel farther distances to their enrolled college choices compared to students from lower-SES backgrounds and with lower academic achievement, respectively. Among four-year college enrollees, Asian, non-Hispanic students selected geographically closer colleges (39.8% closer, on average) compared to their White, non-Hispanic peers. And rural students traveled farther than non-rural students to attend four-year colleges.

Restricting the analytic sample to college-goers who self-reported enrollment in the two-year sector (36.8 percent of all college-goers) finds that students’ SES and mathematics achievement were not statistically significant (p > 0.05) predictors of distance-to-college (a similar finding for college-intending students; see Table 7). In contrast to the full and four-year analytic samples (Models 1 and 2), SES and
mathematics achievement were unrelated to distance-to-college among two-year college-goers (Model 3), net of other variables. That SES and mathematics achievement do not predict distance-to-college among two-year enrollees is likely related to the hyperlocal enrollment within the sector (i.e., minimal variation of the dependent variable). For example, the median distance-to-college for two-year enrollees was 10 miles, and median distances by SES quintile background varied between 9 and 11 miles.

Among two-year college enrollees, Asian, non-Hispanic and Black/African American, non-Hispanic students traveled significantly ($p < 0.05$) shorter distances (37.5% and 35.7% closer, on average) than their White, non-Hispanic peers. And rural college-goers attending two-year colleges were likely to travel more than twice as far, on average, compared to non-rural college-goers, net of other factors.

Even though college-intending and college-going students reflect different student cohorts at different stages of the longitudinal college-going process (and therefore are not directly comparable), regression estimates across analytic samples are largely consistent. Socioeconomic status is a significant positive predictor of distance-to-college, overall and among four-year college choosers, at both the college-intending and college-enrollment stages. However, some differences in regression estimates between analytic samples were observed. The magnitude of model coefficients was generally larger at the enrollment stage than the aspirational stage, suggesting greater influence on distance-to-college at the time of enrollment. For example, at the college-intending stage, a one standard deviation increase in students’ SES was associated with a 27.6% increase in distance-to-college, whereas at the college-enrollment stage the same one unit increase was associated with a 52.5% increase in distance-to-college. This difference in magnitude suggests that students’ social class standing is a stronger determinant of their realized than aspirational college choices. Students’ aspirational
spatial college choices appear less geographically constrained by their social class standing. By contrast, college enrollment appears to be more geographically constrained, overall and at four-year institutions, particularly for students from lower-SES backgrounds.

When comparing the adjusted R-squared values between the full analytic samples, multiple linear regression models held more explanatory power (i.e., larger R-squared values) at the college-enrollment stage than at the college-intending stage. For example, the same model specification yielded an adjusted R-squared value of 0.06 among college-intending students (Table 7, Model 1) and a value of 0.13 among students who self-report postsecondary enrollment (Table 8, Model 1). The regression models likely hold more predictive power at the enrollment stage, in part, because of reduced variation in distance-to-college (i.e., more localized enrollments than aspirational college choices). For example, at the college-intending stage students’ spatial college choices were geographically more ambitious and varied (see Figures 1 and 2), making model prediction more difficult.

**Conditional Logit Analysis of College Choice Among Alternatives (RQ4)**

Results from conditional logit analyses provide additional understanding of the relationship between an institution’s spatial accessibility (i.e., geographic distance) and the likelihood of college choice among alternatives. This analytic approach reveals the institutional characteristics that drive students’ selecting their enrolled college among a set of alternatives (i.e., admitting institutions). Table 9 shows changes in the relationship between distance-to-college and probability of college choice among alternatives as additional predictors are included in the analyses. The coefficients are presented as odds ratios to ease interpretation.
Table 9. Conditional logit results (odds ratio): Predictors of college choice among college-going high school completers admitted to two or more postsecondary institutions: Fall 2013

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Spatial</td>
<td>+ Selectivity</td>
<td>+ Services</td>
<td>+ Price</td>
</tr>
<tr>
<td>Distance (miles) Log</td>
<td>0.799***</td>
<td>0.841***</td>
<td>0.838***</td>
<td>0.828***</td>
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<tr>
<td></td>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.02)</td>
<td>(0.02)</td>
</tr>
<tr>
<td>SES X Distance (miles) Log</td>
<td>1.118***</td>
<td>1.089***</td>
<td>1.092***</td>
<td>1.102***</td>
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<td></td>
<td>(0.02)</td>
<td>(0.02)</td>
<td>(0.02)</td>
<td>(0.02)</td>
</tr>
<tr>
<td>In-State (ref: Out-of-State)</td>
<td>1.255***</td>
<td>1.285***</td>
<td>1.240***</td>
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<td>(0.07)</td>
<td>(0.07)</td>
<td>(0.07)</td>
<td>(0.06)</td>
</tr>
<tr>
<td>Barron’s Selectivity</td>
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<tr>
<td>(ref: Most Competitive/Special)</td>
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<tr>
<td>Highly Competitive</td>
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<td></td>
<td>0.788**</td>
<td>0.763**</td>
<td>0.717***</td>
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<td>Very Competitive</td>
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<td>0.696***</td>
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<tr>
<td>Competitive</td>
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<td>(0.07)</td>
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<tr>
<td>Less Comptv./Noncomptv./Not Rated</td>
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<td>0.944</td>
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<td>Special Focus Institution (Carnegie Basic)</td>
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<td>0.831</td>
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<td>(0.16)</td>
<td>(0.17)</td>
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<td>Less-than-4-year (ref: 4-year)</td>
<td>1.994***</td>
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<td></td>
<td>(0.17)</td>
<td>(0.20)</td>
<td>(0.18)</td>
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<td>Instructional Expnd. per FTE (per $1K)</td>
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<td></td>
<td>1.004</td>
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<td>1.008*</td>
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<td>Academic Supp. Expnd. per FTE (per $1K)</td>
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<td>0.990</td>
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<td>Student Services Expnd. per FTE (per $1K)</td>
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<td>1.055***</td>
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<td>(0.02)</td>
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<tr>
<td>Tuition and Required Fees (per $1K)</td>
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<td>13,490</td>
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<tr>
<td>Likelihood Ratio χ²</td>
<td>302.66</td>
<td>517.00</td>
<td>452.41</td>
<td>558.46</td>
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</tbody>
</table>
Model 1, a parsimonious model with only spatial variables as predictors (i.e., distance-to-college (natural log), the interaction of distance with SES, and an indicator for in-state college), provides baseline estimates on distance effects for student college choice. The statistically significant \( p < 0.001 \) coefficient for distance indicates that a one log unit increase in distance-to-college reduces the odds of college choice among alternatives by 20.1%. The statistically significant \( p < 0.001 \) interaction term between distance and SES suggests a differential distance effect for students from varying social-class backgrounds. Distance is a less negative predictor of college choice for college-goers from higher-SES backgrounds, but carries a more negative effect on college choice for students from lower-SES backgrounds. (See Appendix D for descriptive analysis of median distance-to-college by students’ SES quintile background and binary college choice indicator.) The statistically significant \( p < 0.001 \) coefficient greater than 1 suggests that college-goers are more likely to choose in-state over out-of-state postsecondary institutions from among the institutions that offer admission. A college’s same-state location relative to the chooser increases the odds of enrolled college choice by 25.5%, net of distance-to-college. Among the 6,020 unique college choosers in the analytic dataset, 2,160 (35.8 percent) had the choice between both in- and out-of-state
postsecondary options. The remaining 3,860 (64.2 percent) college choosers were admitted exclusively to either in-state or out-of-state institutions.

Model 2 extends Model 1 by including measures of institutional selectivity (operationalized by Barron’s Admissions Competitiveness Index ratings), specialized academic program offerings (operationalized by the Carnegie Basic Classification), and a binary indicator for institutional level (collapsed into either four-year or less-than-four-year postsecondary institution). The statistically significant coefficients less than 1 for the “Highly Competitive,” “Very Competitive,” and “Competitive” Barron’s ratings suggest that relative to the “Most Competitive” and “Special” four-year colleges (collapsed into a single category), students are more likely to choose the most selective option, conditional on admission, after controlling for distance and in- or out-of-state status. For context, 860 (14.4 percent) of the 6,020 unique college choosers in the analytic dataset were admitted into a four-year postsecondary institution rated “Most Competitive” or “Special” by Barron’s. Alternative model specifications with different reference categories for Barron’s selectivity ratings (not shown) yielded the same general conclusion: students were more like to choose more selective postsecondary institutions. Students were not more likely to choose a special focus institution (i.e., institutions with a high concentration of degrees is in a single field or set of related fields) over institutions with more varied academic offerings (i.e., non-special focus institutions). For context, only 190 (3.1 percent) of the 6,020 unique college choosers had a special focus institution within their choice sets. The statistically significant ($p < 0.001$) indicator for less-than-four-year postsecondary institution suggests that students are more likely to choose such institutions over four-year options conditional on their choice sets. For context, 1,010 (16.7 percent) of the 6,020 unique college choosers had both four-year and less-than-four-year postsecondary institutions in their choice sets.
Model 3 extends Model 2 by including expenditure variables (per full-time equivalent student) as proxies for institutional services and amenities. Net of other controls, instructional expenditures (e.g., faculty salary and benefits) do not affect students' odds of college choice among alternatives. By contrast, expenditures on academic supports and student services are marginally significant ($p < 0.05$) and reduce the odds of college choice by 1.2% and 2.9% for every $1,000 per-FTE increase. However, these estimated coefficients do not hold (either in significance or direction) under full model specification (Model 4) and therefore should be interpreted with caution during this intermediary step.

Model 4 reflects full model specification with the inclusion of sticker price. The statistically significant ($p < 0.001$) coefficient of less than 1 suggests that a $1,000 increase in the published tuition and fees reduces the odds of enrolled college choice by 2.8%. Holding price constant, in-state postsecondary options were no longer prioritized in the college-choice process (essentially promoting out-of-state college choice if price is equalized). This finding is perhaps unsurprising given differentiated tuition pricing at public colleges and universities based on residence status (College Board, 2019, Table 1). Also when controlling for price, the odds of college choice among alternatives increases 5.5% with each additional $1,000 per-student expenditure on student services (e.g., student activities, cultural events, intramural athletics, student organizations). Jacob and colleagues (2018) also find that U.S. students are more likely to choose colleges with greater spending on 'consumption amenities' even if such college options cost more.

Across all model specifications, distance-to-college and its interaction with SES remained significant predictors of college choice among alternatives, suggesting robust relationships with enrolled college choice even when controlling for selectivity,
institutional classifications, academic and campus amenities, and price. Spatial accessibility (or proximal distance-to-college) increases the probability of college choice among alternatives, with stronger effects for students from lower-SES backgrounds.
CHAPTER 5: CONCLUSIONS, DISCUSSION & FUTURE IMPLICATIONS

Student college choice is an inherently spatial process, with students and educational institutions embedded within geographic contexts (Hillman, 2016; Turley, 2009). Framing student college choice as aspatial ignores a critical component of how all students, particularly those from lower-SES backgrounds, make college-related decisions. Prior research finds that students hold spatial college-choice preferences (Ingels & Dalton, 2013), and this study finds that students from lower-SES backgrounds have stronger attitudes toward proximal college choices (i.e., a “close to home” disposition) compared to their higher-SES peers.

Descriptive, spatial, and regression analyses of derived distance-to-college measures reinforce attitudinal survey responses and find systematic class-based differences in students’ spatial college choices at both the aspirational and enrollment stages. Consistent with prior research (González Canché, 2017a; Mattern & Wyatt, 2009; Ovink & Kalogrides, 2015; Sallie Mae, 2016), students from lower-SES backgrounds tend to travel shorter distances to attend college (generally hyperlocal two-year options). This study contributes to the research literature by finding that among four-year college aspirants (most college-intending students), students from lower-SES backgrounds are more distance-sensitive relative to their higher-SES peers. Social class appears to be an influential force shaping aspirational college choice and an even stronger force at the college-enrollment stage when postsecondary destinations are more spatially stratified. McDonough (1997) offers that low-SES students hold “perceptions about geographical constraints . . . [that] delimit the area over which they cast their college choice net” (p. 146).

This study also finds sharp contrasts in distance-to-college by institutional level (e.g., two-year vs. four-year) and rurality. Among students who choose two-year college
options at both the aspirational and enrollment stages, distances are universally short (approximately 10 miles). Hyperlocal enrollment in the two-year sector is also found in prior research that utilizes nationally representative data (e.g., Ovink et al., 2017). Two-year colleges are geographically accessible postsecondary options and financially appealing for price-sensitive students, as they have relatively lower tuition rates than four-year options (College Board, 2019) and allow commuter students to live at home and eliminate room and board costs (Sallie Mae, 2016). However, the spatial and financial ‘convenience’ of selecting two-year colleges may be contributing to the observed social class stratification in the U.S. higher education system, as larger shares of students from lower than higher SES backgrounds typically enroll within this sector (Bastedo & Jaquette, 2011).

Regression analyses also find that students from rural communities typically aspire to attend and enroll in postsecondary institutions at greater distances than their non-rural counterparts, a finding supported by prior research on rural college choice (e.g., Burke et al., 2015). Students from rural communities may find it necessary to travel greater distances to pursue postsecondary education given the limited number of locally available options, particularly four-year colleges (Burke et al., 2015; Hillman, 2016; Koricich, 2014; McDonough et al., 2010). The spatial distribution of U.S. postsecondary institutions informs the mobility required of geographically isolated students to access college.

Conditional logit analyses of students admitted to more than one postsecondary institution find a negative distance effect on college choice among alternatives, a finding bolstered by a robust body of prior literature (Jacob et al., 2018; Kohn et al., 1976; Long, 2004; Orlovensky, 1995; Shah, 2014). Similarly, distance appears to have a larger negative effect on college choice for students from lower-SES backgrounds, a finding
also consistent with prior literature (Avery & Hoxby, 2004; Jacob et al., 2018; Long, 2004). Net of other factors, distance remains a deterrent to student college choice, particularly for lower-SES students, even after gaining admission.

Identifying the determinants of student college choice is critical for deconstructing the complex choice process and identifying ways to help students make postsecondary-related decisions that optimize their educational, social, and educational outcomes. This study centers on one component of student college choice: spatial preferences and behaviors.

For recent high school completers, a demographic that ostensibly has the greatest flexibility in making college choices, selecting a college for enrollment is a consequential decision. Initial enrollment in a four-year over two-year institution improves the likelihood of bachelor’s degree attainment (Goodman et al., 2015; Long & Kurlaender, 2009) and increases earnings among those who ultimately attain the same terminal degree (González Canché, 2017b). Colleges of varying selectivity or ‘quality’ also yield earnings differentials, benefitting those who attend more selective institutions (Black & Smith, 2006; Long, 2010; Ovink et al., 2017; Witteveen & Attewell, 2017). And one identified study (González Canché, 2017a) that examines the returns to college from a geographic perspective finds that four-year college-goers who select a college beyond their nearest 20 options improve their odds of bachelor’s degree attainment and average higher earnings compared to those who select geographically closer four-year options. Lower-SES students, who are especially distance- and price-sensitive, may select localized two-year college options that ultimately lead to suboptimal educational and economic outcomes.

In this study, analyses using different methodological approaches consistently find strong associations between students’ social class and their spatial college-choice
preferences and behaviors. Affective survey responses, empirically derived distance-to-college measures, visualized geographic mobility patterns, multiple linear regression, and conditional logit analysis all suggest class-based differences in U.S. high school students’ spatial college choices. Findings from this study hold implications for educational practitioners, administrators, and policymakers as well as for researchers to advance the study of spatial college choice.

**Implications for Practice and Policy**

Given that students hold spatial preferences when making college choices, it is important for practitioners and policymakers to consider the geographic dimension of student college choice. High school counselors and college access professionals, college enrollment managers and recruiters, and financial aid program developers and administrators can all shape students’ postsecondary opportunities. Educational practices and policies can serve to mitigate the geographic constraints students from lower-SES backgrounds face when choosing college.

**College Navigational Assistance.**

Findings from this study hold implications for how high school guidance counselors and college access professionals advise students on the college-choice process, while attending to their spatial attitudes and preferences. High schools as organizational structures frame students’ college aspirations and may even reinforce class-based differences in college destinations (McDonough, 1997). Within high schools, guidance counselors can play critical roles in fostering a college-going culture and providing students with information and navigational supports, including standardized test registration, college fairs, and admission and financial aid application assistance. Among U.S. high school graduates in 2013, approximately 78 percent self-reported having at least one individualized meeting with a high school counselor on the topic of
college admissions (Velez, 2017). However, the quality and quantity of college counseling varies widely across high schools due to large student caseloads and competing priorities on counselors' time (Perna et al., 2008). For example, in 2012 only two-fifths (40.0 percent) of U.S. high schools had a counselor whose primary responsibility was to assist students with college applications or college selection (Velez, 2017).

Due to high schools’ capacity constraints in providing adequate college navigational assistance, external college access programs (or pre-college outreach programs) can supplement high school supports, particularly for under-resourced high schools that serve socially or economically less advantaged students. Well-known federally sponsored college access programs include TRIO programs (e.g., Upward Bound, Talent Search) and Gaining Early Awareness and Readiness for Undergraduate Programs (GEAR UP), which specifically target low-income and first-generation-to-college students. Core activities of pre-college outreach programs include providing students with opportunities to gain college awareness and campus visits (Swail & Perna, 2001).

School guidance counselors and college access professionals can enhance college navigational assistance by adopting practices that situate college choice within a spatial context. For example, high school guidance counselors should broaden the geographic range of college options presented to students, particularly those from lower-SES backgrounds. And college access programs should provide college visits at no cost to participants to colleges and universities not immediately geographically accessible. As Golledge and Stimson (1997) conceptualize spatial choice, decision makers may activate a ‘mental map’ as a visual representation of choice options. If students’ perceived college options are geographically narrow, they may lack sufficient information
to make optimal college choices (e.g., undermatch). And qualitative research suggests that college visits are decisive factors in students’ enrollment decisions (McDonough, 1997).

In addition, college information resources that integrate spatial components could help expand students’ spatial awareness. Such resources could include the National Center for Education Statistics’ (NCES) College Navigator, a college-search tool that allows prospective students to filter postsecondary institutions by state, region, or ZIP Code and distance range (e.g., within 25 or 100 miles). NCES also provides College Map, an interactive web map that plots college locations and allows users to narrow searches by inputting an address, city or state name, or ZIP Code. Situating postsecondary options within a spatial context, the College Map tool allows users to visualize the spatial relationships among colleges, points of interest, and their residences. Presenting students with multiple college options, perhaps those beyond their immediately known geography, could allow them to consider a broader range of college options and optimize their college choices.

**Institutional Outreach and Recruitment.**

While this study examines spatial preferences and behaviors from the student perspective, findings also can inform outreach and recruitment practices from the institutional perspective. Recognizing that students, particularly those from lower-SES backgrounds, are spatially aware and distance-sensitive during the college-choice process, colleges and universities can adopt practices that affirmatively recruit geographically distant or isolated students who could stand to benefit from attendance.

Postsecondary institutions should make available outreach and recruitment activities for students from rural or geographically distant places. Texas A&M University, for example, arranges bus transportation for students and their parents from across the
state, often hundreds of miles away, to participate in on-campus recruitment activities (Pappano, 2017). McDonough and colleagues (2010) suggest that four-year institutions should partner with rural high schools to provide in-school college representatives who build new enrollment pathways to their institutions and alter entrenched two-year college enrollment patterns. Hoxby and Avery (2013) offer a range of recruitment practices that could counteract the negative effects of geographic distance and spatial isolation on college choice for academically high-achieving students: implementing a need-blind admission policy, visiting high schools that serve large shares of low-income students, building referral pathways with high school counselors, sponsoring campus visits, and targeting individualized student outreach. Less cost-prohibitive and scalable practices could include digital technologies. For example, the University of Missouri at Kansas City regularly hosts live webcasts with prospective students on topics such as financial aid and housing (Jaschik, 2020).

Some institutional sectors, especially selective colleges and universities, already actively recruit out-of-state or geographically diverse students. Han and colleagues (2019) analyzed the off-campus recruitment activities of 15 public research universities during the 2017–18 academic year that included “college fairs (in which multiple colleges attend), day-time high school visits, group travel visits, formal admissions interviews,” among other events (p. 11). Despite the financial resources allocated toward student recruitment, the researchers find that outreach focused mostly “on populous metropolitan areas, ignoring rural communities entirely” (Han et al., 2019, p. 17). Institutions should balance expanding geographic diversity with ensuring equitable access for students from lower-SES backgrounds. Research suggests, however, that increased nonresident enrollment at public research universities correlates with
decreased shares of underrepresented minority and low-income students at those institutions (Jaquette et al., 2016).

Colleges serving mostly “traditional-age” students that have yet to actively recruit nonresident or geographically distant students must contend with stagnating and even declining numbers of projected U.S. high school graduates after the mid-2020s (Bransberger & Michelau, 2016). Fertility rates and demographic shifts will impact the available pool of traditional-age college students as some institutions seek to shore up enrollment to remain financially viable. In modeling the anticipated demand for higher education, Grawe (2018) finds that “migratory forces nudging the population away from the Northeast and Pacific toward the South” (p. 11) may compel institutions to tap into new geographic markets to recruit students.

Colleges and universities should be mindful of students’ spatial preferences in the college-choice process, particularly for lower-SES students who are most distance-sensitive. By affirmatively recruiting rural and geographically diverse students, campuses can dismantle recruitment patterns that typically favor students from higher-SES backgrounds by extending college opportunity to those most in need. Postsecondary institutions should work to eliminate geographic constraints low-SES students already perceive and experience (McDonough, 1997) and not exacerbate such disparities through indifference or inattention.

**Student Financial Aid.**

While lower-SES students may aspire to attend more selective and geographically distant colleges, for many their aspirations are not realized at the enrollment stage when distance and cost become intertwined and a barrier to college choice. As outlined in this study’s conceptual framework, quantitative college-choice studies often substitute distance for cost, suggesting they are suitable proxies for each
other (e.g., Fuller et al., 1982; Jacob et al., 2018). And qualitative research suggests that high school students, particularly those from lower-SES backgrounds, are keenly aware of the financial implications of their spatial college choices: room and board cost savings by living at home (Sallie Mae, 2016), differentiated tuition based on state residency status (College Board, 2019), and travel costs (e.g., airfare) to return home during academic breaks (McDonough, 1997). Given that distance and cost are highly interrelated, postsecondary institutions, state higher education agencies, private scholarship funders, and other stakeholders should consider the implications of how their financial aid programs and policies affect the ability of the most distance- and price-sensitive students to fully exercise their spatial college choices.

Research suggests that financial aid programs and policies can influence students’ geographic mobility when choosing college. For example, a robust body of literature finds that state merit-based financial aid programs are effective at retaining academically high-achieving college-goers in their states of residence through financial incentives that deter out-of-state enrollment (e.g., Shah, 2014; Zhang & Ness; 2010). By contrast, states that participate in tuition reciprocity agreements through regional education compacts experience greater interstate student migration between member states (Medwick, 2010). Individual institutions also may craft financial aid policies to attract out-of-state students by reducing college costs for nonresidents. For example, the University of Arkansas offers the New Arkansan Non-Resident Tuition Award (NRTA), a merit-based scholarship for incoming freshmen from bordering states that covers up to 90 percent of the difference between in- and out-of-state tuition, and in 2017 expanded the program to include all 50 states and the District of Columbia with its ‘Extended States’ NRTA (University of Arkansas, 2019).
Institutions might induce greater geographic mobility by reducing college costs associated with out-of-state or spatially distant college choices, particularly for lower-SES students. Examples include packaging financial aid to include travel expenses for students who require airline travel to return home during academic breaks or tempering differentiated tuition rates based on residence status. Kane (2009) finds that the District of Columbia Tuition Assistance Grant Program (DCTAG), a tuition subsidy program for DC residents to attend any of more than 300 participating colleges nationwide, promotes college enrollment beyond the District, particularly in the Mid-Atlantic Region and even “more distant states” (p. 581). In their examination of “no-loan” financial aid policies at public flagship universities, Waddell and Singell (2011) find policy-adopting flagships expanded their “geographic basins of attraction” by enrolling low-income students from greater distances within their respective states (p. 204). And in their gravity model study of enrollment flows within University System of Georgia (USG) institutions, Alm and Winters (2009) find that receipt of the Georgia HOPE scholarship is positively associated with intrastate student geographic migration, suggesting that merit-based aid allowed Georgians to exercise greater geographic mobility even when they remained in the state.

Targeted financial aid programs may serve as a powerful tool to mitigate the geo-financial constraints students from lower-SES backgrounds face when making college choices, students who often redound to hyperlocal two-year college enrollment. Calibrating financial aid awards based on residence or distance-to-college can reduce students’ college costs and increase likelihood of choice. As an example, Spiess and Wrohlich (2010) highlight Germany’s grant aid system that considers parental income as well as “whether [students] have to leave their home to study or not” (p. 476) when determining award level.
Implications for Future Research

This study provides an in-depth exploration of U.S. high school students’ spatial college-choice preferences and behaviors using the most recent national data available. Additional methodological approaches and lines of inquiry can extend this study’s findings to generate greater insights into the phenomenon of spatial college choice.

Alternative Methodological Approaches for Understanding Spatial College Choice.

While this study builds on related studies that examine student college choice from a national perspective (e.g., Jacob et al., 2018; Long, 2004; Skinner, 2019), narrowing analyses to individual states could yield more actionable insights for state policymakers and public higher education systems. Given that states largely drive higher education policy within their boundaries and exist within unique historical, political, demographic, and geographic contexts (McLendon & Perna, 2006; Perna & Finney, 2014), understanding how college choice manifests under differing contexts could be valuable for identifying and addressing factors associated with variation in the college-choice process—spatial or otherwise.

A limited number of identified quantitative college-choice studies are bounded within a single state: Texas (Niu & Tienda, 2008), Georgia (Alm & Winters, 2009), and Indiana (Burke et al., 2015). While single-state studies are informative for one state or public higher education system, such studies vary in critical features such as time period, population, or methodological approach, which limits comparability. As McLendon and Perna (2014) assert: “Policy-makers and researchers stand to benefit most from scholarship that is inherently comparative, meaning that which draws on rigorous comparisons between and among states” (p. 11).
A unique feature of the HSLS:09 study is that the base-year sampling frame was augmented with sufficient numbers of public high schools to provide “state-representativeness estimates associated with public school students” in 10 select states including California, Florida, Georgia, and Texas, among others (Ingels et al., 2011, p. 59). Future research could disaggregate this study’s national perspective to generate state-level estimates, allowing for insights into spatial college choice within different state contexts.

This study also may be extended through additional methodological approaches not yet widely employed in the college-choice literature. While the conditional logit model is an appropriate—and predominant—method adopted by college-choice researchers (e.g., Avery & Hoxby, 2004; Jacob et al., 2018; Long, 2004; Niu & Tienda, 2008; Shah, 2014; Skinner, 2019), alternative methodological approaches have the potential to unearth greater insights, particularly into the multi-stage nature of the college-choice process.

For example, conditional logit analyses in this study utilize an analytic sample of high school completers who affirmatively select a college among their two or three most-considered college alternatives. For students who do not make a college choice through non-application or non-enrollment, researchers could assume distance-to-college is not derivable or set to zero. Alternative analytic methods beyond the conditional logit model can incorporate more than one process or specify choice in a sequential manner; such alternatives include the nested logit model or the hurdle model.

The nested logit model is an extension of the conditional logit model and similarly relies on a random utility framework to estimate probabilities of discrete choice. The nested logit model can be fit sequentially and allows for correlation across more than one choice process (Heis, 2002).
(Montgomery, 2002) adopts a nested logit approach to understand Master of Business Administration (MBA) program selection among Graduate Management Admission Test (GMAT) registrants. The college-choice process includes a two-part decision tree, with the first decision as attendance status (i.e., full-time, part-time, or non-enrollment) and the second decision as MBA program choice.

The hurdle model (McDowell, 2003) also provides a methodological alternative for understanding spatial college choice by including students who ostensibly travel zero distance by not pursuing postsecondary education. Hurdle models incorporate more than one equation for outcomes with bounded ranges. Applied to a college-choice scenario, the first model would estimate the process of “clearing the hurdle” of traveling greater than zero distance by choosing a college, and the second equation (with different predictors) estimates the determinants of distance-to-college conditional on having made a college choice. No identified quantitative college-choice study utilizes a hurdle model approach for estimating spatial college choice (i.e., distance-to-college).

**Conceptualizing Spatial College Choice and Measuring Spatial Accessibility.**

This study relies primarily on Perna’s (2006) model of student college choice for conceptual framing, but also integrates additional research (e.g., Griffith & Rothstein, 2009; Hillman, 2016; Turley, 2009) and frameworks (e.g., Golledge & Stimson, 1997) that advance college choice as a spatial process. While extant college-choice models include the concept of “location” (e.g., Chapman, 1981; Perna, 2006) as one institutional attribute students consider when making college choices, no available college-choice model asserts a decidedly spatial perspective. This conceptual omission in available college-choice models fails to fully characterize college choice as the spatial process this study and other literature suggest it to be. First, students and postsecondary institutions
exist within a spatial context which can manifest geographic disparities in postsecondary opportunity (Hillman, 2016; Klasik et al., 2018). Second, students hold spatial preferences (Ingels & Dalton, 2013) at varying stages of the college-going process that are influenced by social and economic forces (McDonough, 1997; Radford, 2013). Third, individuals’ perceptions of space and distance are subjective (Norman et al., 2005), and such idiosyncratic perceptions inform spatial decision making (Golledge & Stimson, 1997).

Research on student college choice could be enhanced with conceptual frameworks that elevate spatial context, preference, and perception as integral components of the college-choice process. Rios-Aguilar and Titus (2019) assert that “a more intentional and direct focus on geography and spatial inequality in postsecondary research can have relevance for how we view and serve students” (p. 6). Indeed, emerging theoretical literature on how the spatial distribution of U.S. postsecondary institutions leads to geographically situated college choice (Dache-Gerbino, 2018; Hillman, 2016, 2019; Iloh, 2018) could serve as the foundation for a more thoroughly integrated model of spatial college choice.

Beyond conceptualizing spatial college choice, practical consideration of how to measure concepts such as ‘distance’ and ‘spatial accessibility’ also are critical for advancing college-choice research. Bell (2009) offers that “geography as space is operationalized through variables such as distance, commute time, and the availability of transportation. It is measured in miles and minutes” (p. 495). Through case study research, McDonough (1997) finds that high school students perceive distance-to-college “not in miles, but in units of time” (p. 133).

Quantitative researchers too have adopted myriad conventions to operationalize distance and spatial accessibility: within the same geographic boundary (Card, 1995;
Do, 2004; Frenette, 2009; Hillman, 2016; Kling, 2001; Montgomery, 2002), within a radial distance range (Frenette, 2004, 2006; Griffith & Rothstein, 2009; Ovink et al., 2017; Turley, 2009), and continuous distance-based measures (Alm & Winters, 2009; Avery & Hoxby, 2004; Gibbons & Vignoles, 2012; Long, 2004; Niu et al., 2006; Ordovensky, 1995; Sá et al., 2004). Even within each general approach, spatial accessibility is measured in different ways. For example, boundary specifications include geographic units such as county (Do, 2004), commuting zone (Hillman, 2016), metropolitan area (Frenette, 2009), and region (Montgomery, 2002). Radial distance range specifications also vary in the literature: 12 and 24 miles depending on urbanicity (Turley, 2009), and 50 miles (Frenette, 2004, 2006; Ovink et al., 2017).

This study adopts the distance measure employed in most college-choice literature: straight-line or Euclidean distance (e.g., Long, 2004, Niu et al., 2006). While appealing for its computational simplicity, adopting a straight-line distance likely does not reflect how individuals interact with built environments to gain physical access to college destinations (Dache-Gerbino, 2014; Jones et al., 2010), and researchers openly acknowledge this limitation (e.g., Kohn et al., 1976).

Responding to this limitation, a handful of studies in other national contexts have utilized network (or travel path) distance to more accurately reflect mobility (Cullinan et al., 2013; Kjellström & Regnér, 1999; Walsh et al., 2015). Empirical research finds that Euclidian and network distances are generally highly correlated but not interchangeable measures, especially across degrees of urbanicity and at longer distances (Apparicio et al., 2008; Cubukcu & Taha, 2016). Two identified studies in other national contexts (Falch et al., 2013; Kjellström & Regnér, 1999) utilize travel time to measure distance effects on secondary attainment in Norway and college enrollment in Sweden.
respectively. No identified quantitative college-choice study in the U.S. context incorporates measures of spatial accessibility beyond straight-line distance.

Adopting and comparing alternative measures for ‘distance’ and ‘spatial accessibility’ can build empirical understanding of the range and variability of spatial influences on student college choice. For example, alternative spatial measures and constructs beyond straight-line distance could provide greater insights into how transportation and temporal constraints interact with geographic mobility and college choice (Dache-Gerbino, 2014).

**Understanding College Choice Sets.**

The HSLS:09 study is a valuable data source for studying U.S. student college choice, yet it remains limited in the scope and number of spatially-related survey items and recorded college choices it provides. To further advance the study of spatial college choice, additional data elements through a variety of means should be collected.

Future data collections (survey or otherwise) should collect a greater number of postsecondary options students consider; HSLS:09 limits self-reported enrolled college choices to a maximum of three. Given that college choice is conditioned on the choice set, identifying the full range of college options considered (most of which are ultimately rejected) may yield greater insights into students’ choice process. Additional information on students’ _true_ choice sets (over imputed or hypothesized choice sets, which is common in the literature) could lead researchers to better understand how students construct their perceived postsecondary options. For example, popular college guides advise students to consider a range of options that include “dream,” “target,” and “safety” schools (Franek, n.d.). Understanding the composition and likelihood of admission of students’ college choice sets could offer additional evidence about class-based
differences in the college-choice process and pinpoint a critical element in student-institution match.

Hossler and Gallagher (1987) conceptualize student college choice as a sequential process, and the HSLS:09 study captures the temporal dimension to students’ college-going dispositions and behaviors. This study’s findings suggest that students’ spatial preferences and behaviors vary over time, generally becoming more acute at the enrollment stage. Given that student college choice is a longitudinal process, greater attention to students’ shifting attitudes, preferences, and behaviors should be considered in future research. Understanding how students’ college choice sets vary at critical points in the college-going process (e.g., aspiration, application, enrollment) could provide insights into how decision-making changes over time and illustrate the factors that allow only some students to realize their aspirational college choices.

Collecting information on the full range of students’ college choice sets could be achieved through a variety of means. For example, stated preference experiments (Hainmueller et al., 2015) in which students are presented with a menu of college options and asked to select or rank their preferred choices could reveal their true attitudes and preferences, even if barriers prevent them from realizing their desired enrollment destinations. In addition, studies that adopt qualitative methodologies (e.g., case study, ethnography) could provide more nuanced understanding of students’ perceptions, values, and decision-making processes as they relate to spatial college choice. While extant qualitative college-choice studies (e.g., McDonough, 1997; Radford, 2013) provide rich insights into how students from different social-class backgrounds understand and make college choices, such studies may have limited transferability to diverse and contemporary U.S. college-goers.
Concluding Note

This study contributes to the literature by framing student college choice through a spatial lens to understand how spatial accessibility, or geographic distance, shapes idealized and realized postsecondary destinations. This study also augments longstanding college-choice frameworks (e.g., Chapman, 1981; Perna, 2006) with a deep body of literature across academic disciplines that theorizes and empirically demonstrates the spatial dimension of the college-choice process. This study finds that for students from lower-SES backgrounds, college choice is a geographically constrained ‘choice’. Positing college choice as an inherently spatial process more completely reflects students’ espoused attitudes and observed behaviors when choosing college. Through additional empirical research, theory building, and embedding spatial considerations in college access practices and policies, stakeholders can ensure that students from lower-SES backgrounds have the same opportunities to exercise the full range of geographic choices as their higher-SES peers. Geography should not be destiny.
## APPENDICES

### Appendix A

**College Choice by Institutional Level and Student SES Quintile**

Table A1. Proportion of college-intending high school juniors’ aspirational college choice, by institutional level and student SES quintile: Spring 2012

<table>
<thead>
<tr>
<th>SES Quintile</th>
<th>4-year PSI</th>
<th>2-year PSI</th>
<th>Less-than-2-year PSI</th>
<th>Unknown Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>First (lowest)</td>
<td>0.804</td>
<td>0.179</td>
<td>0.008†</td>
<td>0.008†</td>
</tr>
<tr>
<td></td>
<td>(0.020)</td>
<td>(0.020)</td>
<td>(0.004)</td>
<td>(0.003)</td>
</tr>
<tr>
<td>Second</td>
<td>0.832</td>
<td>0.160</td>
<td>0.007†</td>
<td>0.002††</td>
</tr>
<tr>
<td></td>
<td>(0.019)</td>
<td>(0.019)</td>
<td>(0.002)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Third</td>
<td>0.853</td>
<td>0.132</td>
<td>0.011</td>
<td>0.005†</td>
</tr>
<tr>
<td></td>
<td>(0.013)</td>
<td>(0.013)</td>
<td>(0.003)</td>
<td>(0.002)</td>
</tr>
<tr>
<td>Fourth</td>
<td>0.897</td>
<td>0.093</td>
<td>0.004†</td>
<td>0.006†</td>
</tr>
<tr>
<td></td>
<td>(0.011)</td>
<td>(0.010)</td>
<td>(0.002)</td>
<td>(0.002)</td>
</tr>
<tr>
<td>Fifth (highest)</td>
<td>0.940</td>
<td>0.052</td>
<td>0.007†</td>
<td>0.001††</td>
</tr>
<tr>
<td></td>
<td>(0.008)</td>
<td>(0.007)</td>
<td>(0.002)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Total</td>
<td>0.872</td>
<td>0.117</td>
<td>0.007</td>
<td>0.004</td>
</tr>
<tr>
<td></td>
<td>(0.006)</td>
<td>(0.006)</td>
<td>(0.001)</td>
<td>(0.001)</td>
</tr>
</tbody>
</table>

| Observations  | 8,170      | 900        | 60                   | 30            |

Notes: SES = socioeconomic status. PSI = postsecondary institution. BRR standard errors in parentheses. Row totals may not sum to one due to rounding. †Interpret data with caution; estimate is unstable because standard error is more than 30 percent of the estimate. ††Interpret data with caution; estimate is unstable because standard error is more than 50 percent of the estimate. Weight variable used in this table is W2STUDENT. Unweighted sample size numbers are rounded to the nearest ten to comply with NCES restricted-use data security protocol. Source: U.S. Department of Education, National Center for Education Statistics, High School Longitudinal Study of 2009 (HSLS:09). Author’s analysis.
Table A2. Proportion of college-going high school completers’ enrolled college choice, by institutional level and student SES quintile: Fall 2013

<table>
<thead>
<tr>
<th>SES Quintile</th>
<th>4-year PSI</th>
<th>2-year PSI</th>
<th>Less-than-2-year PSI</th>
<th>Unknown Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>First (lowest)</td>
<td>0.411</td>
<td>0.574</td>
<td>0.014</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>(0.022)</td>
<td>(0.023)</td>
<td>(0.004)</td>
<td>(0.000)</td>
</tr>
<tr>
<td>Second</td>
<td>0.523</td>
<td>0.454</td>
<td>0.022</td>
<td>0.002††</td>
</tr>
<tr>
<td></td>
<td>(0.025)</td>
<td>(0.020)</td>
<td>(0.008)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Third</td>
<td>0.571</td>
<td>0.417</td>
<td>0.008</td>
<td>0.004††</td>
</tr>
<tr>
<td></td>
<td>(0.016)</td>
<td>(0.016)</td>
<td>(0.002)</td>
<td>(0.002)</td>
</tr>
<tr>
<td>Fourth</td>
<td>0.648</td>
<td>0.341</td>
<td>0.007</td>
<td>0.003†</td>
</tr>
<tr>
<td></td>
<td>(0.018)</td>
<td>(0.018)</td>
<td>(0.003)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Fifth (highest)</td>
<td>0.811</td>
<td>0.186</td>
<td>0.003†</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>(0.012)</td>
<td>(0.012)</td>
<td>(0.001)</td>
<td>(0.000)</td>
</tr>
<tr>
<td>Total</td>
<td>0.612</td>
<td>0.368</td>
<td>0.020</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>(0.012)</td>
<td>(0.012)</td>
<td>(0.003)</td>
<td>(0.000)</td>
</tr>
</tbody>
</table>

Observations: 8,820 3,880 120 30

Notes: SES = socioeconomic status. PSI = postsecondary institution. BRR standard errors in parentheses. †Interpret data with caution; estimate is unstable because standard error is more than 30 percent of the estimate. ††Interpret data with caution; estimate is unstable because standard error is more than 50 percent of the estimate. Row totals may not sum to one due to rounding. Weight variable used in this table is W3W2STU. Unweighted sample size numbers are rounded to the nearest ten to comply with NCES restricted-use data security protocol.

Appendix B

College Choice by In- and Out-of-State Institutional Location

Table B1. Proportion of college-intending high school juniors' aspirational college choice, by in- and out-of-state institutional location and student SES quintile: Spring 2012

<table>
<thead>
<tr>
<th>SES Quintile</th>
<th>In-state</th>
<th>Out-of-state (border)</th>
<th>Out-of-state (non-border)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First (lowest)</td>
<td>0.718</td>
<td>0.083</td>
<td>0.198</td>
</tr>
<tr>
<td></td>
<td>(0.024)</td>
<td>(0.011)</td>
<td>(0.024)</td>
</tr>
<tr>
<td>Second</td>
<td>0.694</td>
<td>0.122</td>
<td>0.183</td>
</tr>
<tr>
<td></td>
<td>(0.018)</td>
<td>(0.012)</td>
<td>(0.016)</td>
</tr>
<tr>
<td>Third</td>
<td>0.717</td>
<td>0.104</td>
<td>0.179</td>
</tr>
<tr>
<td></td>
<td>(0.016)</td>
<td>(0.009)</td>
<td>(0.015)</td>
</tr>
<tr>
<td>Fourth</td>
<td>0.661</td>
<td>0.117</td>
<td>0.222</td>
</tr>
<tr>
<td></td>
<td>(0.015)</td>
<td>(0.010)</td>
<td>(0.014)</td>
</tr>
<tr>
<td>Fifth (highest)</td>
<td>0.561</td>
<td>0.140</td>
<td>0.300</td>
</tr>
<tr>
<td></td>
<td>(0.017)</td>
<td>(0.010)</td>
<td>(0.015)</td>
</tr>
<tr>
<td>Total</td>
<td>0.664</td>
<td>0.115</td>
<td>0.221</td>
</tr>
<tr>
<td></td>
<td>(0.008)</td>
<td>(0.005)</td>
<td>(0.008)</td>
</tr>
</tbody>
</table>

Observations 5,820  1,180  2,170

Notes: SES = socioeconomic status. BRR standard errors in parentheses. Row totals may not sum to one due to rounding. Weight variable used in this table is W2STUDENT. Unweighted sample size numbers are rounded to the nearest ten to comply with NCES restricted-use data security protocol.
Table B2. Proportion of college-going high school completers’ enrolled college choice, by in- and out-of-state institutional location and student SES quintile: Fall 2013

<table>
<thead>
<tr>
<th>SES Quintile</th>
<th>In-state</th>
<th>Out-of-state (border)</th>
<th>Out-of-state (non-border)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First (lowest)</td>
<td>0.940</td>
<td>0.035</td>
<td>0.026</td>
</tr>
<tr>
<td></td>
<td>(0.008)</td>
<td>(0.006)</td>
<td>(0.005)</td>
</tr>
<tr>
<td>Second</td>
<td>0.898</td>
<td>0.050</td>
<td>0.052</td>
</tr>
<tr>
<td></td>
<td>(0.015)</td>
<td>(0.007)</td>
<td>(0.015)</td>
</tr>
<tr>
<td>Third</td>
<td>0.854</td>
<td>0.071</td>
<td>0.074</td>
</tr>
<tr>
<td></td>
<td>(0.015)</td>
<td>(0.007)</td>
<td>(0.012)</td>
</tr>
<tr>
<td>Fourth</td>
<td>0.822</td>
<td>0.086</td>
<td>0.092</td>
</tr>
<tr>
<td></td>
<td>(0.012)</td>
<td>(0.007)</td>
<td>(0.009)</td>
</tr>
<tr>
<td>Fifth (highest)</td>
<td>0.716</td>
<td>0.128</td>
<td>0.156</td>
</tr>
<tr>
<td></td>
<td>(0.015)</td>
<td>(0.009)</td>
<td>(0.011)</td>
</tr>
<tr>
<td>Total</td>
<td>0.829</td>
<td>0.081</td>
<td>0.090</td>
</tr>
<tr>
<td></td>
<td>(0.007)</td>
<td>(0.004)</td>
<td>(0.005)</td>
</tr>
<tr>
<td>Observations</td>
<td>10,280</td>
<td>1,230</td>
<td>1,340</td>
</tr>
</tbody>
</table>

Notes: SES = socioeconomic status. BRR standard errors in parentheses. Row totals may not sum to one due to rounding. Student or parent may have reported enrolled college choice. Analytic sample is limited to high school completers as verified by high school transcript (variable X3HSCOMPSTAT). Weight variable used in this table is W3W2STUTR. Unweighted sample size numbers are rounded to the nearest ten to comply with NCES restricted-use data security protocol.

Appendix C

College Choice as Geographically Nearest Postsecondary Institution

Table C1. Proportion of college-intending high school juniors’ aspirational college choice as nearest public, two-year or four-year postsecondary institution, by student SES quintile: Spring 2012

<table>
<thead>
<tr>
<th>SES Quintile</th>
<th>Nearest Public, 2-year</th>
<th>Nearest Public, 4-year</th>
<th>Nearest Public, 2-year or 4-year</th>
</tr>
</thead>
<tbody>
<tr>
<td>First quintile (lowest)</td>
<td>0.090</td>
<td>0.082</td>
<td>0.172</td>
</tr>
<tr>
<td></td>
<td>(0.014)</td>
<td>(0.012)</td>
<td>(0.019)</td>
</tr>
<tr>
<td>Second quintile</td>
<td>0.077</td>
<td>0.083</td>
<td>0.160</td>
</tr>
<tr>
<td></td>
<td>(0.012)</td>
<td>(0.014)</td>
<td>(0.018)</td>
</tr>
<tr>
<td>Third quintile</td>
<td>0.071</td>
<td>0.107</td>
<td>0.178</td>
</tr>
<tr>
<td></td>
<td>(0.010)</td>
<td>(0.013)</td>
<td>(0.016)</td>
</tr>
<tr>
<td>Fourth quintile</td>
<td>0.056</td>
<td>0.078</td>
<td>0.134</td>
</tr>
<tr>
<td></td>
<td>(0.009)</td>
<td>(0.009)</td>
<td>(0.012)</td>
</tr>
<tr>
<td>Fifth quintile (highest)</td>
<td>0.021</td>
<td>0.057</td>
<td>0.077</td>
</tr>
<tr>
<td></td>
<td>(0.005)</td>
<td>(0.007)</td>
<td>(0.008)</td>
</tr>
<tr>
<td>Total</td>
<td>0.060</td>
<td>0.081</td>
<td>0.140</td>
</tr>
<tr>
<td></td>
<td>(0.005)</td>
<td>(0.006)</td>
<td>(0.008)</td>
</tr>
</tbody>
</table>

Observations 450 730 1,170

Notes: SES = socioeconomic status. First row is proportion, and second row is BRR standard errors in parentheses. Nearest college by straight-line distance from location of students’ high school attended in the 2011-12 academic year (variable X2NCESID). Institutional sector reflects IPEDS classification (i.e., 4 = “Public, two-year”, 1 = “Public, four-year or above”) in academic year 2012-13. Row totals may not sum to one due to rounding. Weight variable used in this table is W2STUDENT. Unweighted sample size numbers are rounded to the nearest ten to comply with NCES restricted-use data security protocol.

Sources: U.S. Department of Education, National Center for Education Statistics, High School Longitudinal Study of 2009 (HSLS:09); Integrated Postsecondary Education Data System (IPEDS); Common Core of Data (CCD); Private School Universe Survey (PSS). Author’s analysis.
<table>
<thead>
<tr>
<th>SES Quintile</th>
<th>Nearest Public, 2-year</th>
<th>Nearest Public, 4-year</th>
<th>Nearest Public, 2-year or 4-year</th>
</tr>
</thead>
<tbody>
<tr>
<td>First quintile (lowest)</td>
<td>0.314 (0.023)</td>
<td>0.089 (0.011)</td>
<td>0.404 (0.023)</td>
</tr>
<tr>
<td>Second quintile</td>
<td>0.287 (0.018)</td>
<td>0.109 (0.011)</td>
<td>0.396 (0.020)</td>
</tr>
<tr>
<td>Third quintile</td>
<td>0.238 (0.017)</td>
<td>0.105 (0.011)</td>
<td>0.343 (0.016)</td>
</tr>
<tr>
<td>Fourth quintile</td>
<td>0.189 (0.013)</td>
<td>0.105 (0.009)</td>
<td>0.295 (0.013)</td>
</tr>
<tr>
<td>Fifth quintile (highest)</td>
<td>0.111 (0.010)</td>
<td>0.083 (0.007)</td>
<td>0.194 (0.012)</td>
</tr>
<tr>
<td>Total</td>
<td>0.212 (0.009)</td>
<td>0.098 (0.005)</td>
<td>0.310 (0.009)</td>
</tr>
<tr>
<td>Observations</td>
<td>2,310</td>
<td>1,460</td>
<td>3,770</td>
</tr>
</tbody>
</table>

Notes: SES = socioeconomic status. First row is proportion, and second row is BRR standard errors in parentheses. Nearest college by straight-line distance from location of students’ last attended high school (variable X3TLASTHS). Institutional sector reflects IPEDS classification (i.e., 4 = “Public, two-year”, 1 = “Public, four-year or above”) in academic year 2012-13. Weight variable used in this table is W3W2STUTR. Unweighted sample size numbers are rounded to the nearest ten to comply with NCES restricted-use data security protocol.

Sources: U.S. Department of Education, National Center for Education Statistics, High School Longitudinal Study of 2009 (HSLS:09); Integrated Postsecondary Education Data System (IPEDS); Common Core of Data (CCD); Private School Universe Survey (PSS). Author’s analysis.
### Appendix D

**Median Distance-to-College by College Choice**

Table D. Median distance-to-college (miles) and frequency count of college-choice alternatives among college-going high school completers admitted to two or more postsecondary institutions, by student SES quintile: Fall 2013

<table>
<thead>
<tr>
<th>SES Quintile</th>
<th>College Choice</th>
<th>Percent Difference in Median Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>First quintile (lowest)</td>
<td>26</td>
<td>66</td>
</tr>
<tr>
<td></td>
<td>440</td>
<td>620</td>
</tr>
<tr>
<td>Second quintile</td>
<td>32</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>680</td>
<td>990</td>
</tr>
<tr>
<td>Third quintile</td>
<td>41</td>
<td>72</td>
</tr>
<tr>
<td></td>
<td>820</td>
<td>1230</td>
</tr>
<tr>
<td>Fourth quintile</td>
<td>64</td>
<td>93</td>
</tr>
<tr>
<td></td>
<td>1370</td>
<td>2050</td>
</tr>
<tr>
<td>Fifth quintile (highest)</td>
<td>103</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td>2710</td>
<td>4240</td>
</tr>
<tr>
<td>Total</td>
<td>98</td>
<td>67</td>
</tr>
<tr>
<td></td>
<td>6020</td>
<td>9130</td>
</tr>
</tbody>
</table>

Notes: SES = socioeconomic status. First row is median distance (miles) and second row is frequency count of college-choice alternatives. The full analytic sample consists of 15,150 observations (6,020 unique college choosers with either two or three admitting postsecondary institutions per chooser) as derived from the HSLS:09 student data file (variables S3CLGID, S3CLGAPPID1, S3CLGAPPID2). Statistics are unweighted and reflect the analytic sample. Unweighted sample size numbers are rounded to the nearest ten to comply with NCES restricted-use data security protocol. Sources: U.S. Department of Education, National Center for Education Statistics, High School Longitudinal Study of 2009 (HSLS:09); Integrated Postsecondary Education Data System (IPEDS); Common Core of Data (CCD); Private School Universe Survey (PSS). Author’s analysis.
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