CHARACTERISTICS OF EFFECTIVE EDUCATION POLICY AND VARIATION IN EFFECT BY STUDENT DEMOGRAPHICS

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A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

Educational Policy—Doctor of Philosophy

2018

ABSTRACT

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Schools and districts seeking to improve need education policy researchers to provide information that moves beyond how effective a given policy type usually is (the mean treatment effect); instead offering guidance on which characteristics of a policy are related to better student outcomes, and whether those relationships between policy design and outcomes differ based on student characteristics. This type of policy research can better inform the policy design decisions that principals and superintendents face. This dissertation provides three examples of applying this lens to timely areas of education policy. Chapter 2 looks at measures of college knowledge and college eligibility (net of other common college-going supports), providing evidence that the constructs are distinct: college knowledge relates to whether students enroll in postsecondary education, college eligibility relates to institutional quality, and both relationships are stronger for disadvantaged students. Chapter 3 looks at a subset of studies on year-round education (YRE) – only calendars where all students are on the same schedule – and (after confirming that YRE has a positive effect on student achievement) identifies calendar design characteristics that are linked with better student performance. Chapter 4 returns to college access, but investigates how four different levels of course advising by high school counselors link with whether students demonstrate college eligibility, college knowledge, and enrollment. Analysis reveals that earlier course advising may allow students to reach a higher most-difficult math class and that more frequent counseling is likely linked with intending to submit the FAFSA, but also reveals relatively small marginal effects that do not persist to become differences in college enrollment. Each study

has implications for research and practice in its own area, but more importantly, they showcase the type of research that can help inform not just the selection of a policy type, but the design and characteristics of school policies.

This dissertation is dedicated to Ilana, Finn, Ari, Orin, Kevin, Cora, Aella, and their peers.

ACKNOWLEDGMENTS

Early in my doctoral endeavor, I was advised “if you’re doing it alone, you’re doing it wrong.” Luckily, my development as a scholar was not a lonely journey. I have benefitted from the mentoring of advanced doctoral students, the shared experience and support of my cohort, the opportunity to both mentor and learn from younger scholars, the extraordinary knowledge of MSU faculty, crucial guidance and training from my advisor (John Yun) and committee (Barbara Schneider, Madeleine Mavrogordato, Ken Frank, and Josh Cowen), exceptional access to conferences and training due to generous MSU funding, key input from scholars at other institutions, and the unwavering support of my wife and family.

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CHAPTER 1: SIGNIFICANCE AND FOCUS

The task of identifying education policies that improve student learning is deeply challenging. Many policies or approaches that seem promising have turned out to show no average effect, or to inconsistently show results when they are replicated, expanded, or tried in new contexts. In understanding those policies that are successful, researchers need to consider not just average effectiveness but also one or more of heterogeneity in effects for various groups of students, mechanism of effect, characteristics of policy design that increase effectiveness, or other forms of nuance that can inform policy design.

Policies and interventions often have heterogeneous effects. A well-known example of this is that small class size matters more for minority students than for white students (Nye, Hedges, & Konstantopoulos, 2004). In other cases, there are important differences in effects based on specific characteristics (not just presence) of an intervention or the students it serves. A well-researched example is teacher professional development. Professional development can have positive effects when it is delivered multiple times in a coherent way across a reasonable time span, supplemented by leadership, technical assistance, and time for collaboration (Desimone, 2009; Penuel, Fishman, Yamaguchi, & Gallagher, 2007; Timperley, 2008). Other professional development treatments, particularly one-time trainings, typically have minimal effect.

There are also other, less easily categorized nuances in education policy effects. For example, teacher experience has a nonlinear relationship with teacher performance (Gansle, Noell, & Burns, 2012; Henry, Fortner, & Bastian, 2012). The effect of school size on student achievement differs by both grade level and student income (Leithwood & Jantzi, 2009; Luyten,

Hendriks, & Scheerens, 2014; Ready, Lee, & Welner, 2004). Furthermore, concepts may also need to be split into multiple parts, like dividing college readiness into constructs such as content knowledge, academic skills, non-cognitive skills, and college knowledge (Roderick, Nagaoka, & Coca, 2009). In expanding the body of research-based evidence, it is increasingly important to consider factors like heterogeneous effects on diverse students, design characteristics, nuance, and mechanism.

Examining how Design Characteristics Relate to Heterogeneity

Responding to this need, I have applied an approach that – even in analysis of secondary data – considers how the *characteristics* of policy design relate to *heterogeneity* in effects; both overall and, when possible, by student characteristics. This lens responds both to research needs and to policy-making needs. A school or district leader is not faced with simply a binary question of whether to implement a reform, but needs to pick – and would benefit from being able to make an informed decision about – the specific characteristics or version of that reform to implement in their context.

The Current Studies

Chapters 2-4 present three example analyses applying this lens of research for policy design. Each chapter's questions and analyses also respond to a distinct thread of research in the area examined, and utilize research methods appropriate to those questions. In Chapter 2, I apply this lens to college readiness. Based on prior research, I separate college readiness into two separate constructs: college knowledge and college eligibility. After providing further delineation of the qualities that define each construct, I examine multiple measures of each; analyze how they differentially link to whether students attend college and to the quality of college attended; and explore how those links differ for disadvantaged students.

In Chapter 3, I apply this analytical approach to year-round education. Based on prior meta-analytic findings, I focus on studies of year-round calendars where all students are in school at the same time. This decision recognizes and applies the theoretical difference between multi-track calendars, which are designed to expand school capacity without requiring new construction, and single-track year-round calendars implemented as an academic reform to decrease summer learning loss. I then examine how treatment effects differ based on both policy characteristics (length of longest break, frequency of during-year vacations) and student characteristics (grade range, race, income).

In Chapter 4, I return to the transition to post-secondary education, and apply my policy design-driven approach to the question of whether high school counselors can supplement students' low social capital in order to facilitate both college readiness and college-going. In this work, I consider how multiple specific counseling activities – at a sufficiently granular level to inform the design of supports for individual students – relate to measures of college knowledge and college eligibility for several groups of disadvantaged students. I also assess to what extent these same counseling activities influence post-secondary enrollment.

Looking Ahead

The findings from studies using this new approach reinforce how important considering policy design and heterogeneity can be in keeping research relevant to policy. School and district policymakers are not selecting between dualistic options such as having or not having teacher incentive pay, but instead are considering the design features of such a policy. Quantifying the average treatment effect from widely-varying incentive pay structures may be less important than cross-study findings that incentive pay is more effective when schools avoid rank-order-tournaments or whole-school awards (Fitzpatrick & Burns, 2018). Similarly, interventions and

policies often serve a specific student population such as rural or low-income students; so knowing whether the optimal program design differs based upon the characteristics of students served can be of real use in making education policy at the school and district level. Since most educational interventions have effects of relatively small magnitude, future research needs to move from examining questions of whether or how well a policy *type* works for the *average* student; to informing policymakers of which characteristics of the policy are more effective both overall and for specific contexts.

CHAPTER 2: COLLEGE ELIGIBLE AND COLLEGE KNOWLEDGE: NECESSARY BUT NOT SUFFICIENT FOR COLLEGE ENROLLMENT

My research lens of considering how policy design characteristics relate to for whom the policy is effective can be applied in almost any area of education policy, but the topic of college access is particularly ripe for this kind of analysis. Researchers have not yet developed a clear framing of how different types of readiness for post-secondary education are distinct from each other, nor have we yet discerned much that can guide the provision of student-tailored supports. Because of this match between my lens and the research needs of the college access literature, both Chapters 2 and 4 examine facets of college access.

In this study I used nationally representative longitudinal data to investigate a complex conceptualization of college eligibility and college knowledge as distinct, multi-faceted, and necessary but not sufficient conditions for attending college. Policymakers, practitioners, and researchers have recently focused on improving individual components of college readiness as a way to increase college-going. Reaching college eligibility in math has received particular attention, with links to post-secondary enrollment and success. Completing the Free Application for Federal Student Aid (FAFSA) has received as much or more attention and has been linked to greater likelihood of enrollment and to enrollment at an institution of appropriate selectivity. However, interventions designed to support students in one way typically neglect others, limiting the ability of those interventions to increase college enrollment.

Students that are eligible for enrollment in a 4-year college may fail to enroll because they do not know the right steps to take. A student who knows the steps or who is required by his or her school to complete the FAFSA and apply to college may not be academically eligible for admittance to a 4-year college. Low-income and minority students may be particularly prone to

demonstrating only college eligibility or only college knowledge but not the other—and thereby missing the transition to post-secondary schooling. High schools can mediate both factors, and I used High School Longitudinal Study 2009 (HSLS) data to investigate how both college eligibility and college knowledge link with students' transition to college. I examined the relationship between multiple aspects of college eligibility and several examples of college knowledge and students' enrollment in post-secondary education. I found that the constructs matter differently for *whether* students attend college and for *where* students attend, with larger differences for disadvantaged students.

Distinguishing College Eligibility and College Knowledge

The college access literature lacks a consistent framework for breaking college readiness down into agreed-upon components. In older empirical analyses, college readiness was often operationalized by a single measure. However, there are good reasons to think that college readiness consists of more than one distinct construct, which could behave very differently in how they improve students' prospects for post-secondary education. In this study, I distinguish between two distinct components of whether students are prepared for college: college eligibility and college knowledge, each of which links with access to, and success in, postsecondary education. My definition of these two constructs is consistent with recent works, but introduces greater distinction between their characteristics. College eligibility refers to academic achievement, including students having taken courses and received college exam scores that earn entry into a typical 4-year postsecondary institution. College knowledge refers to awareness of the steps (e.g. taking the SAT/ACT, applying to colleges, seeking financial aid) in between aspiring to attend college and actually doing so. Importantly, college eligibility consists of externally validated metrics linked with college success; while college knowledge can only be

measured by external proxies for actual knowledge, which can be susceptible to bias and manipulation (e.g. a student being required by their school to apply to one or more college or to complete the FAFSA, without possessing the actual knowledge for which that action is an indicator).

College eligibility has four properties that define it. First, indicators of college eligibility are tangible and *observable*. Math course-taking on transcripts, high school diplomas, and other markers of college eligibility are visible flags of readiness. They are also *quantifiable*, in numbers like SAT scores. Third, they are *externally validated*. The connection between college-ready ACT scores and college performance is well-documented (Atkinson & Geiser, 2009; Sackett et al., 2012; Sackett, Kuncel, Arneson, Cooper, & Waters, 2009). So is the importance of completing more advanced math courses (Byun, Irvin, & Bell, 2015; Gaertner, Kim, DesJardins, & McClarty, 2014; Gamoran & Hannigan, 2000). Finally, college eligibility entails only *academics*, excluding other components of a high school student's portfolio for college, such as extra-curricular activities both in and out of school, community service or volunteering, and travel experience. Even students with strong experiential components of their college application need to demonstrate college eligibility as well.

The properties of college knowledge are quite different from those of college eligibility. The core of college knowledge is understanding the steps between high school and college, the correct timing and sequence of those steps, and how to correctly assess the benefits of various post-secondary options. The first property of college knowledge measures is that they *quantify internal knowledge*. That quantification is difficult, since what is actually observed is usually only steps taken. For example, any activity such as FAFSA submission that is required by the school would not actually indicate broader understanding of the process of which that activity is

one step. A second property is that, in one sense, markers of college knowledge are *easily recognized* by those familiar with postsecondary education. Understanding that courses, grades, and the SAT are important for college all have 'face validity' as flags for whether students see the steps on the path toward college, as do planning to apply to college, planning to complete the FAFSA, and submitting applications and the FAFSA on time.

However, the third property of measures of college knowledge is that they are *susceptible to bias*. They particularly lack validity across schools with different characteristics, particularly high- and low-SES schools. For example, a student who professes an understanding that grades are important might not know that everyone at their school gets good grades, or a student might know to take the SAT/ACT but not realize that an above-average score within their school is still below the typical requirement for admission to a four-year college. Research has demonstrated that many students are incorrect about what type of degree to pursue for their preferred career, which can have long-term ramifications (Morgan, Leenman, Todd, & Weeden, 2012; Sabates, Harris, & Staff, 2011; B. Schneider, Kim, & Klager, 2017). Analogously, many students have an incorrect understanding of the entrance requirements of schools that they aspire to attend. Compared to students in other nations, it is particularly likely that American students will expect to complete a four-year degree despite being low-achieving (Jerrim, 2014). Unless this misalignment is taken into account, researchers may interpret the responses of students with incomplete knowledge as indicating broader knowledge about the college application and enrollment process than they actually have. Typical measurements of college knowledge lose the interpretation of how identical responses may have different meanings depending on context.

The fourth critical property of college knowledge is that its *measurement can be manipulated*. A student could be required to complete the FAFSA by their school without

understanding how the FAFSA fits into the financial aid process (e.g. the distinctions among grants, subsidized loans, and un-subsidized loans, the need to re-submit the FAFSA annually); or they may be required to apply to one or more colleges without knowing how to complete other steps in the transition to college.

Prior Research on College Eligibility, College Knowledge, and College-Going

College Eligibility: Importance and Interventions

An important component of college eligibility is taking advanced mathematical courses, which have been shown to have a positive effect on college enrollment (Byun et al., 2015; Muller, Riegle-Crumb, Schiller, Wilkinson, & Frank, 2010). Specifically, completing at least Algebra II improves college enrollment and may also increase the likelihood that students persist (Gaertner et al., 2014; Kim, Kim, Desjardins, & Mccall, 2015).

However, differences in course-taking have been shown to be related to income and minority status. Divergent course-taking explains about a third of racial- and income-based gaps in college readiness (Long, Conger, & Iatarola, 2012; Long, Iatarola, & Conger, 2009). Black students are disproportionately tracked out of advanced math courses, even controlling for individual qualifications in early high school and for family background (Kelly, 2009; Riegle-Crumb, 2006). As a result of these findings, large efforts have been undertaken to increase advanced math course-taking. Several states, including North Carolina, Michigan, and California, now have a statewide policy requiring early algebra or universal Algebra II, in order to increase advanced high school math course-taking, which is expected to help in academic performance and college success.

College Knowledge: Importance and Interventions

College knowledge has been identified as a critical area in which high schools should help students, in order to increase access to higher education, and FAFSA completion is often considered to be the most important component (Bettinger, Long, Oreopoulos, & Sanbonmatsu, 2012). Financial aid itself has been shown to increase the likelihood of poor students attending universities (Sara Goldrick-Rab, Kelchen, Harris, & Benson, 2016). Submitting the FAFSA renders a student eligible for substantial student grants and loans, which makes college far more accessible to low-income students. The problem being countered has straightforward logic. Low-income families frequently perceive college as more expensive than it is (Grodsky & Jones, 2007; McDonough, 2006). The FAFSA, particularly in its prior 116-question version, was a barrier to many families with low financial literacy even if they aimed to complete it (Dynarski & Scott-Clayton, 2006, 2013; Dynarski & Wiederspan, 2012). Requiring and/or assisting in FAFSA completion may expose families to a lower expected family contribution that would (in perception and fact) make college more affordable.

As a result, many schools have made efforts to increase the share of low-income students who complete and submit the FAFSA. The goal is to help students who are academically able to attend college to receive aid for which they are already eligible, in order to facilitate their postsecondary education. These programs show some positive results. Receipt of financial aid information and FAFSA completion have both been linked with increased enrollment in 4-year institutions (Hoxby & Turner, 2013; Stephan & Rosenbaum, 2013). FAFSA completion also increases the likelihood that a student will attend an institution that appropriately matches their academic ability, rather than an institution they are academically overqualified for (Belasco & Trivette, 2015). Experimental provision of FAFSA assistance to low-income families increased

seniors' odds of attending college from 28% to 36% (Bettinger et al., 2012). However, these benefits can only accrue to students who, though lacking one facet of college knowledge, were otherwise ready to matriculate to college. As important as financial aid is, FAFSA completion alone would not help a student who was not academically prepared for college.

Flaws in Considering only one of Eligibility and Knowledge

College eligibility and college knowledge are each important, as are individual measures both. However, focusing on individual indicators may fail to change overall readiness for college. Research reveals that for both college eligibility and college knowledge, shifting requirements may not shift the desired related outcomes, successfully shifted outcomes may not shift college enrollment, enrollment increases may be small and may not translate to increases in persistence. Requiring solely more credits of math may not increase the highest math course completed (Teitelbaum, 2003). Even when it does shift course-taking to a more equitable distribution, implementation of a college-prep curriculum for all does not always improve college entrance rates (Allensworth, Nomi, Montgomery, & Lee, 2009). When outcomes improve from college eligibility treatments, it may be by only small magnitudes (Attewell & Domina, 2008). For example, mandatory college entrance exams in Maine only increased college enrollment by two or three percentage points (Hurwitz, Smith, Niu, & Howell, 2015)

Similarly, financial aid that increases postsecondary enrollment may fail to increase postsecondary persistence past freshman year, particularly compared to the importance of first-year academic performance (Braunstein, Michael MCGrath and Don, 2000). Some students who file the FAFSA before college entrance do not (know to) re-file in subsequent years, which increases their attrition (Bird & Castleman, 2016; Castleman & Page, 2016). That attrition encapsulates the danger of moving an indicator (FAFSA completion) without having

substantively shifted financial literacy, substantive college knowledge, and the ability to successfully navigate college. Even in cases where financial aid alone does increase persistence, it may be by margins so small that they are not cost-beneficial (Bettinger, 2015).

Intuitively, both sets of results make sense for students who are neither college eligible nor have college knowledge and who receive support in remedying (one facet of) one but not the other. College eligibility supports will be relatively ineffective if some of the students with higher attainment do not know to apply to college or do not know how to navigate the many other steps on the path to college: college entrance rates cannot be substantially increased by eligibility alone. The insufficiency of solely-academic preparation was one impetus for work supporting college knowledge (Hoxby & Avery, 2012). In the same way, if a student knows, or is helped to complete, all of the appropriate steps on their path to college but is not eligible for college, then they will not gain entry to college, or will transition to college but not be academically prepared to perform at a collegiate level. Successful transition to college is too complex for small, narrowly-focused treatments to be expected to show much impact on student outcomes (Dobronyi, Oreopoulos, & Petronijevic, 2017). The logic is straightforward when thinking of college eligibility as a whole and college knowledge as a whole: each is necessary but not sufficient. I are able to move past single measures to include multiple components of what college eligibility and college knowledge contain and assess both simultaneously.

Linking Eligibility and Knowledge College-Going in HSLS Data

I used logistic regression to identify which college eligibility and college knowledge behaviors relate to increased odds of students attending college. In this study I utilized a detailed, nationally representative, longitudinal dataset to link specific demonstrations of college eligibility and knowledge on the part of high school students to 2-year and 4-year college

enrollment. The High School Longitudinal Study of 2009 (HSLS) gathered data on more than 23,000 students in 944 U.S. schools as 9th graders in 2009, as 12th graders in 2012, and in a third follow-up in 2013. In all cases, my analytic sample was the subset of the full HSLS with non-missing values for treatment and outcome variables.

The HSLS is the most recent nationally representative, longitudinal dataset, and has several advantages in analyzing the link between both eligibility and knowledge measures and college-going. As such, these data provide an externally valid picture of college-going that is pertinent to policy-making in the 2010s. The dataset is also large enough to allow for sub-sample analyses to examine multiple student subgroups, including racial minorities, economically disadvantaged students, and educationally disadvantaged students. HSLS also includes multiple measures of both college eligibility and college knowledge in addition to other college-going supports, which allows us to accurately reflect the complexity of the transition to post-secondary education by considering the marginal effect of specific actions, net of several other supports. Using these detailed data, I was able to look at the link between college eligibility, college knowledge, and college-going for specific students over time, while accounting for a set of student, family, and school characteristics.

Measures

The dependent variable in all analyses was a binary outcome of college-going. My main analysis uses two separately-run logistic regression models: one comparing enrollment in postsecondary classes (but not a 4-year institution) to students who are not in classes the year after 12th grade, and a second comparing students at 4-year colleges or universities to students in other classes. Additional analysis that moves beyond whether students enroll to examine the quality of school that students attend have a reference category of enrollment in a selective

institution, with an outcome of enrollment in a highly-selective institution, shown in Table 2.7. The independent variables of interest examine nuances in the outcomes for students who demonstrate college eligibility, those who show college knowledge, and those exhibiting both. Table 2.1 shows the constructs I wanted to include in the model and the measures used for each, organized to distinguish among outcomes, college knowledge and college eligibility measures (predictors of interest), and controls.

Within the construct of college eligibility, I was able to examine both reaching college eligibility in math courses taken and whether students took the SAT or ACT at least once. Within the construct of college knowledge, I examined whether 11th grade students intend to complete the FAFSA, whether students submitted the FAFSA, and how highly students rate the importance of grades, the SAT/ACT, and courses for college. I was also able to control for common college-going supports, including meeting with a counselor about college in 12th grade, touring a college or university, and whether the school reviewed the student's academic plan annually.

My analyses accounted for college-specific student and family characteristics in addition to standard controls of race, gender, academic achievement as measured by 12th grade math score, and family income. To account for the attitude of the students toward college in their final year of high school, I included a dummy variable of whether 12th graders expect to complete a BA and whether they expect an advanced degree. I also included a dummy variable indicating whether at least one parent earned a bachelor's degree. That narrow specification should provide differentiation between students who do and do not have parents who, having successfully navigated college themselves, may be able to advise the student on the transition.

I also included measures of second-level school and contextual characteristics. I added

Table 2.1.

Constructs Included and Measures Selected For Them

Concept	Purpose	Measure from HSLS (operationalization)
Enrollment in Postsecondary Education	Outcome	Enrollment in post-HS courses as of Fall
Quality of Postsecondary Institution	Outcome	Enrollment in 4-year college/university
Quality of Postsecondary Institution	Outcome	Designation of enrolled school as Highly Selective
Does student know, ahead of time, the steps to complete to reach college?	Knowledge	Whether 11th-grade student planned to complete FAFSA
Does student know what matters for being accepted into college?	Knowledge	Three: whether 12th grader identifies each of (i) grades, (ii) SAT/ACT, and (iii) course selection as important for being accepted in college
Did student successfully complete the administrative steps on the path toward college?	Knowledge	Whether student actually submitted FAFSA
Was the student academically eligible to attend a public 4-year college in terms of their coursework?	Eligibility	Two: did the highest math course that the student took, according to transcript data, (a) achieve college eligibility in math, or (b) reach advanced math.
Was the student academically eligible to attend a public 4-year college?	Eligibility	Whether student reported taking the SAT or ACT
What common supports for college did student receive?	Control	Three: (i) whether student submitted an education plan to their school as a 9th grader, (ii) whether student was counseled about college/aid in 12th grade, and (iii) whether student toured a college campus
Student characteristics	Control	Female, race, parent education (binary of at least BA)
Student ability	Control	12th grade standardized math score
Student educational expectations	Control	Dummy variables for whether the 12th-grader expects (a) to earn an advanced degree, or (b) to earn a 4-year degree but not an advanced degree
Did Not Apply to College		Separate out students who did not take any steps toward college enrollment
School Characteristics	Control	% of students eligible for FRPL, private school status, % of prior cohort of students who matriculated to a 4-year institution
Counseling Resources in School	Control	Counselor Caseload

dummy variables for private schools. As a measure of total counseling resources available, I included the average counselor caseload at the school, as well as dummy variables to distinguish schools with only one counselor, an out-of-field counselor, or a counselor with at least three years of experience. With regard to students served, I included mean-centered measures of the

percent of the students that are eligible for free lunch and that transition to 4-year colleges. When 2009 data were missing, missing values (for race, gender, parent education, and school-level characteristics) were replaced by values from 2012.[1] For the variables still missing data on these covariates, I made use of flags for cases with missing values in order to retain those cases in my sample after testing whether they are missing at random (MAR) with respect to treatment variables (Larose & Larose, 2014). This standard method allowed me to retain cases missing individual covariates, to increase precision in coefficient estimates without introducing bias.

Analytic Strategy

My primary two-level logistic regression specification included all student-level and school-level control variables to examine how the independent variables of interest change the odds of college enrollment outcomes for high school students. I used the same analytical strategy on sub-samples in order to investigate whether the coefficients differ for various disadvantaged populations of students. Throughout this study, results in tables are expressed in odds ratios for ease of interpretation.[2] The conceptual model for each outcome variable in full analyses was:

Level 1 equation: $Y = \beta_{0j} + \beta_{1j}T_1 + \beta_{2j}T_2 + \beta_{3j}\mathbf{A} + \beta_{4j}\mathbf{B}$

Level 2 equation: $\beta_{0j} = \lambda_{00} + \lambda_{01}\mathbf{C} + u_{0j}$

Equation 3 (mixed model): $\text{Logit}(Y=1) = \log[p(Y=1)/(1-p(Y=0))] = \lambda_{00} + \beta_{1j}T_1 + \beta_{2j}T_2 + \beta_{3j}\mathbf{A} + \beta_{4j}\mathbf{B} + \lambda_{01}\mathbf{C} + u_{0j}$

where **A** is a matrix of student characteristics, **B** is a matrix of home characteristics, and **C** is a level 2 matrix of school characteristics. I included both T_1, several measures of college

[1] The correlation between 2009 and 2012 data collections, at schools with data for both waves, was between .5 and .7 for school-level variables, which affirmed the validity of this cross-wave data use.

[2] For many readers, log odds do not lend themselves to an intuitive understanding of the magnitude or implications of coefficients. Odds ratios can more easily and quickly be interpreted based on direction of relationship and approximate magnitude.

eligibility, and T_2, several measures of college knowledge, to reflect the complexity of facilitating college-going through multiple supports. This configuration of the model allows for an estimation of the marginal benefit of eligibility and knowledge measures in relation to each other. In this instance, the multilevel structure is employed only to correctly account for the nesting of students within schools. The analyses in this chapter do not progress to consider variations in the coefficients of interest across schools (that is, no coefficients are allowed to vary at the second level). Investigating how the college readiness relationships that I examine differ based on school characteristics would be a productive subsequent project. Here, though, **C** is included so that variation in student outcomes can be correctly ascribed to differences in individual students' supports and characteristics; rather than incorrectly estimating and interpreting as student-level differences patterns of college readiness and enrollment that are due to school context.

The same structure was applied to student subsamples to investigate whether the relative importance of college eligibility and college knowledge differs for students facing greater disadvantage. This analysis strategy allowed my model to reflect much of the real-world complexity of the transition from high school to post-secondary schooling. This specification accounts for student ability, SES, and aspirations, in addition to three common college-preparation activities; family characteristics; and nested nature of students in schools, where I included both standard school characteristics and counseling resources. To understand differences in the effect of the two college readiness constructs, I report logistic regression analyses of how the constructs relate to whether students attend college and to the quality of college they attend (4-year college vs. 2-year college, and highly selective institution vs. selective institution).

Table 2.2.
Descriptive Statistics for Analytic Sample; mean or percent

	Analytic Sample	No College	2-Year College	4-Year College
Total Number of Records (N)		2,480	3,970	6,620
College Knowledge				
Actual FAFSA Submission	69%	31%	72%	87%
11th Grader planned FAFSA	33%	25%	32%	38%
Grades Imp for Col	87%	87%	87%	88%
SAT/ACT Imp for Col	86%	84%	87%	87%
Courses Imp for Col	64%	62%	62%	67%
College Eligible				
College Eligible in Math	78%	57%	73%	93%
Took ACT/SAT 1+	41%	30%	35%	51%
Took Advanced Math	53%	26%	41%	76%
College-Going Supports				
Ed Plan 9th Grade	50%	44%	51%	52%
Counseled as Senior	68%	45%	67%	81%
College Tour	53%	40%	47%	65%
Student Characteristics				
Female	51%	43%	53%	54%
Latino	21%	25%	26%	15%
African American	18%	20%	20%	15%
Native/Pacific or Other Race	15%	18%	17%	11%
12th Grade Math	1.23	-4.03	-1.32	6.01
Expects BA (only)	30%	24%	31%	33%
Expects Advanced Degree	36%	17%	26%	54%
Did Not Apply to College	31%	60%	14%	29%
Family Background				
Parent has BA	41%	23%	31%	59%
Poverty	16%	25%	20%	8%
185% Poverty	35%	53%	42%	22%
School Characteristics				
% Transition to College	49.5%	42.8%	42.6%	58.0%
% FRPL	34.0%	41.0%	37.5%	27.6%
Private School	8%	2%	4%	14%
Counselor Caseload	361.1	370.8	372.7	346.6

Note. Data from HSLS restricted-use data file, using longitudinal student weights.

The descriptive statistics are shown in Table 2.2. As in all of my other tables, Table 2.2 reflects NCES longitudinal weights, which compensate for attrition and retain the national representativeness of the data.[3] The averages reveal that students often are partly eligible for

[3] The analytic sample shows slight differences relative to dropped records. Lower-SES parents appear to be more likely to have not responded and lower-SES schools appear more likely to be missing data (especially on the specific measures of college eligibility and college knowledge), so when missing values are dropped, the sample appears to

college or evince partial college knowledge but not the whole. Most students (87%) know that grades are important for reaching college, but under two-thirds realize that course selection is also important. Additionally, students may not gain their knowledge about college in a timely fashion: only one-third of students planned, as juniors, to submit the FAFSA. Table 2.1 also reveals important disconnects between what students say is important and the behaviors that they actually exhibit. The first column reveal that two-thirds of students expect to earn an advanced degree or a Bachelor's and most (86%) know that a college exam is important for college, but just 41% actually took the SAT or ACT. Even among the students who enrolled at 4-year institutions after high school, only 51% actually took a college exam (ACT/SAT) despite the fact that 87% of them said that taking such an exam was important. Cross-tab analysis of these descriptive statistics (not shown) reveals that fully one-quarter of students in the HSLS are in such a mis-matched cell: expecting to earn a post-secondary degree, stating that a college exam is important for being accepted to college, but not taking a college exam. These patterns illustrate that individual measures of college knowledge or college eligibility are not necessarily accompanied by other, even directly related, measures of college readiness.

Results

My analyses moved past considering college eligibility and college knowledge separately, to examining their joint effect on college enrollment for all students. That is, the descriptive analyses above indicate only that students' preparation for college is incomplete, but does not show how students likelihood of reaching college is impacted by each type of college readiness. Prior work has shown how individual elements of college readiness relate to

shift slightly higher in average SES, across most measures examined. Students in the analytic sample, relative to dropped records, are more likely to be white, be high-performing in math, be high income, expect an advanced degree, have friends who expect a BA, and be counseled about college as a senior. They also attend schools with lower rates of free lunch eligibility, higher rates of matriculation to college, and fewer minority students.

enrollment outcomes; here, I distinguish between multiple types of college readiness, controlling for each other, standard supports, and a host of controls. Because of the greater policy interest in disadvantaged students, I then analyzed the joint relationship of college eligibility and college knowledge to enrollment for a variety of student subgroups, separately for whether students enroll in 2-year and 4-year institutions. Finally, I shifted to the question of how college eligibility and college knowledge, for all students and for student subgroups, separately relate to the quality of college attended. I did this by looking at whether or not students attend a highly-selective institution.

Separate Analyses of Eligibility and Knowledge

For comparison with my joint analysis, my first results replicated prior work examining college eligibility and college knowledge as separate influences on college going. Table 2.3 shows the progression from models similar to prior work to my full models. The models with single eligibility and knowledge variables show estimates that are consistent with prior research on the individual effects of college readiness measures, but the models with multiple supports better reflect both the real world of the transition to college and these data.

Model statistics show that the model accounting for multiple advising activities, in addition to student and school controls, better fits the data than a simpler model of student behavior. I deliberately report model quality using the Akaike information criterion (AIC) instead of Bayseian information criterion (BIC) because the AIC has a larger penalty for increasing the number of covariates. The analyses in this chapter (and Chapter 4) incorporate a relatively large number of control variables. This is an intentional choice to reflect the complexity of the transition from high school to college; but it is important to confirm that, even using the model quality measure that has more of a penalty for covariates, the more-complex

model shows better (lower) values of the AIC: the goodness-of-fit is improved by enough to warrant the inclusion of the empirically- and theoretically-grounded variables.

The even-numbered columns show the models that include multiple college readiness measures and multiple other supports, which the AIC confirms fit the data better than the simplified models in odd-numbered columns. Columns 2 and 6 show these complex relationships for attending two-year colleges, while columns 4 and 8 show the relationships for attending four-year colleges. In assessing the importance of college eligibility measures, column 2 reveals that receiving college counseling as a senior showed the largest relationship with two-year enrollment; for four-year enrollment (shown in column six), expectations showed the largest relationship. At both levels, college eligibility in math showed the next-strongest relationship with enrollment, with an odds ratio/coefficient of 1.85 and 1.9. This corresponds to an increase in predicted probability of 4-year college enrollment from 39% to 55%.[4] Following the sizeable estimates for expectations, the second college eligibility measure, taking a college exam, showed an odds ratio of 1.48 for 2-year and 1.62 for 4-year schools.

The college knowledge measures are presented in columns 6 and 8, with model statistics again indicating that the model accounting for counseling resources is better than simpler models. The models showed even larger coefficients for college knowledge than for college eligibility, particularly for actual FAFSA completion. The relative importance of other factors differs somewhat from Table 2.2. Here, for enrollment in 2-year programs, the second-most important factor was knowing that grades are important for attending college (another component of college knowledge), followed by expectations and receiving counseling as a

[4] For ease of interpretations, predicted probabilities represent a student with average values on continuous measures (12th grade math score, % FRPL at school, % matriculating to college at school) who expect to attend college, met with a counselor about college as a senior, and toured a college.

Table 2.3.

Better Fit of Models with Multiple Supports and Multiple Readiness Measures

	(1) 2yr Math Only	(2) 2yr Elig. + supports	(3) 4yr Math Only	(4) 4yr Elig. + supports	(5) 2yr FAFSA Only	(6) 2yr Knowl. + supports	(7) 4yr FAFSA Only	(8) 4yr Knowl. + supports
aic	1863058	1846301	2712559	2684841	1762195	1747673	2686769	2663275
College Eligible								
College Eligible in Math	1.88***	1.85***	1.94***	1.90***				
Took ACT/SAT 1+		1.62***		1.48**				
College Knowledge								
Actual FAFSA Submission					4.32***	4.40***	2.64***	2.62***
SAT/ACT Imp for Col						1.01		1.08
Grades Imp for Col						1.77**		1.06
Courses Imp for Col						0.95		1.23*
11th Grader planned FAFSA						1.07		1.27*
Made Ed Plan in 9th Grade		0.99		0.96		0.94		0.96
Counseled as Senior	2.01***	2.01***	1.72***	1.68***	1.65***	1.64***	1.63***	1.62***
College Tour		1.28+		1.38**		1.31+		1.42**
Student Characteristics								
Female	1.74***	1.72***	1.06	1.05	1.53**	1.46**	1.01	0.96
Latino	1.13	1.13	0.86	0.89	1.16	1.17	0.86	0.86
African American	1.32	1.29	0.87	0.86	1.30	1.28	0.83	0.79+
Native/Pacific	0.94	0.92	0.72*	0.72*	0.90	0.92	0.71*	0.70*
12th Grade Math	1.03***	1.03***	1.05***	1.05***	1.04***	1.03***	1.06***	1.06***
Expects BA (only)	1.49*	1.42*	2.35***	2.24***	1.43+	1.39+	2.39***	2.24***
Expects Advanced Degree	1.74***	1.61**	4.35***	3.91***	1.64**	1.60**	4.47***	3.97***
Did Not Apply to College	0.10***	0.09***	1.55*	1.51*	0.12***	0.11***	1.50*	1.43+
No FAFSA b/c high income	1.04	1.07	0.87	0.86	1.67**	1.74**	1.41*	1.49**
Parent has BA	1.22	1.20	1.86***	1.78***	1.24	1.26	1.91***	1.90***
School Characteristics								
% Transition to College	0.99	0.99	1.02**	1.02**	0.99	0.99	1.02***	1.02***
% FRPL	0.98***	0.98***	1.00	1.00	0.98***	0.98***	1.00	1.00

Table 2.3 (cont'd)

Private School	2.04^{+}	1.96^{+}	1.30	1.28	1.82^{+}	1.75^{+}	1.31	1.29
Counselor Caseload	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
N	6,200	6,200	10,190	10,190	6,200	6,200	10,190	10,190

Exponentiated coefficients

Note: Data from HSLS restricted-use data file, using (3-wave + transcript) longitudinal student weights.

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

senior. FAFSA submission had the largest coefficient for enrolling in 4-year programs, though with a magnitude much smaller in column 8 than column 6. Four other characteristics were linked with at least a 40% increase in odds of enrolling in a 4-year college: expecting an advanced degree, whether the student was counseled about college as a senior, having a parent with a Bachelor's degree, and touring a college. These estimates indicate that when accounting for multiple forms of college knowledge but not college eligibility, college enrollment appears to be shaped in important ways by expectations, multiple types of college knowledge, and supports that students receive. My results in Table 2.3 confirm the importance of both college eligibility and college knowledge for college-going when examined separately. Comparing the pattern of results for 2- and 4-year programs also reveals that college knowledge has a much greater impact than eligibility for 2-year programs, but that the two are of similar importance for 4-year attendance.

My findings using HSLS data are closely aligned with previous research in conclusions, significance, and approximate magnitude. The HSLS data reveal that taking Algebra 2 and Geometry nearly doubles students' likelihood of postsecondary enrollment, an estimate which – although larger than the estimate of 28% for only Algebra II in Kim, Kim, Desjardins, and McCall (2015) – closely matches the coefficient of about 1 for the influence of taking advanced math on 4-year enrollment in Byun, Irvin, and Bell (2015). The magnitude of my HSLS estimate is somewhat larger in this descriptive analysis, but are substantively consistent with the ToT figures of almost 50% increase in students attending an appropriate-selectivity school after receiving college knowledge supports (Hoxby & Turner, 2013) and 25% increase in odds of any enrollment for help submitting the FAFSA (Bettiner, Long, Oreopoulos, & Sanbonmatsu, 2012). The enrollment-from-FAFSA outcomes were larger in in-state, public, and/or two-year colleges,

which is again consistent with my finding of a larger effect for 2-year enrollment than for 4-year enrollment.

Joint Analysis of Eligibility, Knowledge, and Enrollment for All Students

Moving beyond work that has separately considered college eligibility and college knowledge, I turned to examine the question of how they influence college enrollment when they are considered together. Table 2.4 shows both college eligibility and college knowledge incorporated into a single model – yet run separately for attending 2-year and 4-year institutions – in addition to other common college-going supports and the full set of control variables. The model statistics confirmed that including both college eligibility and college knowledge is a better fit for explaining both 2- and 4-year college enrollment for all students than separate considerations of the two constructs: simultaneous consideration of the impact of the two concepts better explains actual enrollment outcomes . Overall, Table 2.4 reveals modestly smaller coefficients for most individual measures of college readiness (intending to complete the FAFSA, FAFSA submission, college eligibility in math, taking a college exam) than in Table 2.3. This shift indicates that examining college eligibility and college knowledge in isolation over-states their effects (likely because the college readiness measures are correlated and by including both, the correlated effects are, in table 2.4, loaded onto the appropriate coefficient). However, the decreases are relatively modest, and the estimates in 2.4 remain of substantive importance.

Across all students, actual FAFSA submission increased the predicted probability of enrolling in a 2-year program from 66% to 89% and the predicted probability of enrolling in a 4-year program from 19% to 37%. These estimates suggest that FAFSA completion can make a large difference in whether the average student accesses post-secondary education, though with

Table 2.4.
Joint Relationship of College Eligibility and College Knowledge with College-Going, Logistic Regression Analyses for All Students

	(1) 2-year program or less	(2) 4-year program
College Knowledge		
Actual FAFSA Submission	4.20***	2.46***
11th Grader planned FAFSA	1.03	1.24*
Grades Imp for Col	1.78**	1.08
SAT/ACT Imp for Col	1.01	1.08
Courses Imp for Col	0.95	1.21+
College Eligible		
College Eligible in Math	1.55*	1.76**
Took ACT/SAT 1+	1.55**	1.42*
College-Going Supports		
Made Ed Plan in 9th Grade	0.93	0.96
Counseled as Senior	1.62***	1.59***
College Tour	1.26	1.38**
Student Characteristics		
Female	1.45*	0.96
Latino	1.17	0.89
African American	1.29	0.82
Native/Pacific	0.90	0.70*
12th Grade Math	1.03***	1.05***
Expects BA (only)	1.34	2.11***
Expects Advanced Degree	1.52*	3.66***
Did Not Apply to College	0.11***	1.42+
No FAFSA b/c high income	1.74**	1.42*
Parent has BA	1.23	1.83***
School Characteristics		
% Transition to College	0.99	1.02**
% FRPL	0.98***	1.00
Private School	1.73+	1.31
Counselor Caseload	1.00	1.00
N	6,200	10,190
aic	1,729,495	2,638,209

Note: Exponentiated coefficients. Data from HSLS restricted-use data file, using longitudinal student weights.
+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

smaller coefficients than in the knowledge-only model. Reaching college eligibility in math also makes students more likely to attend any college and to attend a 4-year college. The fact that the coefficient on math college readiness for 2-year enrollment is smaller (both smaller than the

estimate for FAFSA completion and smaller than the estimate for math's relationship with 4-year enrollment) is logical, as eligibility for a 4-year institution would be expected to encourage students to attend 4-year institutions instead of a 2-year college for which they were overqualified. The coefficient of 1.76 for 4-year colleges emphasizes the large difference in access that math course-taking can make, net of other college readiness and supports; representing an increase from 19% to 29% predicted probability of enrolling. Again, the estimate is smaller than in the model considering only eligibility, but only slightly. This indicates that although considering single facets of college readiness alone marginally over-states their importance, each has a substantial effect even when accounting for the other.

As expected, Table 2.4 emphasizes the importance of multiple facets of college readiness and multiple supports for the average student's transition to college. The strongest relationships with 2-year postsecondary enrollment were FAFSA submission, understanding the importance of good grades, being counseled about college as a senior, student expectations, reaching college eligibility in math, and taking a college entrance exam. That each of these had an odds ratio of at least 1.5 after controlling for the others emphasizes how multifaceted actual college readiness is. The factors that shape enrollment at 4-year colleges differ in a nuanced fashion. FAFSA completion was still very important, but at about half the magnitude as for 2-year schools. The odds ratio on college eligible math increased modestly to 1.76, with other sizeable estimates for expectations, parent education, and taking a college exam, which all showed odds ratios above 1.4. Other context and support variables – math score, parental education, being counseled about college as a senior, a college tour, knowing as of 11th grade to plan on submitting the FAFSA – were also positively and significantly related with 4-year college-going for the average student, at smaller magnitudes. These findings show that a variety of support and readiness variables

relate to college-going, and that college knowledge matters more to any enrollment but eligibility matters more for 4-year enrollment, for the average student. However, policies and interventions tend to focus on disadvantaged students, not the average student.

Joint Analysis for Disadvantaged Students

Tables 2.5-2.6 present the same analytical models from Table 2.4 applied to nine different sub-samples of students, to understand the differential relationship of college eligibility and college knowledge with college-going for disadvantaged students. I calculated estimates for students who do and do not have a parent with a BA; for students who are above and who are below 185% of the federal poverty line; for students who are White, African American, and Latina/o, and for students facing multiple disadvantages, meaning that they have any two of the following: low-income status, no parent with a BA, or racial/ethnic minority status. Overall, the findings are that college knowledge measures matter more for disadvantaged students' enrollment in 2-year programs than they do for the average student; that college knowledge gains less for disadvantaged students' 4-year enrollment but that college eligibility helps disadvantaged students reach 4-year colleges, and that advanced math course-taking is particularly important for disadvantaged students reaching highly-selective institution. In short, what matters for reaching a higher-quality college is different from what matters for reaching any college.

FAFSA: important for disadvantaged students' enrollment in 2-year programs. The estimates of FAFSA submission for enrollment in 2-year programs were often much larger than in the full sample but also varied substantially, from 3.58 for students whose parents have a BA to over 8 for students below 185% of poverty. Across these students, FAFSA completion showed an important relationship with whether they reached post-secondary education. The coefficient on FAFSA submission for 4-year enrollment did not show the same pattern. Instead, the estimate

Table 2.5.

Two-Year College Enrollment (vs. no enrollment) based on College Eligibility and College Knowledge for Disadvantaged Students

	SES				Race/Ethnicity			Mult Disad	All Minority
	Parent Has BA	No Parent BA	Not Poor	Poor	White	African American	Latino	2 of minority, low-ed, poor	
College Knowledge									
Actual FAFSA Submission	3.58***	5.67***	4.98***	8.43***	4.51***	3.15**	3.64***	4.93***	3.68***
11th Grader planned FAFSA	0.46*	0.98	0.83	1.24	0.93	0.90	1.59	0.97	1.18
Grades Imp for Col	1.41	2.02**	1.63	2.66*	1.55*	6.01**	0.49	2.61**	1.65
SAT/ACT Imp for Col	0.48*	0.81	1.09	0.77	0.76	0.26*	0.91	0.62	0.56*
Courses Imp for Col	0.59+	0.85	0.64+	0.79	0.65*	0.96	0.94	0.95	0.80
College Eligible									
College Eligible in Math	2.57*	1.19	1.44	1.05	1.76**	0.93	2.05+	1.14	1.24
Took ACT/SAT 1+	1.57+	1.26	1.04	1.67*	1.48*	1.75+	1.38	1.48+	1.44+
College-Going Supports									
Made Ed Plan in 9th Grade	1.08	0.96	1.24	0.76	0.97	0.88	1.23	0.95	0.98
Counseled as Senior	1.72*	1.17	1.78*	1.04	1.61***	1.66	0.85	1.36	1.36
College Tour	1.08	1.50*	1.34	1.35	1.18	2.04*	1.31	1.31	1.31
Student Characteristics									
Female	2.65**	1.13	1.54*	0.93	1.43+	1.56	1.11	1.07	1.32
Latino	0.85	0.93	1.27	0.93				1.05	
African American	0.61	1.13	0.71	1.03				1.39	
Native/Pacific	1.84	0.75	0.61+	0.99				1.02	
12th Grade Math	1.02	1.03**	1.01	1.03	1.02+	1.02	1.02	1.03+	1.03*
Expects BA (only)	1.39	1.39+	1.59	0.87	1.70**	0.72	0.86	0.96	0.74
Expects Advanced Degree	2.63**	1.64*	1.93*	1.67	2.12***	1.53	1.18	1.72*	1.63+
Did Not Apply to College	0.07***	0.11***	0.09***	0.13***	0.11***	0.18***	0.18***	0.15***	0.18***
No FAFSA; high income	1.40	0.88	1.66+	0.79	1.43*	1.46	0.66	0.70	1.37
Parent has BA			2.05***	1.51	1.45+	0.46*	1.44	0.48	0.89
N	2,070	4,130	3,020	2,030	4,710	1,020	1,130	2,750	2,450

Note: Exponentiated coefficients. Data from HSLS restricted-use data file, using longitudinal student weights. All models also include % FRPL, % transition to college, private school status, and average counselor caseload.

$^{+}p < 0.10$, $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

Table 2.6.

Four-Year College Enrollment (vs. 2-year enrollment) based on College Eligibility and College Knowledge for Disadvantaged Students

	SES				Race/Ethnicity			Mult Disad	Minority
	Parent Has BA	No Parent BA	Not Poor	Poor	White	African American	Latino	2 of minority, low-ed, poor	
College Knowledge									
Actual FAFSA Submission	2.90***	2.05***	2.85***	1.41	2.63***	1.97	3.99***	1.79*	2.58**
11th Grader planned FAFSA	1.74***	1.30	1.42*	1.78	1.31*	0.98	1.08	1.70+	1.22
Grades Imp for Col	1.09	1.19	1.19	0.77	1.29	0.54	2.77+	1.06	1.04
SAT/ACT Imp for Col	1.11	1.05	1.05	1.81+	1.21	1.53	0.64	0.97	0.83
Courses Imp for Col	1.12	1.15	1.12	1.56+	1.01	1.09	0.76	1.21	1.07
College Eligible									
College Eligible in Math	2.17**	2.45**	1.63*	5.08***	2.14***	2.58*	3.50*	2.97**	2.34**
Took ACT/SAT 1+	2.00***	0.91	1.65***	0.69+	1.44**	1.09	0.77	0.77	0.76
College-Going Supports									
Made Ed Plan in 9th Grade	0.99	0.86	0.90	1.18	0.98	0.94	1.08	0.78	0.85
Counseled as Senior	1.34*	2.58***	1.61***	2.24*	1.52**	2.33*	2.05*	2.85***	3.17***
College Tour	1.58**	1.27	1.28	1.13	1.43**	1.91+	1.15	1.35	1.68*
Student Characteristics									
Female	1.15	0.80	1.10	1.01	0.99	0.65	0.45*	0.72+	0.71+
Latino	0.69	1.01	0.52**	1.40				1.11	
African American	1.30	0.79	0.87	1.19				0.99	
Native/Pacific	0.64*	0.56*	0.78	0.61+				0.63+	
12th Grade Math	1.06***	1.03***	1.06***	1.05***	1.05***	1.00	1.05**	1.03**	1.03*
Expects BA (only)	1.71**	2.50***	2.02***	3.53***	1.89***	4.64**	2.65*	3.41***	2.79***
Expects Advanced Degree	3.26***	3.22***	3.48***	2.82***	2.97***	4.96***	5.22***	3.23***	3.66***
Did Not Apply to College	1.72*	1.28	1.29	2.55***	1.51**	1.82+	1.55	1.82*	2.10*
No FAFSA; high income	1.77**	1.30	1.46*	1.47	1.39*	1.28	1.55	2.35*	1.51
Parent has BA			1.88***	1.75*	1.90***	2.89***	1.96*	2.45**	2.04***
N	5,700	4,500	6,810	2,110	7,670	1,390	1,370	2,780	3,230

Note: Exponentiated coefficients. Data from HSLS restricted-use data file, using longitudinal student weights. All models also include % FRPL, % transition to college, private school status, and average counselor caseload.

$^{+}p < 0.10$, $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

was largest for non-poor students and students whose parents have a BA, but was lower for African-American students than for any other group (likely indicating that for these students FAFSA completion alone is not enough). The combination of shifts in coefficients for 2- and 4-year enrollment perhaps indicates that students are being helped or required to complete the FAFSA without also receiving the supports necessary to ensure that they are able to attend 4-year colleges. Aligned with this concept, the coefficient on the 11th-grader planning to submit the FAFSA was largest for 4-year enrollment for more advantaged students – students with educated parents, White students – rather than for disadvantaged students. This likely indicates that for less-advantaged students, being aware only of the FAFSA may not indicate awareness of all of the components of college knowledge. Overall, the college knowledge findings for student subgroups accentuate that college knowledge is important for whether students attend any college, is particularly important for whether disadvantaged students attend any college, but does not make a large difference in whether disadvantaged students reach 4-year programs.

Math courses: especially important for disadvantaged students' 4-year enrollment. The results in Table 2.6 emphasize that ensuring college eligibility may be more important for disadvantaged students than for the average student. The estimates for both eligibility measures on 2-year enrollment vary relatively little across groups. For 4-year enrollment, there are important differences. The odds ratio on math college eligibility for enrolling in a 4-year school was over 2.4 for students whose parents do not have a BA, was larger for African-American students, students facing multiple disadvantages, and Latino students, and was over 5 for low-income students. The changes are large enough to be of substantive significance: reaching college eligibility in math increased the predicted probability of attending a 4-year college by 18-24 percentage points for students whose parents do not have a BA, low-income students, students

facing multiple disadvantages, and African-American students.[5] For racial minorities, students of less-educated parents, and students facing multiple disadvantages, the relationship of math college eligibility and 4-year college going was larger than the relationship of FAFSA submission on 4-year enrollment. Particularly in light of the estimates for FAFSA completion – which are similar in magnitude for these groups as in the full sample – this pattern emphasizes that disadvantaged students need both college eligibility and college knowledge in order to successfully reach a 4-year college.

College Eligibility, College Knowledge, and College Selectivity

Within 4-year colleges, there are large differences in quality. Table 2.7 presents a second set of analyses, examining the relationship between college eligibility, college knowledge, and the *quality* of college attended for various groups of students. Logistic regression analysis was used to compare odds of enrolling at highly selective institutions versus selective institutions.[6] In short, college eligibility shaped the *type* of institution that students attend more than college knowledge did, especially for disadvantaged students.

Table 2.7, in the context provided by Table 2.6, suggests that what matters for reaching a higher-quality college is different from what matters for reaching any college, especially for disadvantaged students. Across five forms of college knowledge and multiple dis-aggregations of students, Table 2.7 shows that college knowledge is relatively unable to help students reach highly selective institutions. While the estimates varied by the specific relationships examined, there were no clear patterns in the (mostly insignificant) estimates. Student expectations were no

[5] For students of low-educated parents, 18 (from 21% to 39%), for low-income students 26 (from 10% to 36%), for African-American students 19 (from 20% to 39%), and for students facing multiple disadvantage, 24 (from 22% to 46%).

[6] The analytic sample is smaller because it only includes students who enroll in a highly selective or selective 4-year institution; excluding students who enroll in non-selective 4-year institutions, enroll in 2-year institutions, or do not enroll.

Table 2.7.

Highly Selective College Enrollment (vs. Selective) based on College Eligibility and College Knowledge

	All	SES				Race/Ethnicity			Mult Disad	Min
	All Students	Parent Has BA	No Parent BA	Not Poor	Poor	White	African Ameri-can	Latino	2 of minority, low-ed, poor	
College Knowledge										
Actual FAFSA Submission	0.64^{+}	0.71	0.63	0.89	0.27	0.49**	3.96^{+}	0.14^{+}	0.37	0.20*
11th Grader planned FAFSA	1.18	1.01	1.61^{+}	0.94	3.25*	1.09	1.62	2.80*	1.69	1.33
Grades Imp for Col	1.23	1.03	2.63*	1.46^{+}	2.43	1.45^{+}	1.29	4.52**	4.51**	2.06
SAT/ACT Imp for Col	0.82	0.91	0.71	0.87	1.31	0.91	0.60	0.58	0.58	0.38*
Courses Imp for Col	1.28	1.37*	1.44	1.38*	1.37	1.41*	0.93	1.66	1.49	1.36
College Eligible										
College Eligible in Math	1.45	1.22	1.41	1.91	0.67	1.25	3.64	2.71	0.93	1.78
Took ACT/SAT 1+	1.64**	1.49*	1.56	1.41*	1.48	1.66**	0.83	4.02**	2.47^{+}	1.33
College-Going Supports										
Made Ed Plan in 9th Grade	1.02	0.83	1.33	0.87	2.02^{+}	1.12	3.81*	0.81	2.50*	1.25
Counseled as Senior	1.48^{+}	1.16	2.82**	1.39^{+}	5.41*	1.41^{+}	49.56***	9.38**	6.77**	5.17**
College Tour	1.19	1.23	1.12	1.31^{+}	0.53	1.17	2.48	0.64	0.68	1.02
Student Characteristics										
Female	1.10	1.27	0.73	1.03	1.68	1.12	0.38^{+}	3.06*	1.57	1.86^{+}
Latino	1.42	1.61	1.23	1.39	0.65					
African American	0.93	0.96	0.68	1.09	0.63					
Native/Pacific	1.04	1.16	1.29	0.96	2.02					
12th Grade Math	1.12***	1.12***	1.13***	1.13***	1.12***	1.13***	1.05	1.11***	1.14***	1.09***
Expects BA (only)	1.19	1.27	0.90	1.23	0.86	1.18	0.07**	1.39	1.09	0.86
Expects Advanced Degree	2.19***	2.02**	2.32*	1.96*	3.05	1.75*	0.21^{+}	1.69	2.77^{+}	2.75*
Did Not Apply to Col	1.34^{+}	1.22	1.21	1.08	1.48	1.27	2.65*	0.55	1.01	0.75
No FAFSA; high income	1.05	1.38	0.34	1.07	16.10*	1.02	10.98*	0.71	2.66	1.16
Parent has BA	1.74***			1.76***	1.38	1.66**	2.79*	2.69^{+}		2.03*
N	5,470	3,820	1,650	4,200	740	4,180	550	520	900	1,330

Note: Exponentiated coefficients. Data from HSLS restricted-use data file, using longitudinal student weights. All models also include % FRPL, % transition to college, private school status, and average counselor caseload. $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

longer a significant predictor of student outcomes; parental education, family income, and some college-going supports showed inconsistently-significant relationships with highly selective institutions.

In contrast, college eligibility measures showed a relatively steady relationship with enrollment at a selective institution. Taking a college entrance exam remained linked with enrollment at highly-selective institutions, with point estimates for the odds ratio of about 1.5 or higher for all groups except African Americans, ranging as high as 4 for Latino/a students. College eligibility in math showed perhaps a weaker relationship with highly-selective enrollment than initially expected, with an overall odds ratio that is both generally insignificant and generally ranges between a magnitude of 1.2 and 1.4 for different types of students. Supplementary analysis revealed that this pattern was because highly selective institutions admit students with more advanced math course taking.[7]

Advanced math courses help disadvantaged students reach highly-selective programs. The same analytical model as in Table 2.7, but with a measure of advanced math course-taking instead of basic 4-year college eligibility, produced sometimes-significant odds ratios between 1.5 and 8.0 for all groups.[8] Advanced mathematical course-taking was associated with increasing the predicted probability of enrolling in a highly-selective institution from 13% to 21% overall. The predicted probabilities were low for the most-disadvantaged groups in

[7] Advanced mathematical course-taking is operationalized as taking math beyond pre-calculus. This includes trigonometry, calculus, statistics, AP math, or IB math.

[8] Point estimates of 1.77* overall, 1.76* when parents have a BA, 2.09+ when they do not, 1.55 for non-poor students, 3.52 for poor students, 1.55* for white students, 2.36+ for minority students, 8.19* for African American students, and 2.96 for students facing multiple disadvantage. Full results available in Table A4. Conclusions are not sensitive to model used. OLS analysis with clustered standard errors produces marginally different estimates (some higher and some lower point estimates, generally decreasing the difference between the estimates for different groups; slight adjustments in individual estimate's significance levels) but the same conclusion about college readiness.

absolute terms, but the large proportional increases (for example, from 5% to 12% for minority students, from 4% to 7% for students with low-educated parents, and from 2% to 6% for students facing multiple disadvantage) indicate that math course-taking can make a substantive difference in whether disadvantaged students reach highly selective institutions. Here, the finding is aligned with those in Tables 2.5-2.6: the college eligibility measure matters substantially, but even more so for disadvantaged students. The analyses indicate important differences between supporting student enrollment in any postsecondary – where college eligibility mattered, but college knowledge mattered at least as much – and student enrollment in a higher-quality institution, where eligibility matters more.

Sensitivity and Robustness Checks

The conclusions about the relationship of college knowledge and college eligibility to college-going are not dependent on the details of the analysis conducted. Alternative analyses with different covariates, different treatment of cases with missing data on covariates, adjustments to how constructs are measured, or slightly different samples produce results that do not importantly differ from those shown above. Appendix tables A5-A8 present comparable models to those conducted above, but using ordinary least squares (OLS) regression instead of two-level modeling. Appendix tables A9-A12 show comparable models using school fixed effects (FE), as an alternative approach for accounting for the clustering of students in schools in the HSLS. Tables A5-A12 have different point estimates and sometimes different significance levels; but the overall patterns and the conclusions from these sensitivity analysis are the same as in the HLM analyses.

The OLS analysis of two-year college-going shows the same overall pattern as the HLM, though the coefficient on FAFSA completion is narrower. To a smaller extent, the coefficient on

college eligibility in math also varies less by student characteristics than in Table 2.5. The OLS analysis of 4-year college enrollment shows essentially the same results for college knowledge; the college eligibility measures show smaller-magnitude coefficients but with the same pattern of statistical significance as in Table 2.6. The OLS analyses could be interpreted as indicating that college knowledge is of even less importance to attending a highly selective institution than indicated in 2.7. The biggest difference in the advanced mathematical course-taking is that in the OLS analysis, taking a college exam remains of greater importance, in addition to math course-taking; but this would only strengthen the central point that college eligibility matters for college quality.

The FE models overall show a similar agreement with the HLM models. The estimated relationships of FAFSA submission with 2-year college-going appear to be less stable (i.e. to vary more with student characteristics, the opposite from how the OLS differed from the HLM), but also to be of larger magnitude. The knowledge and eligibility coefficient estimates are essentially the same in the FE analysis as in HLM for 4-year college-going and highly selective college attendance. For highly-selective college attendance with advanced math, the FE analysis differs in the details but not in the trend: some estimates gain statistical significance (e.g. Latino students and low-income students), some estimates lose statistical significance (e.g. white students, students whose parents have BAs), but with an odds ratio of around 2.0 and sometimes much larger, table A12 still supports the conclusions that math course-taking matters for reaching a highly-selective college, that it matters more than college knowledge measures, and that advanced math matters more than college eligibility for reaching a highly-selective college. Overall, a large set of alternative specifications add support for the conclusions that college

knowledge matters for whether students attend college, college eligibility matters for the quality of institution attended, and those relationships are larger for disadvantaged students.

Discussion

In analyzing three waves of nationally representative data, my work reveals added complexity in measuring students' readiness for college. There is substantial evidence to suggest that both college eligibility and college knowledge are each necessary but not sufficient for students' progress to competitive colleges. These analyses suggest that analyzing either form of college readiness alone overstates its importance in facilitating the transition to post-secondary education. When multiple constructs of each were included, both had separate significant relationships with student enrollment, with college knowledge mattering more for students' enrollment in 2-year institutions compared with no college; but with college eligibility mattering more for the selectivity of institution attended. As expected, the effects of both college eligibility and college knowledge are much larger for disadvantaged students; additionally, for poor minorities and poor children of low-educated parents, college eligibility was more important for enrollment in 4-year institutions than college knowledge.

Previous research has shown that various constructs of college eligibility and college knowledge, considered separately, matter for students' transition to college. My analysis reveals that both are simultaneously important in different ways. For most groups, the odds of enrolling in a 2-year college or in a 4-year college of any quality increased more from FAFSA submission than from college eligibility in math. An exception was for disadvantaged students: specifically for students whose parents did not go to college, African-American students, and students facing multiple disadvantages, college eligibility in math increased the probability of 4-year enrollment more than FAFSA submission. However, for almost all groups, advanced math (or college eligibility in math) increased odds of enrolling in a highly selective 4-year college by more than

FAFSA submission. Importantly, this strongly suggests that college knowledge and college eligibility are distinct, and separately linked to *whether* students attend college and with the *quality* of institution attended. The two constructs are each necessary but not sufficient for supporting student success. This is an important point because some interventions have treated one alone as adequate, without considering the differential effects for students and their different goals.

My work is limited by the characteristics of the national dataset that I analyzed. By using an existing national dataset, I was unable to make observations of the schools. My analysis is also limited by the possibility that school supports, including those in support of college eligibility and knowledge, are offered to students or students are opting in to them based on unobserved characteristics not controlled for by my covariates. This would likely bias my estimates upward, based on the correlation of those unobserved characteristics with both the college eligibility and college knowledge measures and with the enrollment outcomes. The HSLS data also allowed us to analyze college enrollment, but not yet college success. College readiness and enrollment are primarily important for their precedence of and correlation with college success. College grades, persistence, and graduation outcomes will be important to investigate as future waves of data become available.

My analyses add important nuance to policy considerations for preparing disadvantaged students for post-secondary education. Policymakers, counselors, and other practitioners need to pay closer attention to eligibility and knowledge as separate constructs, both of which are crucial for making the transition to post-secondary education. One facet of this distinction was exemplified by the work identifying high-performing and college-eligible low-income students who were not transitioning to college, which was the impetus for much of the FAFSA

completion movement. However, with some urban schools now aiming for 100% FAFSA completion, there are more students in the opposite situation: having applied to college, completed the FAFSA, and finished other markers of college knowledge, without being eligible and/or ready to complete college-level coursework. While students in that situation do indeed enroll in postsecondary institutions at a higher rate than students who do not complete the FAFSA, that alone does not represent a sufficient degree of success in supporting post-secondary education, as those students may not re-submit FAFSA, pass classes at high rates, and/or persist to graduation.

My findings show that FAFSA submission has a much weaker relationship with going to a more-selective college than going to any college. Supporting students only in FAFSA completion, then, may only encourage students to attend lower-tier institutions, which tend to have lower graduation rates. Treating enrollment as a solitary outcome, or treating college knowledge or college eligibility alone as sufficient preparation, misses both the true complexity of the process and the distal outcome for which the intermediate outcomes matter. More well-rounded college preparation, potentially with more points of contact with students, is likely to have a more substantive influence on postsecondary completion rates and postsecondary completion for disadvantaged students. Particularly for low-income, minority, and first-generation college students, high schools need to be preparing students for college beyond the moment of admission.

Future research should examine the relationship of both high school supports (such as course planning, counselor meeting, and college tours) and college readiness measures to longer-term college success measures, but should also further investigate the nuances that my work has revealed. As one example, my analyses showed that FAFSA completion mattered more for

enrolling in a competitive college for disadvantaged students than for average students, with descriptively higher estimates for poor students, minority students, and students of low-educated parents; but it mattered less for the most-disadvantaged students in poor families with low-educated parents. Intensive, perhaps qualitative follow-up could reveal more about the meanings of those complex findings. Future work could also build on my analysis of multiple readiness and eligibility measures by using methods such as path analysis to better understand the joint relationship of multiple simultaneous supports on student intermediate and final outcomes. Once the 'why' of differences in effect is better understood, policymakers and practitioners will be better positioned to implement differential supports that match students' heterogeneous needs in the transition to college.

CHAPTER 3: EFFECTIVENESS OF SINGLE-TRACK YEAR-ROUND EDUCATION: RESULTS OF A META-ANALYSIS

Focusing on how policy design characteristics relate to heterogeneity in outcomes can provide important implications in most areas of education policy. This includes the deceptively-simple question of which days a school building should be open. Careful aggregation and analysis of 21st-century primary research reveals that, even for schools that are open for the same number of days per year, *which* days school is in session makes a difference for student learning, and makes that difference in a way that is contingent on student characteristics.

Teachers, administrators, and policymakers are under substantial pressure to improve student achievement. In many cases, educators are under similar pressure to reduce racial or socioeconomic gaps in achievement. At the same time, summer learning loss has become a focal point in understanding how achievement gaps in America develop. In response to increased pressure to improve student achievement and close achievement gaps, schools have implemented a variety of reforms, including modifications to school schedules and calendars. One of these reforms is year-round education (YRE): redistributing 180 instructional days more evenly in the year and shortening the lengthy summer break.

Prior studies and meta-analyses have shown YRE to have a very modest positive impact on student learning. More importantly, prior literature has shown that single-track YRE, or having all students on the same year-round calendar, has a positive effect, but that multi-track YRE, or operating 4-5 different calendars simultaneously and having some students on vacation at all times, may have no effect. The meta-analysis in this article focuses exclusively on studies of single-track YRE from 2001-2016, in order to provide updated information on single-track YRE's impact on academic achievement in both reading and math in U.S. K-12 schooling. By focusing only on single-track year-round education, I am able not just to arrive at an overall

effect size estimate, but also to begin observing both qualities that make single-track YRE more effective and student populations for whom it is more effective.

Summer Learning Loss

Summer learning loss is a prominent concern in academic and public discussions of education. Summer learning loss refers to the fact that students forget material and show measurably decreased competency at the beginning of one school year than at the end of the preceding year. Concerns focus on not only what students forget over summer vacation, but also on the time that must be spent reviewing previously-taught material at the beginning of each school year. Overall, summer learning loss is worse in math than in reading (Cooper, Nye, Charlton, Lindsay, & Greathouse, 1996), likely because students read but do not do math during the summer. Cooper et al.'s (1996) meta-analytic estimate was that achievement declines by about one month of learning (.16 standard deviations in math and .11 in reading) during summer.

Summer learning loss appears to be worse for disadvantaged students. Research has documented that low-income students lose ground to higher-SES students during summer months when they cannot access school resources (Burkam, Ready, Lee, & LoGerfo 2004; Entwisle, Alexander, & Olson, 2001). The magnitude of this loss relative to their more-advantaged peers is substantial: low-income students lose as much as three months of learning in reading over the summer (Von Drehle, 2010). In total, summer learning loss among low-income students may account for as much as two-thirds of the income-based achievement gap (Alexander, Entwisle, & Olson, 2007).

The documented losses for disadvantaged students are consistent with research on differences in summer resources and opportunities. Low-income students typically attend lower-performing schools than their wealthier counterparts, but the resource differential in summer

may be even greater (Downey, von Hippel, & Broh, 2004). During summer, less affluent children watch more television, converse less with parents, and benefit from less daily parental involvement than wealthier students (Gershenson, 2013). That gap is of substantive importance, given that involvement in summer learning activities may have more of an impact on student academic trajectory than other parental behaviors (Borman, Benson, & Overman, 2005). Wealthier students, in contrast, are more likely to engage in more stimulating activities, like taking lessons, visiting libraries, and attending museums, than less affluent students (Alexander et al., 2007).

Year-Round Education as a Policy Option

Year-round education is seen as a way to combat summer learning loss by shortening or eliminating the long summer vacation. The logic of year-round education is fairly simple: by redistributing the school calendar to create shorter breaks in which there are fewer consecutive weeks for students to forget material, the degree of learning loss during the summer will be lessened, which in turn means that students will need less review after breaks, thus allowing teachers to cover more material over the course of a year.

Year-round education refers to the policy intervention of shortening summer break to distribute instructional time more evenly throughout the year, while retaining the standard 180 instructional days. The National Association for Year-Round Education (NAYRE) defines YRE by saying that it provides "more continuous learning by breaking up the long summer vacation into shorter, more frequent vacations throughout the year…The year-round calendar is organized into instructional periods and vacation weeks that are more evenly balanced across 12 months than the traditional school calendar" (NAYRE, n.d.).

Year-round education is sometimes conflated with other calendar and instructional reforms, so it is important to delineate how it is distinct from seemingly similar policies. YRE is distinct from a reform that is typically called extended year, which consists of adding days to the standard American school year of 180 days. YRE also does not refer to after-school programming, tutoring, summer school for remediation, other summer programming, or lengthening the number of instructional hours in each school day. It refers exclusively to re-allocating the 180 instructional days more evenly throughout the year.

Popularity and cost of year-round education. Year-round calendars have become substantially more popular than in prior eras. Only 350,000 students attended schools using year-round calendars in 1985, growing to more than two million students at 3,000 schools on year-round calendars in 2007, and more than 3,700 schools used year-round calendars in 2012 (NAYRE, 2007; Warrick-Harris, 1995; Will, 2014). Part of the reform's popularity stems from its low cost of implementation (Brekke, 1997; Butchart, 2013). In analysis of YRE in Virginia conducted for the state legislature, for example, the primary factor increasing cost was instructional costs during intersession, which averaged 3% of operating costs (Tittermary 2012). The archaic, agrarian origin of the current school calendar also contributes to public acceptance of school calendar reform (Weiss & Brown, 2003). Moreover, some policymakers contend that YRE can benefit disadvantaged students more than their advantaged counterparts (Davies & Kerry, 2000).

Prior Studies of Year-Round Education

Studies of YRE at individual schools or districts have yielded conflicting results, not only in magnitude but in direction of effect, which makes meta-analysis the most appropriate technique for assessing the impact of YRE. Two prior meta-analyses have examined year-round

education's effect on academic achievement, primarily with subjects merged into a single outcome. Kneese (1996) included both studies with comparison groups and pre/post studies, and found a positive effect on achievement varying from +0.11 to +0.2 standard deviations depending on the exact model and analysis used. Kneese also stated that single-track calendars appeared to have a larger effect than multi-track calendars. Cooper, Valentine, Charlton, and Melson (2003) included only studies with comparison groups, and found an overall effect size of +0.06, but +0.11 for studies that used statistical or matching controls. Cooper et al. (2003) disaggregated by calendar type, and in their fixed-effects unadjusted analyses found that, although multi-track YRE had an effect size of just -0.01 (±.05), single-track YRE had an effect size of +0.16.

Year-round calendars are not all the same, and the most important distinction in type is whether a calendar is single-track or multi-track. On a single-track calendar, all students and teachers are on the same schedule (track). The school building either has all students present or none present on each day, and the building only has students in it 180 days per year. Single-track YRE is usually implemented as an academic reform to improve student achievement. In contrast, multi-track YRE is typically implemented in response to over-crowding when there is no funding available for additional classroom space. On a multi-track calendar, some of the students (for example, 25%) are on vacation at any time, while the other students (in this example, 75%) are in school. The tracks rotate through their time in school and on vacation, which would allow a school with room for 900 students to serve 1,200 students on a rotating basis.

Focus on Single-Track YRE

Multi- and single-track YRE differ in purpose (budgetary vs. academic intervention) but also differ in how they operate. Most recent research has focused on effectiveness, but prior work identified an array of problems unique to multi-track calendars (for a thorough review of disadvantages specific to multi-track calendars, see Sparks, 2002). This subsection elaborates on operational differences and problems with multi-track schools, to make clear the reasoning behind treating single- and multi-track YRE as separate policies.

One set of problems stems from the fact that a fraction of classes are on break at all times. Because there are multiple schedules within a school, siblings can end up on different tracks (Glines, 1997; Shields & Oberg, 1999). If a family goes on a trip during one student's vacation, the sibling would be pulled out of class. At any given time, multi-track schools have classes on break, and teachers of those classes are typically unavailable. This can impede communication within the school (Alkin, Atwood, Baker, Doby, & Doherty, 1983; Rodgers, 1993). The lack of communication can lead to disunity among teachers and staff (Severson, 1997; Shields, 1996). The split schedule can also have negative interactions with standardized testing (California Department of Education n.d.). In an extreme example, one track of students may return from a multi-week break just a few days before annual testing, which creates inequities in test preparation across tracks (Helfand, 2000).

In all or nearly all weeks of the year, at least some students are attending a multi-track school. This near-constant use of the school creates a second set of problems. The school must operate more days, increasing demands on support staff like custodians and teacher aids. Administrators are needed year-round, as they must work when any track is in operation, substantially increasing fatigue among administrators (Mutchler, 1993). Continuous use of the

school building also impedes any large facilities work (Mussatti, 1981) and in some cases makes routine maintenance and repair more difficult (White, 1993). If teachers supplement their income by assisting on a track they do not teach, they also lose the option of engaging in lesson planning between school years (St. Gerard, 2007). Given that some teachers are working at nearly all times, it is also difficult to schedule staff-wide professional development.

A third set of problems result from there being multiple tracks rather than a single schedule. Each classroom has to serve multiple tracks, so teachers share classrooms (Dixon, 2011). In some cases teachers have to set up and take down their classroom every few weeks; in others, teachers have mobile carts to move between classrooms. In either case, it interferes with teacher performance. Of significant concern, Mitchell and Mitchell (2005) found substantial racial segregation between tracks. Parental requests for specific tracks can contribute to uneven distributions by socioeconomic status and race (McNamara, 1981). In some multi-track schools, English Language Learners are unevenly distributed across tracks as well (Brekke, 1986). Multi-track calendars can also worsen the effects of academic tracking: in addition to not being in classes with students of differing academic abilities, students may not be in the school building on the same schedule as students of differing ability.

Given the array of problems specific to multi-track but not single-track YRE, it is not surprising that prior work has found important differences in the results of the two types of school calendar. The limited research directly comparing single- and multi-track YRE have found that single-track schools showed larger performance gains (Turk-Bicakci, 2005; White & Cantrell, 2001). The effect of multi-track YRE may actually be negative (Graves, 2010; Graves, McMullen, & Rouse, 2013). In both the Kneese (1996) and Cooper et al. (2003) meta-analyses, the authors found a larger treatment effect for single-track than multi-track YRE. Estimating the

effect of grouped single- and multi-track YRE as a single treatment of "year-round education" would require ignoring the important guidance provided by prior research findings. As a result, I excluded multi-track YRE and focused only on single-track YRE, because it is an academic intervention previously shown to have a modest but significant effect.

Research Questions

Guided by prior research, this meta-analysis examined single-track YRE only. The first research question was therefore: what is the estimated effect of single-track YRE for math achievement and for reading achievement? The summer learning loss literature shows that disadvantaged students fall further behind their advantaged peers over the summer. This disparity points to the possibility that the effect size of YRE, which derives in part from mitigating summer learning loss, will differ for subgroups of students. Thus, the second research question was: what is the effect size (of math and reading achievement) for only low-income students and for only minority students? There may well also be differences in the effect of single-track YRE based on the characteristics of the calendar as implemented. The third research question was therefore: what is the relationship between characteristics of YRE (calendar structure, duration of the longest remaining break) and the effect size estimate?

Method

Research Synthesis Process and Selection Criteria

I will describe the decisions and steps of the research synthesis process that preceded meta-analytic calculations in detail to show how results could be replicated, and, more importantly, to illustrate the restrictions that were applied to the sample. Most importantly, I deliberately excluded studies of multi-track calendars and studies that combined single- and multi-track calendars. Although that decision decreased the size of my final sample, it allowed

me to answer a better, narrower set of research questions focused only on single-track YRE. At all steps, the search process adhered to best practices in research synthesis as outlined by the Campbell Collaboration (Kugley at al., 2017).

Electronic databases searched. I conducted searches on 21[9] electronic databases, using search terms, keywords, and filters specific to each tool. My search terms for this meta-analysis included those used by Cooper et al. (2003), augmented by terms used in pertinent research published after that meta-analysis. The final base search terms were: "year-round school" or "year-round education" or "alternative calendar" or "modified school calendar" or ("year-round calendar" AND school) or "year-round schools" or "year-round schooling". Searches were restricted to studies dated 2001-2016, in order to avoid duplicative inclusion of studies that were in the Cooper et al. (2003) work. I sought additional grey literature and unpublished reports from pertinent sites, to access documents not indexed by any of the searched database. Those sites included the more than 50 (excluding higher education-specific resources) listed in the Campbell information retrieval guide (Hammerstrøm, Wade, & Jørgensen 2010). The decision of whether to review all titles or conduct a within-site search depended on number of reports and available search interface on the individual, e.g. corporate, websites. Excluding newspapers and wire feeds on platforms that include those media, searches yielded 346 results.

"Footnote chasing". In addition to searching databases, my research synthesis protocol included footnote chasing in two directions. Using the "cited by" feature on both ProQuest and Google Scholar, I examined all publicly available works that cited the Cooper et al. (2003) meta-

[9] ERIC, PsycARTICLES, PsycEXTRA, PsychINFO, ProQuest Research Library, ProQuest Dissertations & Theses Global, Dissertations & Theses @ CIC Institutions, Education Administration Abstracts, Education Full Text, Social Sciences Citation Index, Sociological Abstracts, PolicyFile, International Bibliography of the Social Sciences, Periodicals Index Online, EconLit, Sociology Database, PRISMA, Social Services Abstracts, PAIS International, Google Scholar, Web of Science.

analysis or any study downloaded for full-text review, to conduct what is sometimes called cited reference searching. Additionally, for each study in the download/full-text review sample, all footnotes were reviewed and any studies that were not already part of the sample were added from this traditional footnote chasing. Finally, a small number of studies not found by any search were added via expert identification.

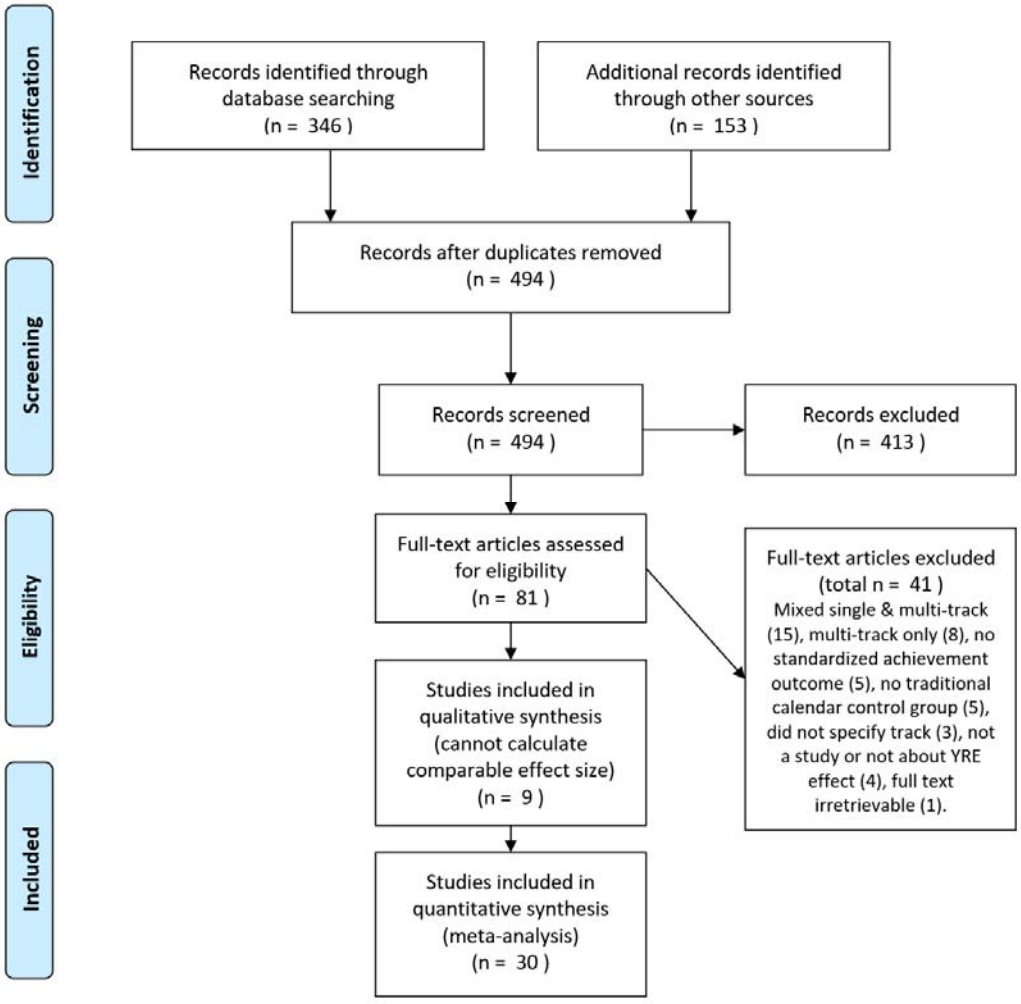
Selection criteria and exclusions. The 494 results from the initial search included a large number of works that were not actually studies warranting inclusion in this meta-analysis. Four selection criteria, adapted from those used by Cooper et al. (2003), were applied to identify those that were viable evaluations of the effect of YRE in the U.S.:

1. studies cannot be evaluations of extended instructional time (e.g., lengthened school day or additional instructional days)
2. studies must include achievement data of some kind
3. studies must include a comparison group
4. studies must be of K-12 schooling in the United States

Figure 1 illustrates the flow of documents during the search process. Initial searching identified 346 unique results, with another 153 found through footnote-chasing, cited reference searching, and expert identification. Applying the four exclusion criteria to these results (reading abstract-only) winnowed the preliminary results into an initial sample of 81 studies that were reviewed in full text, to apply the same exclusion criteria and limit examination to studies of single-track YRE. The quantitative meta-analyses presented below are of a limited subset of this initial sample.[10]

[10] Studies excluded as having no control group include one Master's research project that compared an urban YRE school to a convenience non-equivalent control group of the rural school at which Schmidt (2011) worked.

Figure 3.1. Search Process Flow Diagram, Adapted from Moher et al. (2009)



One elective restriction was applied deliberately in order to more accurately address a narrower research question, despite the resulting decrease in sample size. Only studies of single-track YRE were included. Studies of multi-track YRE were excluded, as were studies that mixed single- and multi- track YRE and studies that did not specify the calendar type. This analytic restriction eliminated a large percentage of the initial sample: 26 studies were excluded for one of those three reasons. The exclusion was applied because prior work indicates not just that the two calendars are introduced for different reasons, but furthermore that multi-track YRE may have no treatment effect, whereas single-track YRE has been found to have a positive effect.

Some studies also lacked the information necessary to calculate an effect size, and were excluded for that reason. After applying all restrictions, the resulting sample included 30 studies.

In order to ensure coding quality, a second researcher coded 25% of search results, with inter-rater reliability of 90% and all nonmatched coding discussed until consensus was reached. A 25% sample of the full-text reviews were also conducted by two researchers, with all differences resolved with full agreement on the final sample. As an additional quality check, I extracted the data for calculating effect sizes (both continuous and dichotomous outcomes) on two separate occasions (in many cases, separated by several months) and calculated the effect size estimate and variance using each set of figures, achieving intra-rater reliability over .96 and correcting all non-matching estimates.

Procedures for Coding Studies

Student outcomes. I extracted the student outcome data needed for calculating the effect size(s) from each study. In most cases this was mean score, standard deviation, and sample size (N) for the treatment and control groups, or N and percent proficient. For the former, Cohen's *d* figures summarize the standardized mean differences. For the latter, figures were extracted for log odds, and findings are reported in odds ratios, for easier interpretation. When necessary, I extracted data from other analyses such as F-tests and ANOVA. When multiple estimates were provided instead of a single overall treatment/control estimate (e.g., values for three grades or over three different years) I extracted the data for multiple effect size estimates from that study. A total of 53 math *d*, 54 reading *d*, 29 math odds ratio, and 27 reading odds ratio effect sizes were extracted from 30 studies.

In addition to full-school statistics, where available, I extracted the data necessary for calculating effect sizes for sub-groups of the full sample: for low-SES students only (26

estimates from 11 studies) and for minority[11] students only (41 estimates from 12 studies). Note that those sub-group analyses include the full-study estimates for the few studies whose treated students were 100% eligible for FRPL or were 100% minority. Also, since data on disadvantaged students included just one study of dichotomous outcomes for minorities and just two estimates of dichotomous outcomes for low-SES students, those estimates were converted into Cohen's *d* estimates.

Calendar characteristics of interest. To consider my second research question, I consistently recorded two independent variables of interest. Single-track YRE calendars can differ from each other on two important axes. Single-track YRE can be implemented in a variety of calendar structures—whether a calendar has 30 days of instruction followed by 5 of vacation (called 30-5), 45 days of instruction followed by 10 of vacation (45-10), 45-15, 60-20, or another alternative—which could moderate the impact of the calendar type on student achievement. Unfortunately, reporting of calendar structure was very inconsistent. Of studies in the final sample, only 11 (38%) reported a single calendar structure analyzed. Another six (21%) reported the combined performance of multiple schools following different calendar structures. Though 11 (38%) did not provide calendar structure information, I contacted authors and was able to add structure information for 8 of them. Table 3.2 thus shows a calendar structure for 19 (66%) studies, revealing that the 45-10 structure was recorded twice as often as any other structure.

Single-track YRE calendars can also differ in the number of weeks to which summer vacation is shortened. Schools shorten their summer from the traditional 10 weeks to lengths ranging from 4 to 8 weeks; given the concern about summer learning loss, it would not be

[11] Some studies reported data for White, African American, and Hispanic students, others reported White and non-White students. I use the term *minority* to refer to non-White students throughout this paper, even though Whites were less than 50% of students at some of the schools studied.

surprising for those lengths to moderate the effectiveness of single-track YRE. Reporting of longest break was similar to that for calendar structure, with 13 (45%) reporting a break length and another 2 (7%) reporting the combined performance of multiple schools with breaks of different lengths. Again, I was able to supplement reported data by contacting 4 (14% of) authors about the length of summer break, but for 10 studies (34%) no data are available. The studied schools with available summer length data show large variation in that length: one as short as 4 weeks, two at 5 weeks, six at 6 weeks, two at 7 weeks, and four at 8 weeks long.

Study, school, and sample characteristics. For each study, I recorded standard information on the study and report itself. For the studies, this included the report author, year of publication or release, published/unpublished status, and the matching protocol used to identify the comparison school(s). For the treatment schools examined, this included the state in which the schools were located, years of student testing data included, and the type of score used for the outcome measurement. I also recorded sample/student characteristics associated with each estimate. For studies that separately reported the outcomes for multiple student groups, I recorded these characteristics data separately for each estimate within those studies. I coded the grade range of the students tested, a value for school type (elementary [K-5], middle [6-8], or high [9-12] school), the percent of treatment-group students that were Hispanic or African-American (subsequently referred to as "minority"), and the percent of treatment-group students that were eligible for free/reduced price lunch (FRPL) or otherwise were designated low-income.

Effect Size Calculation and Analytic Approach

I used the data in each study in the final sample to calculate one or more effect sizes for math and for reading. For continuous outcomes I calculated Cohen's *d*, which is the difference in outcome between the treatment and control groups divided by their pooled standard deviation

(Borenstein, 2009). Because only four estimates had combined treatment and control samples of less than 100 and none were under 50, the small-sample correction (to use Hedges' g) was not needed (Hedges, 1981). For dichotomous outcomes – percent proficient, percent passing, etc. – I calculated odds ratios and logged odds ratios (Fleiss & Berlin, 2009). Findings are presented in odds ratios, for ease of interpretation. For both outcome types, I extracted the figures on two separate occasions (in many cases, separated by several months) and calculated the effect size estimate and variance using each set of figures, achieving reliability over .96 and correcting all non-matching estimates. The two types of outcome are analyzed separately both to allow for interpretation of meta-analytic estimates to remain close to the results of the original articles, and also because it would not be surprising for there to be a larger difference in means than in dichotomous outcomes. Given that YRE is intended to combat summer learning loss, which is concentrated among lower-SES and often lower-performing students, the effect of YRE might be to improve the achievement of students but without shifting below-proficient students to proficiency.

Missing data. Studies that did not report all data necessary to calculate an effect size were handled in one of three ways. First, authors were contacted in order to seek supplemental information to allow for standard calculations. For a subset of studies whose authors could not provide additional data, the N and mean but not standard deviation figures were provided. Standard deviations can be imputed for effect size calculations with continuous outcomes (Furukawa et al. 2006, Philbrook, Barrowman, & Garg 2007, Stevens 2011). For studies missing standard deviation data, standard deviations were imputed (singly for YRE and traditional-calendar students, by subject) based on other studies in the analytic sample with the same outcome (e.g. TerraNova or national percentile rank). Table 3.3 shows the studies in the third

group: studies for whom comparable data for extracting an effect size was not included in the study, was not available from the author, and could not be imputed.

Studies with dependent estimates and final meta-analytic calculation. The structure of the data from my final sample complicated selecting a final model for estimating the average effect size for single-track YRE. The effect sizes extracted from studies with multiple estimates were heterogeneous in their structure. Twelve studies reported one estimate, the remainder had more than one estimate, but not with a consistent hierarchical relationship. Several provided multiple grades of data for the same year, multiple years of data for the same grade, or reported multiple races for the same grade in multiple years. While those data structures do not create statistical dependencies in the estimates, three studies provided estimates following the same cohort of students (or multiple cohorts) for multiple years, which would have correlated errors among the repeated measures of the same students if all estimates were included in a weighted average. Common approaches to meta-analytic calculations for studies with multiple effect size estimates were not appropriate for these data, but robust variance estimate (RVE) was.

Several typical techniques for resolving within-study dependence are not suitable to the single-track YRE effect sizes. It is common to calculate a simple or weighted average of multiple effects size estimates from a study in order to produce a single estimate for that study (used in 42.9% of meta-analyses according to Ahn, Ames, & Myers (2012)). This aggregation approach, though, does not properly account for the correlation among those within-study estimates (see Becker, Hedges, & Pigott 2004, Kim & Becker 2010, Gleser & Olkin 2009, Raudenbush, Becker, & Kalaian 1988). Multivariate meta-analysis is the most common approach for addressing dependence among estimates (see Gleser & Olkin, 2009; Hedges & Olkin, 1985; Raudenbush, Becker, & Kalaian, 1988), but it requires within-study correlation statistics

(Becker, Hedges, & Pigott, 2004; Jackson, Riley, & White, 2011) which are not available for my final sample. Three-level meta-analysis may be able to account for hierarchically structured effect size estimates (Konstantopoulos, 2011), but there are insufficient estimates in this final sample for a three-level model to be appropriate. Meta-regression would also be mismatched without a larger sample of studies (Borenstein, Hedges, Higgins, & Rothstein, 2009).

Meta-regression with RVE addresses precisely the data problem in the single-track YRE dataset. RVE was developed to estimate meta-regression coefficients in models with dependent effect sizes and properly account for those statistical dependencies, when the structure of their dependence is unknown (Hedges, Tipton, and Johnson 2010a; Hedges, Tipton, and Johnson 2010b). In a test of possible ways to address dependence in effect sizes, RVE estimates were found to be consistent with other methods, and both the effect size and heterogeneity estimates were robust to variations in the intraclass correlation value p (Scammacca, Roberts, & Stuebing 2014). RVE has been validated (Moeyaert et al. 2017) and is increasingly used to account for the dependence of multiple within-study estimates in meta-analyses in education (e.g. Clark, Tanner-Smith, & Killingsworth 2016, Conn 2017, Dietrichson, Bøg, Filges, & Jørgensen 2017, Gardella, Fisher, & Teurbe-Tolon 2017, and Swanson et al. 2017).

Final meta-analytic calculation. Hedges et al. (2010a) discuss the hierarchical dependence form of RVE as applying to multiple studies produced by the same lab. My final sample has hierarchical dependence from multiple estimates (of different but not independent samples) from the same study, so the same type of correlation needs to be accounted for. I therefore use hierarchical weights in the RVE rather than the correlated effects weights which are intended for addressing the dependence among multiple measures of the same outcome or group. Hedges et al. (2010a) find that 50 estimates from 10 studies leads to almost nominal results

(0.944 to 0.957 for the nominal 95% confidence interval), with nearly nominal results for less-balanced distributions of estimates, confirming that the YRE sample is large enough to produce valid RVE estimates. Additionally, my models made use of a small sample correction to both residuals and degrees of freedom in order to reduce the Type I error rate (Tipton 2014). The RVE calculation of the meta-regression coefficient only (i.e. the effect size value of interest) can be used with as few as 10 studies (Tanner-Smith & Tipton 2014). My sample is therefore large enough to use RVE to estimate the effect size of YRE. My final model, run separately for math and for reading, is an RVE meta-regression calculation of the coefficient only, using the small sample correction and hierarchical weights.

Results

The analytic sample for this synthesis was 30 studies. Three sets of analyses were conducted on their effect sizes. First, I conducted a main effect calculation, using RVE to calculate a cross-study weighted average (correctly accounting for correlated errors) for continuous and dichotomous outcomes in reading and math. I then conducted analyses of this same structure restricted only to estimates for low-income students and only to estimates for minority students, because the theory of summer learning loss might predict YRE to provide greater benefit to disadvantaged students. I also conducted analysis of this structure divided by grade span, to assess whether there appear to be differential effects in elementary and middle schools (i.e. based on student age). Third, I conducted RVE analysis of the studies of 45-10 and 45-15 calendars, and weighted average estimates of the studies of schools with summer break lengths of various numbers of weeks, in order to investigate the relationship of calendar characteristics to student learning in year-round schools. In addition to these three analyses, I completed a check of how the study identification strategy related to outcome estimates.

Table 3.1

Characteristics of Studies in Final Sample

Study author and year	Math E.S.	Reading E.S.	N, YRE students	State	Calendar structure	Weeks of summer	Grade level
Continuous outcome of mean achievement score							
Abakwue 2011	+0.10	+0.36	120	TN			8
Carl 2009	+0.69	+0.35	726	WI	10-day breaks	~4	3-6
Cary 2006	+0.07	+0.20	466	VA			3, 5
Coopersmith 2011	+0.21	+0.13	7,148	TX	45-15[a]	4-6[a]	6-8
Crow 2009, Crow & Johnson 2010[b, c]	-0.15	+0.00	163	TX	45-10[a]	8[a]	3-5
D'Alois 2005	+0.13	+0.02	167	VA	45-10	4	3, 5
Fritts-Scott 2005	+0.05	-0.09	451	AR	Mixed	8	1-3
Graves 2009, 2010	-0.04	+0.06	~17,000	CA	Mixed	Mixed	Avg. 3.6
Lindsay-Brown 2010	-0.04	-0.16	113	SC	45-15	6	4
Malicsi 2003	-0.14	+0.51	1,099	Guam	45-15		1, 3, 5
Marks 2006	+0.07	+0.30		TN	45-10	8	6
McLean 2002	+0.36	+0.15	71	OH	45-15	5	5-8, 11
McMillan 2005	+0.16	+0.14	219	TN	45-10[a]	7	3-5
Merill 2012		+0.11	42	IL	45-10[a]	6	5
Moore 2002, Moore & Verstegen 2004[d, e]	+0.29	0.03	64	VA	Not standard	~6	3-4
Ramos 2006, 2011[e]	+0.29	+0.48	74	CA/ID/IA	45-15	"~6"[a]	5
Sexton 2003[e]	+0.27	+0.08	87	VA			8
Thomas 2002	+0.28	+0.31	446	TX	¾ 30-5		10
Trent 2007	+0.16	+0.14	330	TN	45-10[a]	7	6-8
Varner 2003	+0.01	+0.49	146		45-15[a]	"slightly over 8"	3
Wilmore-Dafonte 2013[c]	0.06[a]	+0.08[a]	11,608	TX	Mixed	Mixed	5

Table 3.1 (cont'd)

Study author and year	Math E.S.	Reading E.S.	N, YRE students	State	Calendar structure	Weeks of summer	Grade level
Dichotomous outcome (percent proficient, percent passing, etc.); E.S. in odds ratio							
Beazley 2001	1.21	1.02		AZ	Atypical	6[a]	9-12
Carl 2009	0.79	0.83	3,228	WI	10-day breaks	~4	3-6
D'Alois 2005	1.54	1.37	297	VA	45-10	4	3, 5
Evans 2007[f]	2.15	3.37		IN			3
Ferguson 2001	3.96	0.54		VA	45-10		5
Helton 2001	0.98	0.91		FL		"~5"	4-5
Kellems 2006, Oppel 2007[f]	1.34	1.25		IN	45-10[a]		3, 6, 8, 10
Mitchell-Hoefer 2010	1.34	0.95		SC	45-10[a]		3-5
Schumacher 2015	1.09	1.12	620	NE	Atypical	5	3-5
Thigpen 2004	0.55	0.59		MS	45-15		2-5
Winklemann 2010	0.88	0.99		IL	45-15 most common	6	3

Note. Data extracted from primary study documents.
[a]I am indebted to the authors who shared additional, unpublished data for inclusion in this meta-analysis.
[b]The sample for this study is buildings, not students (student-level results were not provided), so its results may be under-weighted in analyses.
[c]Both studies include 5th graders in Texas in 2006-2008, so it is possible that these results include the same students (both studies anonymized the schools analyzed). This would involve a maximum of 164 students' results, so it should not bias the results in a significant fashion even if those students are included twice.
[d]Parental sign-up for the year-round school was voluntary.
[e]Single track school co-located with a traditional calendar school.
[f]Kellems (2006) and Oppel (2007) conducted analyses of the same school and year, though for different grade/subject combinations. Estimates were extracted from both studies, but analyzed as if from a single study. The 3rd graders in Kellems (2006) and Oppel (2007) represent 2 of the 58 estimates in the Evans (2007) study.

Descriptive Characteristics of Studies

Table 3.1 shows the characteristics of the 30 studies included in my meta-analytic calculations. It reveals variety in state, grades served, calendar structure, and summer length. Table 3.2 shows the characteristics of the nine studies that otherwise met inclusion criteria but had academic outcome data from which a comparable mean difference could not be extracted.

Atypically, the majority of the studies in Table 3.1 and Table 3.2 are dissertations[12]. Published works, perhaps in order to increase their sample size to make statistically significant findings easier to achieve, tended to look at mixed single- and multi-track YRE. As a result, excluding mixed studies resulted in a final sample with 3 reports, 2 conference presentations, 5 articles, and 20 dissertations. Readers interested in greater detail about the final sample, including achievement measures, identification strategy, and modeling, should refer to Table A1.
Both tables illustrate the weak reporting of calendar structure and summer length in primary studies of YRE. Descriptively, it is of interest that Table 3.1 shows that two of the six negative Cohen's *d* effect size estimates are from the only two studies of schools that retained an 8-week break for summer, rather than a shorter break (with two more from schools with 6-week breaks, and none for studies reporting schools with summer shortened to 5 or 4 weeks). The 30 studies examined predominantly 45-10 or 45-15 calendars serving students in grades 3–5. Only three studies included grades earlier than 3, and only three studies examined high school students.

The descriptive features of the studies whose results could not be included in my meta-analytic calculations are similar to those of the included studies. These nine studies are primarily of late elementary grades, conducted in a variety of states and with weak reporting of calendar structure and summer vacation length. Table 3.2 reveals that all of the statistically significant findings were of positive effects for single-track YRE.

[12] Even for two studies that appear in published form as well, I refer to the dissertation as the primary source document, because the dissertations include the data needed to calculate effect sizes, while publication page limits can preclude that. As later descriptive statistics illustrate, the studies of only single-track YRE included smaller Ns than most publication outlets prefer; I suspect that this is a contributing factor in the tendency for published works to mix single- and multi-track schools' achievement. Several authors of dissertations in final samples subsequently worked as school administrators, creating less of a career incentive to seek publication than doctoral students who matriculate to university positions.

Table 3.2.

Characteristics of Studies Meeting Criteria, but Reporting Non-Comparable Outcome Data

Study author and year	Analysis and finding summary	State	Calendar structure	Weeks of summer	Grade level
Anderson 2009	Two-level regression with interaction term for YRE/grade. Positive for both subjects; author estimated *d* .03-.10	HI	Not standard	6	3,4
Graves 2011	Change in % at 25th, 50th, 75th percentiles from YRE and number of years on calendar. More negative than positive coefficients, sensitive to specification, about half significant.	CA	Mixed	Mixed	All
Johnson 2005	T-test of difference in mean of % proficient (with no way to extract odds ratio); statistically insignificant findings in math and communication arts.	MO		6	3,4,7,8,10,11
Marlett 2007	4-way ANOVA with positive, insignificant effect for reading (no math analysis).	IL	45-15		3, 8
Tittermary et al. 2013	School-level gain relative to predicted. Black students made faster gains, esp. in math, at YRE schools; as did Hispanic and economically disadvantaged students.	VA	Mixed	"~6"	3-5, 7-8, 11
Mixed subjects into single outcome variable					
Beringer 2002		Mixed	45-15 & 45-10	6	11
Corbett 2003		AL	Mixed	Mixed	4
Stenvall & Stenvall 2001		CA	Mixed	Mixed	Mixed
Wilmore & Slate 2012		TX	Mixed	Mixed	5

Note. Data extracted from primary study documents.

[a]I am indebted to the authors who shared additional, unpublished data for inclusion in this meta-analysis

Meta-Analytic Findings: RVE Overall and Sub-Sample Analyses

For each study that included multiple estimates I used inverse-variance weights to calculate a single effect size for each study to display in Table 3.1. However, I used RVE meta-regression (intercept only) with the small sample correction to combine all effect sizes across studies into an estimated effect size for single-track YRE.

Table 3.3 reveals that the RVE estimates of the effect of single-track YRE differ for continuous and dichotomous outcomes. Effect sizes for mean performance are always positive and sometimes statistically significant. The odds ratios, instead, are at close to 1, indicating no average effect. This combination of overall effects estimates may indicate that the effect of YRE is in improving the performance (or diminishing the summer slide) of students below proficiency, but that possibility could not be tested with these data. The overall Cohen's *d* estimates are large relative to the estimated size of summer learning loss (estimated at 0.11 in reading and 0.16 in math), but counter to expectations, the estimate for reading (.17) is larger than the estimate for math (.08) for the full sample. Also unexpectedly, the values for low-income students (.08 math, .14 reading) and for minority students (.04 math, .11 reading) are not larger than for the full sample. More aligned with predictions is the fact that the reading effect size estimate is larger than the math effect size estimate for the minority and low-SES subsamples. In math, the apparent effect of single-track YRE is greater in middle school than in the elementary grades. This could be because elementary math skills like addition or multiplication may be more likely to be used during summer months than middle-school math like algebra. Given that estimates for subgroups are based on a small sample, they should not be interpreted as conclusive; but they do seem suggestive that the conceptualization of YRE as particularly effective for disadvantaged students may be an over-simplification of a more

Table 3.3.

Average Estimates of Math and Reading Effect Sizes for Overall Sample and Sub-Samples, RVE

Sample		Cohen's *d*, Math	Odds Ratio, Math	Cohen's *d*, Reading	Odds Ratio, Reading
Full Sample	Estimates	0.08*	0.96	0.17**	1.03
	95% CI	[0.02, 0.15]	[0.73, 1.27]	[0.08, 0.27]	[0.68, 1.55]
	Tau^2	0.000	0.1557	0.0058	0.0775
	$Omega^2$	0.043	0.000	0.0213	0.000
Disadvantaged Students					
Low-SES	Estimates	0.08		0.14	
	95% CI	[-0.03, 0.18]		[-0.05, 0.32]	
	Tau^2	0.0335		0.0251	
	$Omega^2$	0.000		0.000	
Minority	Estimates	0.04		0.11	
	95% CI	[-0.09, 0.16]		[-0.05, 0.27]	
	Tau^2	0.0281		0.0243	
	$Omega^2$	0.000		0.000	
Level of School					
Elementary[a]	Estimates	0.06	1.03	0.18*	1.13
	95% CI	[-0.06, 0.17]	[0.64, 1.65]	[0.03, 0.32]	[0.58, 2.20]
	Tau^2	0.000	0.2218	0.0172	0.0503
	$Omega^2$	0.1016	0.000	0.0331	0.0335
Middle[a]	Estimates	0.16*		0.17*	
	95% CI	[0.04, 0.28]		[0.02, 0.32]	
	Tau^2	0.000		0.000	
	$Omega^2$	0.0292		0.0068	

Note: Based on the number of estimates included, especially in the subsample analyses, random effects are probably inappropriate, despite the statistically significant heterogeneity present in the fixed-effects models. These calculations exclude the Crow (2009), McMillan (2005), and Moore (2002) sources that have dependent estimates.
$+p < .10$. $*p < .05$. $**p < .01$. $***p < .001$

[a]Elementary grades defined as K-5, middle grades as 6-8

nuanced situation. The effectiveness of single-track YRE for disadvantaged students may warrant particular focus in future research.

For both dichotomous and continuous outcomes, Table 3.4 reveals important differences in estimates for analyses using differing identification strategies. Studies comparing YRE students to others in the same school district, county, or other geographic proximity show *d* estimates more than twice as large as in the full sample of studies, although proficiency estimates are marginally smaller. Cohort comparison analyses produce larger-magnitude effect size

estimates in reading, but an insignificantly negative *d* estimate in math. The results for studies using matching look very like the overall estimates: insignificant estimates for dichotomous outcomes (though with slightly larger point estimates than for the full sample of studies), +0.09 for math, and +0.11 for reading.

Heterogeneity. I tested for heterogeneity among the effect size estimates provided by the studies in my final sample using both tau squared (τ2) and omega squared. In RVE analysis using hierarchical weights, omega squared is a measure of variation in within-study (within-cluster) estimates of effect. Tau squared, instead, estimates variance between clusters (studies), and is therefore more similar to the meta-analytic measures of heterogeneity with which readers may be more familiar (Fisher & Tipton, 2015; Higgins, Thompson, Deeks, & Altman, 2003). I will emphasize the τ2 figures, as a measure of whether the effect size estimates are measuring a single 'true' effect, or whether instead the between-study differences are indicative of multiple underlying estimates. Phrased differently, a larger value for τ2 indicates that a relatively large proportion of the variance in effect sizes is due to actual differences in what they are measuring; a smaller value for τ2 indicates that the effect size estimates are varying around a single mean. The estimates for tau squared in RVE models of dichotomous outcomes are much larger than for Cohen's *d* (meaning that there is greater heterogeneity). This is not surprising, given how sensitive proficiency rates are to shifts in cut scores. For the mean difference analyses, estimates for tau squared are in general quite small: zero for four of the estimates in Table 3.3, and never above .0335 (for math for low-SES students), a pattern which is true in Tables 3.5 and 3.6 also. The estimates can be transformed into standard deviation estimates – estimates of how stable or varied the true effect is – for each model (Borenstein et al. 2009). For example, for low-SES students in math, the value of 0.0335 implies a standard deviation of 0.183, or an estimate that

Table 3.4.
Sensitivity of Estimates to Identification Strategy of Primary Studies

Sample		Cohen's *d*, Math	Odds Ratio, Math	Cohen's *d*, Reading	Odds Ratio, Reading
Full Sample	Estimates	0.08*	0.96	0.17**	1.03
	95% CI	[0.02, 0.15]	[0.73, 1.27]	[0.08, 0.27]	[0.68, 1.55]
	Tau^2	0.000	0.1557	0.0058	0.0775
	$Omega^2$	0.043	0.000	0.0213	0.000
Identification Strategy					
Proximity (e.g. same county, district)	Estimates	0.19	0.85	0.36*[b]	0.85
	95% CI	[-0.14, 0.53]	[0.64, 1.13]	[0.07, 0.64]	[0.43, 1.68]
	Tau^2	0.000	0.1914	0.0284	0.0564
	$Omega^2$	0.4245	0.000	0.0030	0.0073
Cohort Comparison	Estimates	0.00	1.17	0.22	1.45+
	95% CI	[-0.23, .22]	[0.58, 2.37]	[-0.10, 0.53]	[0.86, 2.42]
	Tau^2	0.000	0.0506	0.0068	0.0035
	$Omega^2$	0.0433	0.000	0.0443	0.0184
Matching	Estimates	0.09	1.25	0.11**[a]	1.17
	95% CI	[-0.04, 0.21]	[0.22, 7.28]	[0.06, 0.17]	[0.39, 3.44]
	Tau^2	0.0069	0.000	0.0005	0.1132
	$Omega^2$	0.0116	0.000	0.0081	0.0000

Note: Based on the number of estimates included, especially in the subsample analyses, random effects are probably inappropriate, despite the statistically significant heterogeneity present in the fixed-effects models.
+$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$
[a]Because of limited DF in RVE calculations, the p-value may be untrustworthy

95% of effect estimates will be between -0.28 and 0.44. Smaller estimates for tau squared imply much smaller bands for the range of effect size estimates; for example, 95% of reading estimates would be expected between 0.02 and 0.32. Across specifications, nearly half of RVE analyses produce tau squared values of zero, indicating a precise estimate with minimal variation in the underlying studies' estimates.

Calendar characteristics. Despite the incomplete reporting of calendar structure and summer length, I conducted preliminary analyses of how this calendar characteristics relate to study estimates. Table 3.5 reveals mostly-insignificant estimates that are suggestive of shorter summers and 2-week rather then 3-week breaks during semesters as beneficial to students. The odds ratio estimates by calendar structure, from subsample RVE calculations, have large and

Table 3.5.
Preliminary Analysis of Effect of YRE based on Calendar Characteristics

Characteristic		Cohen's *d*, Math	Odds Ratio, Math	Cohen's *d*, Reading	Odds Ratio, Reading
Calendar Structure, RVE					
45-15	Estimates	0.23	0.58	0.32+	0.63
	95% CI	[-0.18, 0.63]	[0.04, 8.87]	[-0.04, 0.68]	[0.04, 9.52]
	Tau^2	0.0064	1.1537	0.0213	0.000
	$Omega^2$	0.0999	0.000	0.0514	0.2978
45-10	Estimates	0.08	1.52	0.11*	1.13
	95% CI	[-0.04, 0.20]	[0.94, 2.46]	[0.01, 0.21]	[0.58, 2.20]
	Tau^2	0.000	0.000	0.0004	0.000
	$Omega^2$	0.000	0.0819	0.0180	0.0588
Weeks of Summer, weighted avg.					
4		0.57	0.80	0.28	0.84
5		0.36	1.08	0.15	1.09
"4 to 6"		0.21		0.13	
6		0.16	1.17	0.08	1.02
7		0.16		0.14	
8		0.00		0.11	

overlapping confidence intervals, but the estimates for 45-10 calendars are positive and for 45-15 are negative. For continuous outcomes, the math estimate is (descriptively) twice as large from studies of 45-10 calendars as 45-15 calendars; and the reading estimate, though smaller in magnitude, gains statistical significance. For summer length, the small number of estimates in each number of weeks made separate RVE analyses inappropriate. Instead, Table 3.5 reveals inverse-variance weight means by length of summer vacation. For both subjects, the largest *d* estimate is for the shortest summer. In math, each increase in summer length is (descriptively) associated with a lower effect size estimate, seeming to indicate that as summer is shorter, summer learning loss does indeed diminish.

Growth. Year-over-year growth is in several respects a better measure of policy effectiveness than achievement or proficiency. However, just seven of the studies in the final

Table 3.6.

Growth Outcome Analyses

Study author	Growth measure	Math difference	Reading difference
Anderson	Student-level growth in scale score, grade 3 to 4	+13.8	+6.91
Anderson	Student-level growth in scale score, grade 4 to 5	+6.65	+4.44
Carl	Average of student-level growth in scale score for non-mobile students 2005-2007, starting grades 3-6	+21.33	+10.86
McMillan	Student-level 3-year National Curve Equivalent gain scores, grades 3-5	+1.8	+0.01
Mitchell-Hoefer	Cohort change in share proficient, tracking students who stayed in the same school	-1.0	-10
Ramos	Student-level national percentile rank, 5th grade minus 3rd grade	+5.165	+1.645
Thigpen	Grade 3 to 5 change in share of students proficient; student-level analysis of students enrolled only in YRE or TR schools	+13.86	+5.68
Tittermary	Average SOL score compared to regression-predicted score. Reported as within 10 points or lower/higher than predicted. Figure is the share of students lower than predicted subtracted from the share higher than predicted.		
	Black	+19% (45-26)	+16% (29-13)
	Latino/a	-7% (33-40)	+7% (27-20)
	FRPL	+13% (43-29)	+6% (19-13)
Tittermary	Share of YRE schools at which student SOL scores grew faster than the average of traditional schools		
	Overall	55%	42%
	Black students	65%	74%
	Latina/o students	53%	76%
	FRPL	42%	61%

Note. Data extracted from primary study documents

sample report a form of growth, so assessment of the relationship between YRE and growth must be considered tentative. Additionally, the studies have different growth-related outcome variables – including school-level change in percent proficient, cohort change in percent proficient, student-level change in proficiency status, school-level growth in mean score, student-level growth in score, growth relative to predicted value – which makes producing an estimated average effect seem unwise. Instead, the individual study findings are summarized in Table 3.6. Across the outcome variable examined, the studies tend to find positive effects for student growth, which are modestly larger-magnitude in math than in reading.

Discussion

Across analyses, single-track YRE consistently shows no effect on dichotomous outcomes but shows an effect on average achievement in both reading and math. The estimates are relatively stable for elementary schools, middle schools, minority students, and low-SES students, but differ more depending on calendar characteristics and studies' identification strategies. Overall, though, the magnitude of achievement increase from single-track YRE is comparable to the magnitude of estimated summer learning loss.

The summer learning loss literature would have predicted a larger effect in math than in reading, which these data do not show. However, the estimates do indicate that single-track YRE outperforms traditional calendar education by approximately the same amount as Cooper et al.'s (1996) estimate of summer learning loss. In both subjects, the estimate is, though modest, large enough to be policy-relevant. Prior analysis has found effect sizes in the .1-.2 range to be important in education policy (Bloom, Black, & Lipsey, 2008; Hill, Bloom, Black, & Lipsey, 2008; Lipsey & Wilson, 1993) and, for example, the estimated effect was .11 for year-long Title 1 programs (Borman & D'Agnostino, 1996).

My most unexpected finding is that the YRE estimates are no larger for low-SES students, and are marginally smaller for minority students, than for the full sample. That difference may be a result of the relatively large proportion of the overall samples in the primary studies that were poor and minority. However, it may indicate an important mis-conceptualization about the mechanism of YRE's effect. Prior researchers have shown that low-income students progress at a rate similar to their peers during the school year but experience greater summer learning loss, resulting primarily from weaker access to educational summer opportunities than more-advantaged students. YRE is understood to counteract that summer learning loss, producing more benefit for the (low-income and minority) students for whom summer learning loss is greater. It is unclear whether the absence of larger effect for disadvantaged students is the result of a ceiling effect on the magnitude of benefit from YRE, the result of basically re-distributing learning loss during the year (i.e. differential advantages in access to educational resources during the not-in-session weeks during the schoolyear), or something else. Since YRE is an intervention intended both to help all students and to close achievement gaps, that my synthesis of research found no gap-closing indicates a need to further understand *how* YRE helps *which* students. Future research needs to seek better understanding of the benefit of single-track YRE on students of various demographics.

Limitations

There are two important analyses that could not be completed in as rigorous a method as would be preferred with the data available, because of extensive under-reporting of calendar characteristics. The summer vacation of schools in the final sample for this meta-analysis ranges from as short as five weeks to a high of eight weeks, with vacations as long as ten weeks appearing in other studies not included in this analysis. Given that one premise of YRE is that

the shortened summer break combats summer learning loss, a strong theoretical case can be made that shortening summer break to only 20 weekdays would be expected to have a different impact on students than a summer break shortened but still 40-50 weekdays long. However, less than half of the studies in the final sample reported the length of the summer vacation (and did not combine schools with multiple summer lengths to produce a single estimate of effect), which precluded formal analysis of whether a shorter summer is more beneficial than a longer summer within single-track year-round calendars.

Similarly, only half of the studies indicated which calendar structure the year-round schools being studied used (and did not combine schools with multiple calendar structures to produce a single estimate of effect). Again, a strong theoretical case can be made that the different calendar structures (30-5, 45-10, 45-15, 60-20, and 90-30) would be expected to have a different impact on students and teachers. Perhaps students on a 60-20 calendar need a few days of review after each four-week break, and so days are lost to review on that calendar structure. Perhaps, instead, teachers on a 30-5 calendar burn out because they get no lengthy breaks during the year and have a shorter summer than teachers on a traditional calendar. A 45-10 calendar might combine the strengths or combine the weaknesses of the calendars with more- and less-frequent breaks. Unfortunately, because so few studies clearly reported data on calendar structure and because those that did report structure almost exclusively followed two of the structures, I could conduct only a preliminary assessment of how calendar structure links with student achievement within year-round schools.

Finally, focusing only on single-track YRE restricted my sample. Especially among published studies, researchers usually merge single-track and multi-track schools into a single YRE "treatment." Including only single-track studies created a dissertation-heavy final sample

and contributed to the sample of studies being too small to make strong conclusions about the impact of YRE on disadvantaged populations.

Conclusion

As evidence of single-track YRE's effect grows, it becomes increasingly important to understand the characteristics that increase its effectiveness. Future research should therefore report results in a way that allows for variation in calendar structure and summer length to be studied in greater depth. There may be important differences in how different length summers and how 30-5, 45-10, 45-15, and 90-30 calendars impact teachers and students. Omitted calendar characteristics limit my ability to examine these important questions, so future work should clearly identify the length of the summer break and calendar structure.

The central conclusion from analyzing 2001-2016 data is that single-track YRE has a modest positive effect for average achievement, though no effect on proficiency rates. The magnitude of the effect size is sensitive to the subsample analyzed and the model used, but it is positive in all specifications. Given the relatively low cost of adopting single-track YRE, this analysis supports increased adoption of single-track YRE. Findings that single-track YRE has a greater effect for middle school than for elementary school in math need to be considered very tentative based on the smaller sample of studies and weaker model used in the grade-span analyses. However, they are new, as none of the final sample's studies compared effect across grades, and Cooper et al. (1996) only looked at secondary and elementary education. Consistent positive estimates for YRE, but only provisional information on effects by grade, by student characteristics, or by calendar structure is suggestive that future research should begin to focus on which types of single-track YRE are most effective for which types of students.

CHAPTER 4: CHALLENGES MITIGATING A DARWINIAN APPLICATION OF SOCIAL CAPITAL: HOW SPECIFIC ADVISING ACTIVITIES BY HIGH SCHOOL COUNSELORS CAN SHIFT MEASURES OF COLLEGE READINESS BUT NOT COLLEGE-GOING

Chapter 2 examined the effects of college eligibility and college knowledge on college enrollment, the quality of college attended, and how those effects differ by student characteristics. College readiness measures, though, can also be considered an outcome for high school students. A growing body of research indicates that college readiness can be moved by one or more treatments. Again, though, a school or district would not be deciding simply whether to provide college readiness supports for their students; but might be deciding, for example, what parameters to establish for requiring, receiving, and/or reviewing their students' education plans. In Chapter 4 I examined how well various designs of such a support relate to college knowledge outcomes, college eligibility outcomes, and college enrollment outcomes for various groups of students.

Rationale for Study

Access to postsecondary education in America differs substantially by socio-economic status (SES). Income gaps in access to post-secondary education are significant and may be growing (Alon, 2009; Bailey & Dynarski, 2011; Haveman & Smeeding, 2006). Of students in the top quintile of academic achievement, almost all students in the top SES quartile attend post-secondary institutions, but far fewer students from the bottom SES quartile do so, and much of this disparity may be caused by the information and guidance that low-SES students often lack (Plank & Jordan, 2001). In this study, I frame this disparity in information and guidance as an issue of social capital: disadvantaged students' social networks do not include knowledge of how

to navigate the path from secondary to post-secondary education. If schools learn how to target counseling efforts to supplement students' social capital and college readiness, then low-SES students may be able transition to post-secondary education at higher rates.

Research has shown that having more high school counselors and students actually meeting with counselors can help increase rates at which students enroll and succeed in postsecondary education (Belasco, 2013; Domina & Woods, 2014). A second set of research has shown that specific forms of college readiness, including college eligibility such as advanced mathematical course-taking (Byun et al., 2015; Gaertner et al., 2014; Gamoran & Hannigan, 2000; Muller et al., 2010; Zelkowski, 2011) and college knowledge such as completing the Free Application for Federal Student Aid (FAFSA) (Belasco & Trivette, 2015; Hoxby & Turner, 2013; Stephan & Rosenbaum, 2013) are linked with better postsecondary outcomes. However, most of the evidence that links the work of counselors to these readiness outcomes is limited and often based on small purposive samples. I bridge that gap by linking specific activities by high school counselors to specific demonstrations of college readiness by students in the nationally representative longitudinal data of the High School Longitudinal Study of 2009 (HSLS), and then assessing if that link differs for disadvantaged students, operating within social capital framework.

Social Capital

At its core, social capital is the idea that a person is impacted by the knowledge, norms, and resources held by their community, family, and social contacts (Bourdieu, 1987; Coleman, 1988; Portes, 1998). Parents with resource-rich social networks can provide more resources to their children and link their children to yet other resources; as a result, social capital often enhances the ability of individuals to improve their knowledge and, subsequently, long-term

status (Lin, 1999; Waithaka, 2014). Resource-rich networks are those with diverse members who share resources, expertise, and connections; in such networks, members have access to a greater amount of useful information (Lin, 2000). Social capital has many facets, but I focus on the type of knowledge available within a network. The social networks of low-SES students often include little knowledge regarding the college application process. Lower-SES students' lack of knowledge can impede them from attending college even when they aspire and intend to enroll (S. Goldrick-Rab & Pfeffer, 2009; Roderick et al., 2009). College-aspiring, academically well-performing disadvantaged students often fail to complete the steps to reach post-secondary education, simply because they do not know what those steps are. A critical premise of this study is that specific counseling activities related to college preparation can serve as supplementary social capital, and thereby enable low-SES students to better prepare for and transition to college than they would if they relied only on their out-of-school social capital.

The out-of-school social capital available to disadvantaged students typically provides little guidance on the transition to post-secondary education. The networks of low-SES students disproportionately consist of people who have not earned four-year degrees (Farmer-Hinton & Adams, 2006; Perez & McDonough, 2008). As a result, without the support of institutions like schools, low-SES students are typically provided little guidance on access and transition to tertiary education. For example, Noguera and Wing (2006) found that even within the same school, while white middle class parents readily discussed college preparation and college knowledge issues, lower-SES students were often not even aware of what Advanced Placement (AP) classes were until their junior year of high school. For Latinos, even parents with college degrees are disproportionately unable to pass on that advantage to their children (Alon, Domina, & Tienda, 2010). Without interventions to compensate, the transition from high school to college

functions as a nearly Darwinian application of social capital, in which academically capable low-SES students are filtered out of college (and the life-long benefits from post-secondary education) because of their low social capital and low social capital for college. Ideally, schools could serve as a supplementary network by linking students to adults who can share knowledge and resources to enable students to successfully navigate to and through post-secondary education. Counselors may be able to serve a bridging role, connecting students to resources and information beyond what their network provides (Lin, 2001).

Prior research supports the broad proposition that counselors can be an important factor in compensating for low-SES students' low social capital and lesser knowledge about college readiness. Low-income students whose parents did not attend college often rely on high school counselors as their single source of data (Cabrera & La Nasa, 2001). Engaged and effective counselors can encourage minority and first-generation students to pursue higher education (Farmer-Hinton & Adams, 2006). Some evidence indicates that, as this would predict, counseling to improve college knowledge can increase low-SES students' odds of enrolling in college (Castleman & Goodman, 2014). These findings are corroborated by analyses of ELS 2002 showing that accounting for differences in social capital decreases race and income gaps in college enrollment (Klasik, 2012). In this chapter, I investigate how specific advising activities impact specific demonstrations of college readiness and college-going for all students and for disadvantaged students, as a test of whether advising activities can indeed serve as a supplement to social capital from out-of-school networks.

Prior Research on College Readiness, College-Going, and Advising

Significant bodies of research have examined college eligibility, college knowledge, and the ability of high school counseling to shift college-going. The following sections summarize

each as a distinct stream of literature. Specific types of counseling activities, and their known link to student outcomes, are discussed in some detail because they guide the selection of treatment variables examined in this study.

Importance of College Eligibility and College Knowledge

Students' college readiness has important links with their access to and success in postsecondary education. As in Chapter 2, I distinguish between two components of college readiness: college eligibility and college knowledge (Roderick et al., 2009). In the framing of Chapter 4, though, college readiness measures are an (intermediate) outcome to be influenced by supports during high school. College eligibility refers to basic skills, academic skills, and content knowledge, including students having taken courses and received grades that earn entry into a typical 4-year postsecondary institution. College knowledge refers to awareness of the steps (e.g. taking the SAT/ACT, applying to colleges, seeking financial aid) in between aspiring to attend college and actually doing so. College knowledge has been identified as a critical area for high schools to help students with, in order to increase access to higher education (Conger, 2005). Counselors can mediate both factors, and I use High School Longitudinal Study 2009 (HSLS) data to investigate how.

College Eligibility. Taking advanced mathematical courses is a central element of being eligible to enroll in college. More advanced mathematical course-taking (reaching Algebra I, reaching Algebra II, and taking courses like pre-calculus) has a positive effect on college enrollment (Byun et al., 2015; Gaertner et al., 2014; Gamoran & Hannigan, 2000; Kim et al., 2015; Muller et al., 2010). Similarly, remaining enrolled in math through senior year may increase the likelihood that a student will complete a 4-year degree (Zelkowski, 2011).

Guidance regarding math enrollment may be particularly important for disadvantaged students. The effects of advanced mathematical course-taking on postsecondary enrollment and performance are larger for disadvantaged students, and divergent course-taking explains about a third of racial- and income-based gaps in college readiness (Long et al., 2012, 2009). Without interventions to compensate, black students are disproportionately tracked out of college readiness, even controlling for individual qualifications in early high school and for family background (Kelly, 2009). By shifting course enrollment decisions, particularly in math and at the beginning of high school, counselors can support students' matriculation to college.

College Knowledge. One component of college knowledge that has received significant attention is submission of the FAFSA. Submitting the FAFSA renders a student eligible for substantial student grants and loans, which makes college far more accessible to low-income students. FAFSA completion, and completion assistance, have both been linked with increased enrollment in 4-year institutions (Bettinger et al., 2012; Hoxby & Turner, 2013; Stephan & Rosenbaum, 2013). FAFSA completion also seems to increase the likelihood that a student will attend an institution that appropriately matches their academic ability, rather than an institution they are academically overqualified for (Belasco & Trivette, 2015). In response to these findings, high schools are increasingly encouraging FAFSA submission, requiring FAFSA submission, or providing assistance for students to complete the FAFSA.

Importance of Attending a Selective College. Long-term outcomes are widely understood to be better for students who attend college. Student outcomes are also better if they attend a more-selective institution. Students, including minority students, are more likely to graduate and graduate on-time as they attend more-selective institutions (Alon & Tienda, 2005; Cohodes & Goodman, 2012; Melguizo, 2008, 2010). The benefit to graduation rates appears to

be continuous rather than only true at quality cut-points (Shamsuddin, 2016), and students show higher future earnings as well (Hoekstra, 2009; Long, 2008). Despite these documented benefits, from one-quarter to one-half of US students undermatch – enroll in a college or university for which they are overqualified – and low-SES students are more likely to undermatch (Belasco & Trivette, 2015; Smith, Pender, & Howell, 2013). Particularly for low-income students, students who aspire to earn a college degree are enrolling at institutions which decrease the student's likelihood of earning a degree. Early evidence indicates that greater social capital for college can contribute to students preferring more-selective institutions (Hill, Bregman, & Andrade, 2015). If so, then supplementing students' knowledge could facilitate the matriculation of low-SES high school students to appropriately-matched colleges and universities.

Importance of High School Counseling to College Readiness and Postsecondary Outcomes

College readiness measures appear to be malleable based on high school counselors' work. Unfortunately, the research-to-date provides only minimal guidance for what high school counselors should actually do in order to help their students. One body of research has established that a lower student:counselor ratio (a lowered counselor caseload) is beneficial to students (Domina & Woods, 2014; Hurwitz & Howell, 2014). Another has shown that students benefit from actually meeting with a counselor (Belasco, 2013; Bryan, Moore-Thomas, Day-Vines, & Holcomb-McCoy, 2011; McDonough, 2005b). A third has linked specific small-scale activities or programs to student postsecondary enrollment or success (Domina, 2009; Plank & Jordan, 2001). However, the first two do not provide much guidance to counselors, and the third is based on non-representative local data of samples too small to allow dis-aggregation to examine differing student groups.

Benefits of Smaller Counselor Caseloads. Counselors are better able to help students when the number of students each counselor is responsible for is smaller. Unfortunately, counselors are typically overworked, especially in schools serving disadvantaged students. According to survey data, counselors spend only 13% of their time in college guidance and are often responsible for 500-700 students, which would compute to a national average of just 38 minutes per year on each student for academic and college advising (Domina & Woods, 2014; McCarthy, Kerne, Calfa, Lambert, & Guzmán, 2010; McDonough, 2005a). Additionally, counselors in schools serving more minority students often have less resources allocated for college preparation and planning (Bryan et al., 2011). This differential treatment is worsened by the fact that schools with more minority students tend to have fewer counselors. High poverty schools average 1.3 full and part-time counselors per school; public high schools overall average 2.6 counselors per school (McDonough, 2005a). Countering these problematic counselor workloads and thereby increasing students' access to counselors appears to be a successful way to improve postsecondary access.

Having a smaller caseload per high school counselor appears to be beneficial to students' college readiness and college-going outcomes. Research using the Education Longitudinal Study of 2002 shows that having a smaller counselor caseload at a school results in students being more likely to talk to a counselor about college, plan to attend college, take the SAT, and enroll in a four-year college (Domina & Woods, 2014). The magnitude and policy significance of these benefits may be large. Using regression discontinuity analysis of School and Staffing Survey data for states with maximum-allowed student:counselor ratios, Hurwitz and Howell (2014) estimate that adding an additional counselor is associated with a 10 percentage point increase in four-year college enrollment rates. Social capital theory emphasizes the way in which networks

with denser, stronger ties can provide more benefit (Burt, 2000; Lin, 2008). Students cannot gain a beneficial amount of social capital from a counselor who is overworked or who does not meet with them.

Why Counseling Matters. While recent research does not shed light on what specific counseling activities benefit college readiness, research has shown that counselors can be important for student outcomes. Simply talking with counselors can sometimes help students better proceed to post-secondary education. For example, analysis of ELS showed that student-counselor visits increase the likelihood of students enrolling in postsecondary education, with larger effects for low-SES students (Belasco, 2013). Also, initial analysis of 9th-grade-only HSLS data showed that talking to a counselor about going to college made it approximately twice as likely that a student planning to pursue a BA would plan to take the SAT/ACT, with even greater importance for first-generation college students (Radford & Ifill, 2013).

However, access to counselors is not always equitably distributed. An analysis of counseling resources in fifteen schools found that counseling is often more available for higher-performing students than for students in more basic courses (Perna et al., 2008). Given minorities' disproportionate enrollment in more basic coursework, this is particularly unfortunate, especially given other research showing the importance of counselors to minorities' path to college. Interviews illustrate that engaged and effective counselors motivated many African American students who enroll in higher education, with counselors also influencing movement to four-year rather than two-year institutions (Farmer-Hinton & Adams, 2006). Counselors can provide information on critical topics including why high school course selection is important, how the system of college testing functions, and what financial aid is available; all of which are especially important for students with no parents who attended college (Fallon,

1997; Stephan, 2013). While these foundational prior studies show the importance of counselors, they do not tell us what counselors should do, which students they should meet with, or which counseling activities matters more.

Initial evidence on specific advising activities. Correlational analyses, qualitative work, and evaluations of local programs provide initial evidence on counselor activities' effects, which guides my selection of treatment activities to examine. Quasi-experimental analysis of national data indicates that students who received college outreach had better academic outcomes and postsecondary enrollment rates, but by very modest amounts (Domina, 2009). That finding of a small effect for a broadly-defined 'treatment' is one part of why I instead focus on identifying specific activities' effects. Evidence also indicates that interventions matter more for disadvantaged students. For students with low family support, analysis of NELS data shows that strong school supports can increase students' odds of enrollment in a four-year institution from 50 to 75 percent (Plank & Jordan, 2001). A composite measure of the school providing guidance increased a student's likelihood of enrolling in a four-year institution by around one-third.

Prior studies guide my selection of 9th-grade course selection, multi-year course planning, and multiple points of contact with counselors as my treatment variables. Because of course sequences, 9th-grade course enrollment has implications for both whether students end high school college-eligible and how strong their college application transcript will be. As a result, creating a multi-year course plan may also be helpful to students. According to one analysis, the strongest predictor of 12th-grade math course enrollment is 10th-grade math course enrollment (Barbara Schneider, Swanson, & Riegle-Crumb, 1997). That makes careful selection of the 10th-grade math course important. In fact, according to analysis of the Educational Longitudinal Study of 2002, students who met with a counselor by 10th grade doubled their odds of applying

to college and increased their odds of applying to at least two schools rather than none by 3.5 (Bryan et al., 2011). In contrast, if college-focused advising does not start until junior or senior year of high school, students may already have made course-taking decisions that preclude them from college preparedness, particularly in math, science, or foreign language (Corwin, Venegas, Oliverez, & Colyar, 2004).

Continued support after initial course-planning appears to also be important. Even comparing students from the same starting point part way through high school, minorities – likely due to gaps in college knowledge and social capital – are less likely than whites to reach college-eligible math. Comparing white to African American and Hispanic students who enroll in Algebra 1 in 9th grade, minority students on average do not reach the same final math courses as their white counterparts (Riegle-Crumb, 2006). Even comparing students who have already completed graduation requirements, students diverge in their remaining course-taking, with African American and Latino students much less likely to take difficult twelfth-grade courses even if as of 11th grade they are on track to be college-eligible (Roderick, Coca, Moeller, & Kelley-Temple, 2013). This indicates that additional follow-up meetings may be of extra benefit to disadvantaged students' college eligibility. Multiple meetings with a counselor may also be important for college knowledge. Survey data show that when students feel their counselor knows them, they are more likely to choose a college based on its ability to help them secure a good post-college job, more likely to select a school based on its academic reputation, and more likely to go to college directly after high school (Johnson, Rochkind, & Ott, 2010). Student impressions are borne out in behaviors, with multiple counselor meetings but not solely 10th grade meetings increasing students' likelihood of applying to college (Robinson & Roksa, 2016)

With the data from a new national longitudinal study, I was able to look at what counseling activities matter for specific college readiness outcomes for students who differ in their academic qualifications and family resources. High schools may differentially impact inequity for different types of disadvantaged students (Jennings, Deming, Jencks, Lopuch, & Schueler, 2015) and type of disadvantage relates distinctly to college application (Klasik, 2012). Based on these findings, I looked at counselors' impact on students using several methods and definitions of disadvantage.

Linking College Advising Activities to College Readiness in HSLS Data

The prior literature on advising, college readiness, and college-going points toward three inter-related research questions that expand our knowledge base. First, how – in nationally representative data and accounting for the complexity of students' transitions – do specific advising activities relate to concrete demonstrations of college readiness? Second, how do those same counseling activities relate to actual college attendance? Third, how do those relationships differ for disadvantaged students? The HSLS 2009 provided an excellent resource for examining all three questions. I used multilevel logistic regression to identify which advising behaviors relate to increased odds of students demonstrating readiness for college and increased likelihood of actual enrollment. In this study I utilized the same detailed, nationally representative, longitudinal dataset as in Chapter 2 to link specific advising activities on the part of high school counselors to distinct demonstrations of college readiness by individual students.

Data

The High School Longitudinal Study of 2009 (HSLS) collected data on more than 23,000 students in 944 U.S. schools as 9th graders in 2009, with subsequent waves of data collection from 12th graders in 2012 and a year after on-time high school completion, in 2013. As was the

case for my work in Chapter 2, the HSLS has several advantages in analyzing the effect of counseling on college readiness and college-going. HSLS is the most recent nationally representative, longitudinal dataset. As such, these data provide information on college preparation that is pertinent to policy-making in the 2010s, with external validity to the full student population. The dataset is also large enough to allow for sub-sample analyses to examine multiple student subgroups, including racial minorities, economically disadvantaged students, educationally disadvantaged students, and students facing multiple disadvantage. HSLS also includes multiple measures of various counseling and college-going supports, which allows me to accurately reflect the complexity of the transition to post-secondary education by considering the marginal effect of specific treatments, net of other supports. As an additional reflection of this complexity, the rich data also allowed me to consider more than one outcome for each construct of college readiness, college knowledge, and college-going.

Using these detailed data, I was able to look at the link between advising and college readiness and enrollment behaviors for specific students over time, while accounting for a set of student, family, and school characteristics. Prior research provided very little guidance on which advising activities impact students the most. My starting hypothesis was that these analyses would show some advising activities to be more strongly linked to college readiness behaviors than others.

Measures

The variables used in this chapter overlap with those in Chapter 2 because the studies both deal with the transition from high school to college, but there are important differences in constructs and measures. The differences, driven by the differing theoretical framework and research questions of the two chapters, are summarized in Table 4.1. At its core, my analysis in

this chapter (a) focused on actual advising activities (specific to a high school education plan, but controlling for other common supports) that individual students benefitted from, (b) considered college readiness and eligibility as outcomes in some analyses, (c) accounted for the counseling resources present in students' schools, and (d) included measures of the social capital (for college) that students had access to.

My analyses considered three treatment levels of course advising activities which all focus on whether an individual student received support in planning their coursework. The HSLS provides data on whether a student put together no plan, an employment plan, an education plan, or a plan that includes both education and employment. I collapsed these categories into a dummy variable for whether the student developed a plan that included education (with or without employment). The group with such a plan is my reference group, and my models have a dummy variable to indicate students with no plan. I then examined the marginal benefit of two additional supports in academic planning. My first independent variable of interest was whether the student submitted their plan to the school, and the second was a binary variable for whether the student met with an adult in the school to review the plan at least once per year. With this construction, my analyses were able to examine – for students who were required to make an education plan – the marginal benefit to college readiness and college-going for having to submit that plan and having that plan annually reviewed.

The outcomes of interest were college eligibility, college knowledge, and college-going. I operationalized college eligibility as whether the 12th grade student is college-eligible in mathematics, meaning that the student completed both Geometry and Algebra 2, which are typically included in minimum 4-year college entrance requirements.[13] I was able to examine

[13] The main determination is based on credits earned in each, which is then supplemented by other variables including the highest math class completed and the current math course 12th-graders said they were taking. Students

Table 4.1.

Differences in Measurements Used in Chapter 4 (versus Chapter 2), and Rationale

Difference in Measures Used	Rationale
Variables in Chapter 2, not used in Chapter 4	
College Tour	Not as important an outcome as FAFSA measures
Exam Important	Too little differentiation to treat as an outcome variable
Grades Important	Too little differentiation to treat as an outcome variable
Courses Important	Too highly correlated with planning variables
College Exam	Per Chapter 2 findings, secondary CE measure behind math courses
12th Grade Math	12th grade math scores are partially a result of course enrollment
Variables New to Chapter 4	
9th Grade Math	Prior math performance influences math course placement
Advising/Planning Treatments	
Made No Education Plan	Included so that the reference category is students with a plan
Submitted Education Plan	Identifies the marginal effect of submitting an education plan in addition to just being required to make one.
Counselor Helped with Plan	
Annual+ Review	Differentiating the effects of early guidance and guidance at multiple times
Counseling Resources (Experienced Counselor, Counselor Largest Influence, One Counselor at School)	Moving beyond student:counselor ratio to include other measures of counseling resources,
Social Capital for College	
Majority of Friends Plan on College	Friends who expect to attend college are more likely to be able to share information about reaching college than students who do not share that expectation
Talked to Counselor about College, 9th Grade	Measure of whether student's social network of adults in school began sharing information about college in 9th grade
Talked to Mom about College	Whether family does or does not discuss college with student
Parents have Previous FAFSA Experience	Direct measure of whether parents have already helped navigate a sibling's application to college

Two forms of college knowledge using the Free Application for Federal Student Aid (FAFSA), which is an important component of college knowledge (Bettinger, Long, Oreopoulos, & Sanbonmatsu, 2009). I was able to look at whether 11th-grade students intend to submit the FAFSA, as a measure of whether they have timely understanding of the sequence of steps for transitioning to college, and also look at whether students actually submitted the FAFSA, as a measure of whether they successfully navigated the application of college knowledge.[14] I

not enrolled in any math class have an approximately normal distribution with a mean near that of students enrolled in math classes that do not demonstrate college eligibility, so unenrolled students are treated as not math.

[14] In all analyses, I exclude students who said no because they are ineligible or because they can afford college without the FAFSA. Descriptive statistics show that these students' characteristics align much more with the

focused on math courses and FAFSA (over, e.g., taking a college exam) based on their importance as identified in Chapter 2 and in prior research.

I operationalized college-going using three different outcome variables, all of which are binary. The first outcome was whether or not the student is enrolled in postsecondary classes the Fall after completing high school. The second as whether they are enrolled in a four-year (BA) program. The final enrollment outcome was the selectivity of the institution in which students at ranked (four-year) institutions are enrolled; where the reference category is selective and a value of 1 indicates highly selective.

I was able to control for a robust set of characteristics in my multivariate models. As in Chapter 2, I included common student, family, and school controls, augmented by educational attainment expectations and basic counseling supports, such as meeting with a counselor about college in 9th grade and/or in 12th grade.[15] In addition, I included multiple measures of the counseling resources available in a school to focus the variation captured by whether individual students received supports, not on the general availability of supports in their school.

I also included student, family, and school variables to account for knowledge available to the student in – social capital provided by – their environment. These variables were the percent of students at the school who matriculate to college, whether more than half of the student's friends plan to attend college, and (in models of actual FAFSA submission) whether

FAFSA 'yes' group. For these students, intent to submit the FAFSA is probably not a valid measure of college knowledge.

[15] In all cases where data were missing from the 2009 wave of data, missing values (for race, gender, parent education, and school-level characteristics) were replaced by values from the 2012 wave. For the few variables still missing data on covariates, I make use of flags for cases with missing values in order to retain those cases in my sample, after testing whether the variables are missing at random (MAR) with respect to treatment variables.

the student's parents have previously helped a family member apply for financial aid. For all variables, I present descriptive statistics of the analytic sample in Table 4.2.[16]

Analytic Strategy

As in Chapter 2, I used two-level logistic regression to examine how advising activities relate to students' odds of demonstrating college readiness. My primary specification was a two-level multivariate logistic regression including all student-level and school-level control variables, to examine how the treatment variables change the odds of college readiness and enrollment outcomes for high school students. Throughout this study, results in tables are again expressed in odds ratios for ease of interpretation. The conceptual model for each outcome variable in full analyses is:

$$\text{O.R. Outcome} = \beta_0 + \beta_1 T_1 + \beta_2 T_2 + \beta_3 \mathbf{A} + \beta_4 \mathbf{B} + \beta_5 \mathbf{C} + \varepsilon$$

where **A** is a matrix of student characteristics, **B** is a matrix of home characteristics, and **C** is a level 2 matrix of school characteristics. I included both T_1, submitting an education plan, and T_2, annual review of the education plan, in a single model where the reference category is creating a plan to reflect the complexity of facilitating college-going through multiple counseling supports. This configuration of the model allowed for an estimation of the marginal benefit of submission and review in addition to plan creation. The first-level equation included the student and family variables, with the second-level variables incorporating school demographics and counselor characteristics. For all the advising-enrollment relationships, I applied the same structure (as in Chapter 2) to student subsamples to investigate whether advising is more important for students facing greater disadvantage. This analysis strategy allowed my model to reflect much of the real-world complexity of the secondary-postsecondary transition; accounting for student ability, SES,

[16] Table C1 (in the appendix) shows the correlation matrix for all covariates. The only covariates that are highly correlated are expected to be so, e.g. a student's family income and their school's percent eligible for free lunch.

Table 4.2.

Descriptive Statistics for Analytic Sample; mean or percent

	Analytic Sample	Does not expect BA	Expects BA Only	Expects Advanced
Total Number of Records (N)		2,480	3,970	6,620
College Knowledge				
Actual FAFSA Submission	69%	54%	73%	80%
11th Grader planned FAFSA	33%	24%	35%	40%
Courses Imp for Col	64%	60%	62%	70%
College Eligible				
College Eligible in Math	78%	65%	82%	88%
Took Advanced Math	52%	30%	55%	70%
Education Planning				
Submitted Education Plan	33%	29%	34%	37%
Annual+ Review of Plan	22%	18%	22%	26%
Counselor Helped with 9th-grade Plan	11%	9%	12%	12%
No Education Plan	50%	58%	49%	44%
College-Going Supports				
Ed Plan 9th Grade	50%	44%	51%	52%
Counseled about College in 9th Grade	18%	15%	18%	20%
Counseled on Aid as Senior	48%	44%	49%	52%
Counseled on College as Senior	68%	56%	70%	77%
College Tour	53%	40%	47%	65%
Student Characteristics				
Female	51%	45%	49%	58%
Latino	20%	26%	18%	18%
African American	18%	19%	16%	20%
Native/Pacific or Other Race	15%	19%	13%	13%
9th Grade Math	0.91	-3.20	1.94	3.90
Did Not Apply to College	31%	33%	30%	30%
Family Background				
Parent has BA	41%	26%	46%	50%
Poverty	15%	23%	12%	12%
185% Poverty	35%	47%	31%	28%
Social Capital for College				
Majority of Friends Plan on College	51%	30%	53%	68%
Talked to Mom about College	80%	70%	82%	88%
Family has FAFSA experience	61%	67%	58%	59%
School Characteristics				
% Transition to College	53.3%	48.1%	53.9%	57.5%
% FRPL	38.5%	43.4%	36.6%	35.5%
Private School	8%	4%	8%	11%
Counselor Caseload	360.7	369.0	356.7	356.4
Experienced Counselor	80%	79%	81%	80%
One Counselor in School	12%	12%	11%	12%

Note. Data from HSLS restricted-use data file, using longitudinal student weights.

and aspirations, in addition to three minor college-preparation activities; accounting for family characteristics; and correctly nest students in schools, with measures for both standard school characteristics and also counseling resources. The approach let me estimate the marginal effect of plan submission and annual plan review, after accounting for an array of other characteristics, resources, and influences that shape students' preparation for post-secondary education, particularly including social capital.

The descriptive statistics for treatment, outcome, and control variables are shown in Table 4.2. In addition to the whole-sample figures, I present the sample split by students' educational expectations. The mean masks large differences, with students who have higher expectations showing modestly larger counseling supports and substantially larger college knowledge and college eligibility measures. The figures again reveal that students currently fail to prepare to meet their own expectations. For example, even among students who expect to earn a post-baccalaureate degree, less than three-fourths know that course selection matters for college acceptance and one in eight does not even reach college eligibility in math.

Results

Tables 4.3 illustrates the progression for three different outcomes from a model similar to that used in most research, through a model with multiple forms of treatment, to my full model that incorporates social capital measures. I again use BIC to assess whether the added covariates improve model fit enough to justify their inclusion; for all three outcomes, the answer is yes. The lower BIC in columns 3, 6, and 9 means that for each of intending to complete the FAFSA, reaching college eligibility in math, and enrolling in post-secondary education, a complex model with multiple college-going supports and multiple indicators of students' social capital for college better fits the data.

Table 4.3.

Model Building, Showing Benefit of Multiple Treatments and Social Capital Measures to Model Fit, Across Outcomes

	(1) Intent, Common Model	(2) Intent, Multi-Treatment (no SC)	(3) Intent, All Controls	(4) Math, Common Model	(5) Math, Multi-Treatment (no SC)	(6) Math, All Controls	(7) Enrollment, Common Model	(8) Enrollment, Multi-Treatment (no SC)	(9) Enrollment, All Controls
Counseling Activities									
Submitted Education Plan	1.23*	0.86	0.86	1.19	1.05	1.06	0.93	0.80	0.77+
Annual+ Review of Plan		1.69***	1.70***		1.20	1.21		1.26	1.30
Counselor Helped make 9th Grade Ed Plan		1.00	0.96		0.94	1.03		1.15	1.16
Made no Ed plan		0.89	0.89		0.88	0.92		1.02	1.07
Other College Supports									
Met w/Cnslr re College			1.28*			0.82			1.05
Mom Talked to 9th Grader About College			0.95			1.28			1.36*
Counseled on College as Senior				2.17***	2.17***	2.08***	2.91***	2.92***	2.80***
Counselor biggest influence			1.29			0.89			0.91
Student Characteristics									
Female	1.87***	1.86***	1.87***	1.15	1.14	1.10	1.66***	1.66***	1.58***
African American	1.06	1.03	1.00	0.71*	0.70*	0.71*	1.17	1.16	1.14
Latino	1.07	1.07	1.11	0.94	0.95	0.92	0.90	0.90	0.85

Table 4.3 (cont'd)									
Native/Pacific	1.05	1.06	1.07	0.94	0.94	0.94	0.86	0.86	0.84
9th Grade Math	1.02*	1.01*	1.02*	1.11***	1.11***	1.10***	1.05***	1.05***	1.04***
Majority Friends			1.01			1.57***			1.74***
Expect Col									
Expects BA (only)	2.28***	2.27***	2.19***	2.50***	2.48***	2.33***	2.47***	2.47***	2.20***
Expects Advanced	2.41***	2.37***	2.33***	2.89***	2.85***	2.61***	3.50***	3.50***	2.94***
Degree									
Parent has BA	0.85+	0.84*	0.84*	1.67***	1.67***	1.62***	1.91***	1.92***	1.84***
FAFSA			0.41***						
Previously									
No FAFSA (high income)	0.27***	0.27***	0.27***						
School									
Demographics									
% Transition to	1.00	1.00+	1.00+	1.02**	1.02**	1.02**	1.00	1.00	1.00
College									
% FRPL	1.01***	1.01***	1.01***	1.01	1.01	1.01	0.99	0.99	0.99
Private School	0.99	0.97	0.89	2.30	2.27	1.40	2.13**	2.13**	2.02*
Counselor									
Qualities									
Counselor	1.00	1.00	1.00	1.00	1.00	1.00	1.00*	1.00*	1.00*
Caseload									
Experienced			1.00			0.93			0.72
Counselor									
1 Counselor at			1.24+			2.00*			0.98
School									
N	13,160	13,160	13,160	13,160	13,160	13,160	13,160	13,160	13,160
aic	4071423	4054672	3991613	2704489	2702281	2671882	3030364	3027735	2981130

Exponentiated coefficients

Note: Data from HSLS restricted-use data file, using (3-wave + transcript) longitudinal student weights.

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

For all outcomes, but particularly for 4-year enrollment, the student controls are generally significant, and in some cases substantial, in the expected direction. Across outcomes, the family characteristics are significant and often large, as expected based on prior research on the transition to college. The school controls are, both in this example and for other treatment-outcome pairings, generally small. For percent free-lunch eligible and percent of students matriculating to post-secondary, the odds ratio estimates are almost always 0.95-1.05. However, they are sometimes significant, alter the values of the other estimates, are theoretically important, and improve model statistics, so I retained them to improve the precision and validity of the model.

In column 3, meeting with a counselor at least once per year is linked with an odds ratio of 1.7, showing substantively increased likelihood that students plan to submit the FAFSA. The benefit appears to come not from educational plan submission (which shows no effect), but from frequent contact with counselors. These results also reveal an underlying large gender discrepancy in FAFSA submission intent: 25% of male but 38% of female students said they planned to submit the FAFSA. As expected, based on the complexity of supporting student transitions, having met with a counselor about college in ninth grade also relates to FAFSA intent, as does a student's own educational expectations.

The results linking counseling activities to math eligibility and enrolling in a four-year program in Table 4.3 are complex. Although the coefficients on covariates generally have the expected direction for both outcomes, the education planning variables are small and insignificant. Interestingly, the coefficients for most measures of social capital for college (majority of friends planning to go to college, mother talking to 9th grader about college, parent

having a BA) have the largest-magnitude point estimates in column 9—the college-going outcome that is of the greatest substantive importance. The three outcomes in Table 4.3 represent only a subset of those examined, and they are primarily presented to show the improvements in model fit gained by retaining the multiple treatment and social capital measures that my research questions initially suggested including.

Table 4.4 reveals the coefficients of interest (i.e., the relationship between each of four advising activities and the college readiness/enrollment variable) summarizing the results of nine separate logistic regression models for college readiness and college-going outcomes, which include all control variables (full models in Appendix C). The results show a much weaker relationship between counseling activities and outcomes for the average student than might be expected. Only three coefficients are statistically significant at conventional levels, and four of the eighteen estimates show a negative relationship. The strongest relationships seem to be between annual review of a student's education plan and both FAFSA outcomes, but the overall main effects finding is that counseling activities are not helping average students very much.

Counseling Activities and Disadvantaged Students' College Readiness

The college advising and college readiness literatures both build on the premise that more-disadvantaged students are less prepared for college and may benefit more from better supports during high school. Focusing on the lack of knowledge in disadvantaged students' networks, counseling supports in particular may provide extra benefit to students with low social capital. As a result, I conducted a sequence of analyses to look at whether the treatment relationships are stronger for disadvantaged students. I again operationalized disadvantage seven different ways in order to understand the importance of advising activities for students facing different types of disadvantage. I ran the full model, restricted to samples of students below

Table 4.4.
Odds Ratios from Multivariate Logistic Regressions between Treatment and Outcome Variables, Full Set of Control Variables, for All Students

Treatment	Plan Submission	Annual+ Review of Plan	Counselor Helped 9th Plan	Made No Ed Plan
College Ready				
College Ready in Math	1.06	1.21	1.03	0.92
Pre-calculus	1.31+	0.85	1.02	0.84+
Advanced Math	1.17	0.88	0.97	0.88
FAFSA[a] Intent	0.86	1.70***	0.96	0.89
Actual FAFSA[a]	0.83	1.48*	0.85	0.93
Applied to 2+ Colleges	1.29	0.83	1.40*	0.97
College Enrollment				
Enrolled in Classes	0.77+	1.30	1.16	1.07
In 4-Year Program	0.98	1.05	0.95	1.01
Highly Selective School	0.95	0.82	0.98	0.98

Note. Data from HSLS restricted-use data file, using longitudinal student weights. Control variables from Table 4.2 are included in each model..

[a]Students who do not intend to submit the FAFSA because they are ineligible or have too high of a family income are excluded.

+ $p < 0.10$, *p<.05. **p<.01. ***p<.001

185% of the poverty level, non-White students, non-White students below 185% of the poverty level, students in poverty, students with no parent who earned a BA, students below 185% of the poverty level with no parent who earned a BA, and non-White students with no parent who earned a BA. Table 4.5 shows the full model results for some selected models for disadvantages students. Readers should note that these (a) are to illustrate the construction of the full models, and (b) were selected because their findings are more interesting than the majority of results. Table 4.6 summarizes the results (the coefficients of interest, expressed in odds ratio; the equivalent of the top two rows in 4.5) of all 72 regression models with different permutations of treatments, outcomes, and disadvantaged groups. In these models applied to subsamples, statistical significance becomes a less clear indicator of relationships of substantive importance, because the smaller sample size makes it computationally more difficult to achieve statistical

Table 4.5.

Selected Models of Plan Submission/Review and Various Outcomes for Disadvantaged Students

	(1) FAFSA Intent, Poor Students	(2) FAFSA Intent, Poor Minority	(3) FAFSA Intent, No Parent BA	(4) FAFSA Intent, Poor No Par BA	(5) Advanced Math, Poor	(6) Precalc, Poverty	(7) Adv Math Minority No Par BA
Counseling Activities							
Submitted Education Plan	0.84	0.80	0.75^{+}	0.71	2.74***	2.77***	2.00**
Annual+ Review of Plan	2.29**	2.59*	2.07***	2.33**	0.65	0.82	0.90
Counselor Helped make 9th Grade Ed Plan	1.37	0.84	1.27	1.50	0.66	0.56	0.68
Made no Ed plan	0.96	1.04	0.98	1.02	0.79	0.80	0.74
Other College Supports							
Met w/Cnslr re College	1.19	1.15	1.30^{+}	1.35	1.34	1.51	1.18
Mom Talked to 9th Grader About College	0.68^{+}	0.73	0.89	0.68^{+}	1.88**	1.85^{+}	2.10**
Counseled as Senior			1.03		1.62*	1.27	1.34
Counselor biggest influence	1.05	1.18	1.37	1.21	0.71	0.85	1.28
Student Characteristics							
Female	2.53***	2.83***	1.85***	2.23***	0.92	0.81	0.99
African American	0.97		1.07	1.06			
Latino	1.12		1.16	0.94			
Native/Pacific	0.89		0.86	1.10			
9th Grade Math	1.01	1.01	1.02*	1.02	1.07***	1.06***	1.09***
Majority Friends Expect Col	1.42*	1.65*	1.25*	1.61**	1.31	1.12	1.38
Expects BA (only)	1.62*	1.71^{+}	2.07***	1.50^{+}	1.03	1.41	1.38
Expects Advanced Degree	2.27***	1.95*	2.42***	2.03**	1.89*	1.99*	2.22**
Parent has BA	0.96	0.89			0.87		
FAFSA Previously	0.47**	1.25	0.44***	0.45**			
No FAFSA because high income	0.14***	0.14**	0.33***	0.16**			
School Demographics							
% Transition to College	1.00	1.00	1.01*	1.01	1.02*	1.02**	1.01*
% FRPL	1.01^{+}	1.00	1.01**	1.01*	1.00	1.01^{+}	1.01*
Private School	1.19	1.06	0.73	1.09	1.14	1.28	1.23
Counselor Qualities							
Counselor Caseload	1.00	1.00	1.00	1.00	1.00^{+}	1.00*	1.00***
Experienced Counselor	0.78	0.94	0.97	0.79	1.00	0.84	1.06

Table 4.5, (cont'd)							
1 Counselor at School	1.40^{+}	1.26	1.39*	1.50^{+}	0.89	0.60	0.85
N	3,120	1,530	6,560	2,560	4,360	2,660	2,660

Exponentiated coefficients
Note: Data from HSLS restricted-use data file, using longitudinal student weights.
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

significance at the same time as I am conducting a relatively large number of tests of significance (and the presented figures do not reflect any correction for the large number of comparisons). In Tables 4.5 and 4.6, the patterns in the magnitude of the coefficients on the relationship of interest may provide information that is masked by attention only to statistical significance. The results for all students are repeated in column 1 of table 4.6 for comparison with the results for disadvantaged students.

Table 4.5 reveals that for some outcomes, advising activities matter more for disadvantaged students than for the average student. However, these activities are only one component in a complex weave of supports on the path to college. In particular, other supports and social capital measures show positive relationships (with magnitudes that vary across the outcome/group pairings) in 4.5. The coefficients in Table 4.6 are all from models using this full set of controls, which can be seen in full in Appendix C.

Table 4.6 summarizes the results for all relationships examined. Interpreting such a large number of estimates, particularly with a majority of statistically insignificant estimates, is complex. Table 4.6 does reveal four important patterns in the findings, though, in addition to the unexpected finding that the advising activities when considered individually appear to do relatively little to support students' transition to college. First, advising activities show a pattern of positive relationships, some of which are significant and substantive. Second, counseling does not seem to have negative effects, and has larger effects on college readiness outcomes measured during high school than on college-going. Third, patterns of impact indicate that the most-disadvantaged groups may benefit most from receiving advising, and reveal that distal indicators are more responsive to treatments than proximal outcomes. Fourth, my findings emphasize that disadvantage is a multifaceted concept and multiple disadvantage is not simply cumulative

Few counseling activities show a systemic link to improved college readiness and college-going for the full sample. This finding runs counter to most prior research, which had linked counseling activities to college readiness and college readiness to college-going. However, this overall null finding should not be applied with too broad of a brush. The descriptive pattern in point estimates indicates lightly positive rather than lightly negative relationships. There are, for example, just 6 estimates under 0.8 for the math and FAFSA outcomes, and two-thirds of the significant estimates are for positive coefficients. More importantly, the estimates reinforce that the right treatment can make a difference, with some very large and significant estimates.

My findings introduce nuance by showing that desirable outcomes respond to different counseling activities. Plan submission shows no effect on FAFSA intent or submission, but annual plan review has a main effect (odds ratio of 1.7) on FAFSA intent. The same treatment

has larger effects for poor students, low-income minorities, students of low-educated parents, and low-income students with low-educated parents, more than doubling the odds that these disadvantaged students plan to complete the FAFSA. The selected counseling supports show no relationship with applying to multiple colleges for any group. The relationship between submitting an education plan and the highest math course is complex to assess. There is no main effect for any of the three outcomes, and no subgroup relationship for reaching college eligibility. However, for minority students and minorities with no parental BA, submitting an education plan is linked with approximately doubling the odds of taking advanced math. For the same two groups, submitting an education plan is linked with an odds ratio of about 2.75 for reaching pre-calculus. Given what prior research has shown about the mistakes that students with low social capital –particularly minorities – make by enrolling in ninth-grade courses that put them on track for ineligibility at four-year institutions, this finding matches the logic of the treatment. Conversely, given the lack of effect for other groups with low social capital and particularly for students whose parents did not attend college, it remains unclear whether these estimates constitute a substantive effect or a conveniently-believable artifact of making many comparisons.

The analyses of disadvantaged students show that it is easier to shift indicators than to shift proximal outcomes. For actual FAFSA completion, the same treatment that moved FAFSA intent overall and for several groups of disadvantaged student shows an effect only overall and perhaps for minority students, with smaller coefficients. In another illustration of the same challenge, my analyses show greater effects in college readiness than college-going.. None of the full-sample relationships shows a relationship with any of the three college enrollment outcomes that is either significant or large. The estimates for disadvantaged students show much less of a

Table 4.6.

Treatment Effect Estimates for Disadvantaged Students Across Outcomes in Multivariate Regression Estimates

	(1) All Students	(2) Poor Students	(3) Minority Students	(4) Poor Minorities	(5) Students in Poverty	(6) No Parent BA	(7) Poor No Parent BA	(8) Minority No Parent BA
College Ready								
Math CR Submit Plan	1.06	1.26	1.43	1.38	1.04	1.30	1.19	1.60
Math CR Plan Review	1.21	1.77	0.84	1.40	2.65	1.17	2.07	1.03
Advanced Math Submit Plan	**1.17**	**1.01**	**1.77***	**0.87**	**0.72**	**1.14**	**1.07**	**2.00****
Advanced Math Plan Review	0.88	1.15	0.71	1.62	2.65^{+}	0.93	1.29	0.90
Pre-Calc Submit Plan	**1.31**$^{+}$	**1.64**	**2.74*****	**1.59**	**1.20**	**1.37**	**1.28**	**2.77*****
Pre-Calc Plan Review	0.85	0.76	0.65	1.44	1.43	0.90	1.13	0.82
FAFSA[a] Intent Submit Plan	0.86	0.84	1.22	0.80	0.91	0.75^{+}	0.71	1.07
FAFSA[a] Intent Plan Review	**1.70*****	**2.29****	**1.27**	**2.59***	**1.57**	**2.07*****	**2.33****	**1.49**
Actual FAFSA[a] Submit Plan	0.83	1.32	0.77	1.00	1.69		1.37	0.75
Actual FAFSA[a] Plan Review	1.48*	1.28	1.71^{+}	1.84	1.08		1.17	1.54
Apply to 2+ Colleges Submit Plan	1.29	1.18	1.36	1.29	1.47	1.31	0.84	1.12
Apply to 2+ Colleges Plan Review	0.83	0.88	0.81	0.77	0.68	0.71	1.10	0.85
College Enrollment								
Enrolled in Classes Submit Plan	0.77^{+}	0.99	0.69	0.91	1.25	0.78	0.95	0.79
Enrolled Plan Review	1.30	1.35	1.81*	1.75	1.20	1.26	1.38	1.80*
4-Year Prog Submit Plan	0.98	0.96	1.15	1.52	1.29	0.95	0.79	1.29
4-Year Prog Plan Review	1.05	1.33	0.95	0.92	1.49	1.17	1.60	1.20
Highly Selective Submit Plan	0.95	0.13**	1.54	0.13	0.14*	0.87	0.10*	2.19
Highly Selective Plan Review	0.82	5.32*	0.55	8.81	11.96*	0.89	13.24*	0.69
Highly Selective Counselor Helped	0.98	0.25*	1.50	0.03	0.33	0.86	0.26^{+}	1.50
Highly Selective, No Ed Plan	0.98	0.37*	0.88	0.26^{+}	0.12**	0.72	0.21**	0.37*

Exponentiated coefficients

Note: Data from HSLS restricted-use data file, using longitudinal student weights.

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

pattern than in the college readiness outcomes. It appears to be easier for counselors to shift what students say they will do and their course enrollment decisions than to influence the college enrollment outcomes that matter most for long-term student outcomes.

Careful examination of the results also emphasizes the importance of dis-aggregating data and considering multiple types of disadvantage. The absence of main effect for plan submission and pre-calculus masks significant and substantial effects for minorities and minorities with low-educated parents. There is no main effect for plan review and any enrollment outcome, but the odds ratios over 10 linking annual review to attending highly-selective institutions for students in poverty and low-income students with low-educated parents are suggestive. Attention to these complexities in what works for whom is important for designing future interventions that best serve the needs of diverse students and helping overworked counselors prioritize what aid they provide to which students.

Sensitivity and Robustness

In most respects, the analyses in this chapter are robust to the same alternative analyses as in Chapter 2. Appendix D presents OLS results and Appendix E presents FE results for the 72 models (144 counseling-outcome relationships) that are shown in Table 4.6. The OLS analyses might point toward a slightly more positive assessment of the effect of counseling activities. For FAFSA intent, the same pattern is revealed in significance and relative magnitude. In OLS analyses, plan submission seems to relate more strongly to math course-taking: the relationship between plan submission and college eligibility gains significance, plan submission and precalculus looks the same as in HLM, and the estimates for plan submission and advanced math are larger in magnitude and more often significant. In contrast, the estimates for annual review and actual FAFSA submission lose significance. As in the main analyses, OLS shows no

relationship of any treatment with enrollment, 4-year enrollment, or highly selective enrollment. The fixed-effects analyses show, overall, less stable estimates across student groups (particularly, the magnitude of the coefficient on annual plan review and FAFSA intent varies more), but reveals the same main patterns. The models in 4.6, like the models in Chapter 2, are robust to a large number of variations in covariates, analytic sample, and measurements that were conducted at various stages of this study.

The exception is that the results are not robust to an approach that drops cases with missing data on covariates. That is, when cases with missing records (primarily on share of students at the school who matriculate to 4-year institutions and whether the student spoke with their counselor about college in 9th and in 12th grade) the estimated coefficients gain substantially in magnitude and significance. That is true both for the annual review/FAFSA and 9th grade submission/math course-taking relationships emphasized above, and also for a further relationship of 9th-grade plan submission to both college attended and quality of college attended. This seems to indicate that there are differences in the way that students who *are* missing data and students *not* missing data respond to the college advising supports; with students not missing data showing a larger gain from counseling activities. This nuanced sensitivity may point toward a future research project examining the differences between students (and their responsiveness to treatments) with full and partial responses to waves of survey data; but does not shift the primary conclusion in my analysis of counseling, college readiness, and college enrollment.

Discussion

My analyses of the detailed, nationally representative, longitudinal HSLS data show nuance in the importance of various advising activities to different groups of students'

demonstrations of college readiness. Multilevel multivariate logit analysis found weak main effects in the full-sample analyses, except that annual review of an education plan increases the likelihood that a 12th-grader will plan to submit the FAFSA (odds ratio of 1.7) and submitting an education plan increases the likelihood both that a student will take pre-calculus and to a lesser extent that they will take an advanced math course. Careful analysis of the results for disadvantaged groups showed that it was easier to shift college readiness than college-going outcomes and that students in poverty and poor students with low-educated parents may benefit the most from counseling. The combination of these sets of findings seems to reveal that some counselor activities can facilitate disadvantaged students' transition to college, but that the pertinent treatments and the size of their effect differs for college knowledge, eligibility, and enrollment.

Prior studies have found that advising can impact college readiness and that college readiness impacts postsecondary decisions. Despite efforts focused on FAFSA completion and math college readiness outcomes, disadvantaged students continue to show lower math achievement, insufficient FAFSA submission, lower college enrollment rates, and greater undermatch than their peers. A large reason for those deficits is weaknesses in disadvantaged students' social capital: students don't know the right steps to take in order to reach college and the benefits of attending more-competitive colleges. My analyses show a nuanced picture of intensive counseling activities that can help disadvantaged students, but that there are not broader population effects and that effects on interim measures may not persist to ultimate outcomes.

My work is this chapter is again limited by the characteristics of the national dataset that I analyzed. My analysis is also limited by the possibility that advisors are selecting students, or students are opting in (to the advising activities I analyze) based on unobserved characteristics

not controlled for through my covariates. That would bias my estimates upward, based on the correlation of those unobserved characteristics both with the advising activities and with the college readiness outcomes. The HSLS data also allowed me to analyze college readiness and enrollment, but not college success. College grades, persistence, and graduation outcomes will be important to investigate as future waves of data become available. College readiness and enrollment are primarily important for their precedence of and correlation with college success. Finally, the activities that relate to changes in college readiness relate to students *creating* a plan and then *reviewing* that plan with an adult in the school; but those activities are conditional on the school *requiring* a plan. Unobserved latent inequalities between those schools and others could also bias my estimates.

My findings of an association between plan submission and advanced mathematical course-taking, and between students meeting with a counselor at least every year and having enough college knowledge to plan to complete the FAFSA, contribute to a small literature on how specific advising activities link to specific student outcomes. The results illustrate that people, social networks, and supports do matter for students, but in a very nuanced way. It is noteworthy that the effects are larger for more-disadvantaged students; the magnitude of effect for several of the disadvantaged groups examined was large enough to be of substantive and policy significance in several outcomes. In decreasing the extent to which college access is driven by social capital, college counselors will need to focus their time on activities with track records of success. In order to achieve positive student outcomes and postsecondary access, it is critical that counselors provide supports that successfully support students, particularly for students whose networks otherwise lack individuals who can provide guidance on the path to college.

CHAPTER 5: SUMMARY AND CONCLUSIONS

Chapters 2-4 of this dissertation apply a specific research lens to three different topics. This nuanced approach, of considering how policy design characteristics relate to *when* and *for whom* a policy is more effective, could be applied in almost any realm of education policy. These three example applications each have policy implications and topical implications for research within their own area, and they jointly have implications for research methods across topics in education policy.

Summary of Findings

In Chapter 2, I conducted multi-level logistic regression analyses of nationally representative longitudinal data to investigate how two distinct types of college readiness relate to college enrollment when considered jointly. College knowledge measures (knowing to complete the FAFSA, actually submitting the FAFSA, knowing that course selection matters for college acceptance) related to large increases in whether students enroll in any post-secondary and smaller but still significant increases in whether students enroll in 4-year institutions. College eligibility measures (reaching college eligibility in math, taking a college entrance exam, taking advanced math) showed a weaker relationship to enrollment in any post-secondary, a stronger relationship to enrollment in 4-year institutions, and a connection between advanced math and enrolling in highly-selective institutions. Sub-sample analyses revealed that college knowledge can matter more for disadvantaged students, but that some college knowledge measures by themselves don't appear to impact outcomes beyond enrollment in any institution; while college eligibility measures, instead, showed much larger estimates for low-income, minority, and first-generation students on both enrollment and institution quality. My findings indicate that college knowledge and college eligibility relate differently to whether students

enroll and to the quality of where they enroll, and that the transition to college requires multiple supports. Distinguishing between multiple types of college readiness for different groups of students can facilitate more useful policy recommendations. For example, a low-income school seeking to increase its students' participation in higher-selectivity postsecondary education could apply these findings by providing paired support for college eligibility and college knowledge; recognizing that supporting just the latter has less effect for low-income students.

In Chapter 3, I conducted a meta-analysis of research on single-track year-round education, 2001-2016. Thirty studies met inclusion criteria and had data from which an effect size estimate could be calculated, yielding 82 math effect sizes and 81 reading effect sizes, predominantly from grades 3-8 and all from the United States. Sensitivity analyses show a larger effect in middle school than in elementary school in math, but show (unexpectedly) no larger effects for minority and low-SES students than for the full sample. Analysis of the moderating effect of calendar structure on effect size were not conclusive, but for mean achievement, estimates were larger for schools that shortened summer to the fewest consecutive weeks of vacation. The magnitude of the main treatment effects (robust variance estimation meta-regression of the coefficient only, with hierarchical weights and the small sample correction) are Cohen's d of +0.08* in math and +0.17** in reading, and odds ratios of 0.96 in math and 1.03 in reading. The estimates for mean achievement are large enough to be policy-relevant, and are also approximately the same magnitude as the decrease in achievement caused by summer learning loss.

In Chapter 4, I returned to college access but focused on nuance within the question of whether different amounts of counseling can move individual measures of college readiness. Low-income and minority students access college at lower rates than their more-advantaged

peers, caused in part by lesser social capital. Low-SES students' networks rarely provide help navigating the application and enrollment process, preventing even academically-capable students from competing in the near-Darwinian process of college admission because of their lower social capital. In multi-level logistic regression analyses of nationally representative longitudinal data, I found that college readiness measures may respond to earlier course planning and that college knowledge measures may respond to more-frequent contact with counselors, but primarily found that advising activities have little effect on college readiness and less effect on college enrollment.

Policy Implications

The findings of each preceding chapter have bearing on the design of policies in the area studied. In Chapter 2, I found that college knowledge and college eligibility relate differently to whether students attend college and to the quality attended; that multiple measures of college readiness of both types – FAFSA intent, FAFSA submission, math course-taking, taking a college exam – can be important in an additive way for post-secondary outcomes; and furthermore that these relationships are even larger for disadvantaged students. Taken together, these findings are indicative that high schools should think of college readiness as multifaceted; and therefore provide multiple kinds of support to their students in order to move what are separate (intermediate) college knowledge, (intermediate) college eligibility, and (final) enrollment and in-college outcomes.

Chapter 3 not only confirmed that single-track YRE shows a consistent modest positive effect, but provides some meta-analytic information on what calendars are best, and for which students YRE makes the largest difference. The effects of YRE are larger in middle school than in elementary school; are (unexpectedly) larger in reading than math and (unexpectedly) no

higher for low-income or racial minority students; and are larger for the outcome of mean achievement than for percent proficient. Schools that shortened the summer break to the fewest consecutive weeks tended to show the largest effects from calendar conversion, and maybe also from 2-week instead of 3-week within-term breaks. These distinctions can inform the details of calendar reform efforts in specific contexts. A district with larger concerns about middle school performance than elementary performance might consider YRE to be aligned with their needs. A district under short-term pressure specifically about proficiency rates might prioritize other reforms, given the more-consistent effect of YRE on mean achievement. Regardless of context, policymakers can seek the implementation of calendars that match the more-effective design features of minimized summer vacation length and 45-10 rather than 45-15 calendars.

The findings in Chapter 4 can inform the provision of counseling services to high school students, but also point to the need for further research. As predicted based on the sequential nature of math courses, students are more likely to reach college eligibility (or take a more advanced math course) if they have to made a four-year education plan as a freshman and submit it to their school. Students who meet with a counselor annually are more likely to plan to complete the FAFSA, demonstrating greater knowledge about the college application and enrollment process. However, those same counseling activities show weak links to actual FAFSA submission or to the substantive outcomes of college enrollment and college quality. Additionally, when multiple counseling supports are considered simultaneously, the marginal observed effect of each is quite small. These findings can inform school-level interventions – emphasizing the importance of beginning to map the path to college by ninth grade at the latest, knowing that various college readiness outcomes respond to different treatments, and understanding that multiple (perhaps many) types of counseling and contact will be necessary to

achieve the multiple readiness and enrollment outcomes that are beneficial to students – but also provide a reminder that single school policy changes are unlikely to achieve the degree of improvement that most policy-makers hope for.

Topical Research Implications

The results of Chapters 2 and 4 also point toward a weakness in our understanding of how to prepare students for college. If counseling can shift college readiness indicators (Chapter 4), and college readiness indicators relate to college outcomes (as shown in Chapter 2), the lack of connection between counseling and college outcomes reveals an incomplete understanding of the mechanisms of how counseling, college readiness, and college-going actually relate. Future research can recognize the eligibility/knowledge distinction and recognize that individual treatments are likely to have only marginal benefits; but work to understand college readiness as a multi-step process, with deeper understanding of the links between supports, college readiness, enrollment, and college success.

The facets of single-track YRE that I was and was not able to examine can guide further research on calendar reform. The key question now is which characteristics of single-track YRE calendars with especially-shortened summers have the greatest effect on students. That is, within such schools where a 5-week summer break us used to minimize summer learning loss, whether 45-10, 45-15, 30-5, or other calendar structures best support student learning; along with further examination of other policy variation such as between-sessions tutoring, or whether the optimal policy characteristics are different based on student characteristics, particularly for older and younger students and for low-income students.

Research Methods Implications

The way that nuance was operationalized into policy design characteristics and student characteristics in each chapter was specific to the area being examined. In Chapter 2, the most important distinction was looking at multiple college knowledge and multiple college eligibility measures, while also considering student characteristics and several types of college-going outcomes. In Chapter 3, the most important distinction was to look at the policy characteristics (summer length, calendar structure) within solely single-track calendars, in order to understand more-effective calendar design *within* the reform previously shown to be more effective than multi-track calendars. In Chapter 4, the most important distinction was to examine four separate types of counseling support specific to education plans (while also controlling for other student supports and counseling activities), to see how different levels of treatment through education planning activities relate to college knowledge and to college eligibility.

In order to successfully apply the lens presented in this dissertation – to conduct research that can inform the design of effective policies, rather than informing the selection of general policy types with positive average effects – researchers will need to consider what distinctions are most pertinent to the policy area under examination. In some instances, this will require looking at characteristics within categories (as I did with calendar structure within only single-track YRE); in some instances, this will require developing new categorizations (as in the distinct parts of college readiness that I and others are working to delineate); in some instances, this will require allowing empirical data to shape the categorization (e.g. the evidence that small groups may respond to incentives driving the separate categorization of individual, small group, and large group incentives). In all cases, it will require original and critical thought to what

aspects of the policy's design are most likely to influence *how successful* the intervention is and *for whom* it is effective.

The lens of how policy characteristics relate to heterogeneity in outcomes also has a critical implication for primary research and evaluation reporting. In conducting the meta-analysis for Chapter 3, I not only had to engage in extensive follow-up with authors to find out key characteristics like summer length, but was not able to glean that information for all of the studies even after significant effort. Researchers reporting on the effects of a single intervention should provide information not just on a policy type (year-round education, teacher incentive pay, etc.) but provide sufficient description of the intervention details so that follow-up analyses can examine these characteristics. In order to learn about how to design effective policies by looking across instances and variation in separate implementation – rather than relying on rare multi-arm experiments or other single studies that allow for assessing the impact of characteristics – original studies need to include specific information on the details and features of the policy as implemented in the evaluated context.

APPENDICES

APPENDIX A:

Supplementary Models of College Eligibility and College Readiness

Table A1.

Correlation Table for College Knowledge/College Eligibility Variables

	FAFSA	Tour	Exam Important	Grades Important	Course Selection Important	FAFSA intent	College Eligible Math	Col Exam	No App	9th Ed plan	Hispanic
FAFSA	1										
Tour	0.1111	1									
Exam Imp	0.0454	0.0412	1								
Grades Imp	-0.0037	-0.0017	0.1672	1							
Courses Imp	0.0339	0.0677	0.0616	0.1467	1						
FAFSA Intent	0.1938	0.146	0.0409	0.0209	0.067	1					
Elig Math	0.2216	0.1048	0.0584	0.0047	0.0403	0.0436	1				
Col Exam	0.0798	0.1599	-0.0149	-0.0167	0.0374	0.0852	0.1227	1			
No App	-0.1559	0.0005	-0.0303	0.0278	0.0063	-0.0108	-0.0433	0.0017	1		
9th Ed plan	0.0723	0.0772	0.0227	0.0443	0.0716	0.059	0.0296	0.0245	-0.0075	1	
HISPANIC	-0.06	-0.023	-0.0134	0.0328	0.0325	0.0295	-0.0938	-0.085	-0.001	-0.0155	1
BLACK	0.0199	0.0261	0.0573	0.0495	0.0613	0.1091	-0.0513	0.0022	0.0131	0.0909	-0.056
Other Race	-0.0297	-0.0227	-0.0201	0.0204	0.012	0.0003	-0.0529	-0.0456	-0.0105	-0.0076	0.1852
Parent BA	0.0851	0.1177	0.0035	-0.0261	-0.0013	-0.0646	0.1688	0.154	0.0141	0.0076	-0.1979
Female	0.1275	0.0452	0.0039	0.0867	0.0426	0.1445	0.0564	0.0178	-0.0392	0.0673	0.0047
Math score	0.2041	0.1373	0.0388	-0.0152	0.0317	0.0499	0.3591	0.1422	-0.0094	-0.0032	-0.1164
Expects BA	0.0473	0.0336	0.0153	-0.0076	-0.0401	0.0304	0.0524	0.0105	-0.0178	0.0074	-0.0509
Expect Adv	0.1804	0.1466	0.0428	0.0233	0.1028	0.1011	0.1851	0.1387	-0.0106	0.0914	-0.0564
Counsel Col	0.2593	0.0904	0.0043	0.0248	0.0427	0.0462	0.1881	0.0648	-0.0689	0.0444	-0.0153
Caseload	-0.0358	-0.0481	0.0357	0.029	0.0036	-0.0221	-0.0515	-0.0371	-0.0067	0.0478	0.1128
Private	0.0354	0.0759	-0.0295	-0.0092	-0.0178	-0.0291	0.0954	0.106	0.0069	-0.0343	-0.074
% FRPL	-0.0312	0.0146	0.0198	0.0104	0.0163	0.1002	-0.0836	-0.0337	0.0109	0.0423	0.2348
% 4 Year	0.0384	0.0835	-0.02	-0.0173	-0.002	0.0121	0.1347	0.1449	0.005	-0.0486	-0.0836

Table A1 (cont'd)

	Black	Other Race	Parent BA	female	Math Score	Expects BA	Expects Advanced	Counseled on College	Counselor Caseload	Private	FRPL
Black	1										
Other Race	0.0931	1									
Parent BA	-0.1269	-0.0808	1								
female	0.0508	0.0051	-0.0238	1							
Math score	-0.2188	-0.055	0.3098	-0.0422	1						
Expects BA	-0.0462	-0.0375	0.0672	-0.0273	0.0644	1					
Expect Adv	0.04	-0.0335	0.1545	0.0982	0.2587	-0.4958	1				
Counsel Col	0.0143	-0.0176	0.1066	0.0566	0.1674	0.0293	0.1471	1			
Caseload	-0.007	0.0294	-0.0413	0.0071	-0.0313	-0.0191	-0.0051	-0.0837	1		
Private	-0.0651	-0.0474	0.2004	0.0065	0.1371	0.0143	0.0754	0.0982	-0.3361	1	
% FRPL	0.2474	0.0725	-0.2559	0.0181	-0.2624	-0.0595	-0.0794	-0.0517	0.0157	-0.1764	1
% 4 Year	-0.0078	-0.0247	0.1996	0.0044	0.2115	0.0056	0.1315	0.1165	-0.279	0.4786	-0.2435

Table A2.

Sensitivity Analysis: OLS, fixed effects, and 2-level Specifications of Enrollment Outcomes

	(1) OLS 2-year	(2) Fixed Effects	(3) 2-Level Logistic	(4) OLS 4-Year	(5) Fixed Effects	(6) 2-Level Logistic
College Knowledge						
Actual FAFSA Submission	3.97***	5.62***	4.20***	2.48***	2.83***	2.46***
11th Grader planned FAFSA	1.10	1.12	1.03	1.16	1.15	1.24*
Grades Imp for Col	1.09	1.04	1.78**	1.24+	1.35*	1.08
SAT/ACT Imp for Col	0.96	0.92	1.01	0.95	0.95	1.08
Courses Imp for Col	0.91	0.93	0.95	1.10	1.15	1.21+
College Eligible						
College Eligible in Math	1.42**	1.90***	1.55*	1.75***	1.95***	1.76**
Took ACT/SAT 1+	1.17	1.53**	1.55**	1.24*	1.34**	1.42*
College-Going Supports						
Made Ed Plan in 9th Grade	1.17	1.35*	0.93	0.95	0.92	0.96
Counseled as Senior	1.42**	1.69***	1.62***	1.48***	1.63***	1.59***
College Tour	1.05	1.04	1.26	1.48***	1.68***	1.38**
Student Characteristics						
Female	1.20	1.46**	1.45*	0.92	0.98	0.96
Latino	1.29	0.80	1.17	0.85	0.87	0.89
African American	1.15	1.04	1.29	0.91	0.75*	0.82
Native/Pacific	0.96	0.74	0.90	0.78+	0.77*	0.70*
12th Grade Math	1.02**	1.02**	1.03***	1.05***	1.07***	1.05***
Expects BA (only)	1.38*	1.30+	1.34	2.33***	2.65***	2.11***
Expects Advanced Degree	1.53**	1.67**	1.52*	3.74***	4.40***	3.66***
Did Not Apply to College	0.13***	0.07***	0.11***	1.59***	1.78***	1.42+
No FAFSA b/c high income	1.45**	1.42+	1.74**	1.34*	1.31*	1.42*
Parent has BA	1.32*	1.50**	1.23	1.78***	1.97***	1.83***
School Characteristics						
% Transition to College	1.00	2.01	0.99	1.03***	0.89	1.02**
% FRPL	0.99*	0.97**	0.98***	0.99	1.02	1.00
Private School	1.87*	0.00	1.73+	1.11	377.82	1.31
Counselor Caseload	1.00	1.00	1.00	1.00	1.00*	1.00
N	6,200	6,200	6,200	10,190	10,190	10,190

Exponentiated coefficients

Note: Data from HSLS restricted-use data file, using (3-wave + transcript) longitudinal student weights.

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A3.

Sensitivity Analysis: OLS, fixed effects, and 2-level Specifications of Selectivity

	(1) OLS, 1-Level	(2) School Fixed Effects	(3) 2-Level Logit (Main Analysis)
College Knowledge			
Actual FAFSA Submission	0.58*	0.50**	0.64+
11th Grader planned FAFSA	1.12	1.11	1.18
Grades Imp for Col	1.21	1.09	1.23
SAT/ACT Imp for Col	0.84	0.92	0.82
Courses Imp for Col	1.32*	1.32*	1.28
College Eligible			
College Eligible in Math	1.08	1.24	1.45
Took ACT/SAT 1+	1.41**	1.91***	1.64**
College-Going Supports			
Made Ed Plan in 9th Grade	0.96	0.98	1.02
Counseled as Senior	1.39*	1.11	1.48+
College Tour	1.08	0.98	1.19
Student Characteristics			
Female	1.09	1.15	1.10
Latino	1.14	1.47+	1.42
African American	0.62*	0.54**	0.93
Native/Pacific	0.85	0.81	1.04
12th Grade Math	1.10***	1.14***	1.12***
Expects BA (only)	0.99	1.04	1.19
Expects Advanced Degree	1.45*	1.91**	2.19***
Did Not Apply to College	1.05	0.97	1.34+
No FAFSA b/c high income	1.26	1.19	1.05
Parent has BA	1.58***	1.52**	1.74***
School Characteristics			
% Transition to College	1.01**	4.25*	1.02*
% FRPL	1.00	0.97	1.00
Private School	1.02	0.00*	1.55
Counselor Caseload	1.00	0.99*	1.00
N	5,470	5,470	5,470

Exponentiated coefficients

Note: Data from HSLS restricted-use data file, using (3-wave + transcript) longitudinal student weights.

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A4.

Advanced Math Supplement: Joint Relationship of College Knowledge and College Eligibility with Selectivity of College Attended

	(1) All Students	(2) Parent Has BA	(3) No Parent BA	(4) Not Poor	(5) Poor	(6) White	(7) African American	(8) Latino/a	(9) 2 of minority, low-ed, poor
College Knowledge									
Actual FAFSA Submission	0.74	0.78	1.10	0.90	0.26	0.48**	2.72	0.18+	0.33
11th Grader planned FAFSA	1.02	0.96	1.60+	1.04	3.88*	1.09	1.13	2.60+	1.81
Grades Imp for Col	1.11	1.09	2.60*	1.34	2.12	1.39	1.06	4.40**	4.04*
SAT/ACT Imp for Col	0.78	0.83	0.70	0.82	1.21	0.90	0.73	0.55	0.53
Courses Imp for Col	1.31	1.40*	1.47	1.41*	1.78	1.34+	1.00	1.60	1.47
College Eligible									
Advanced Math	1.77*	1.76*	2.09+	1.55	3.52	1.55*	8.19*	1.60	2.96
Took ACT/SAT 1+	1.81**	1.36+	1.78+	1.43*	1.97	1.58*	0.58	3.97**	2.25+
College-Going Supports									
Made Ed Plan in 9th Grade	0.95	0.85	1.28	0.98	2.13	1.11	4.21**	0.67	2.31*
Counseled as Senior	1.73*	1.31	3.02**	1.41+	6.95*	1.35	49.42***	7.69**	7.03**
College Tour	1.15	1.16	1.24	1.28	0.45	1.16	2.33	0.76	0.66
Student Characteristics									
Female	1.11	1.23	0.72	1.07	1.20	1.11	0.38*	2.67+	1.61
Latino	1.48	1.86+	1.45	1.27	0.77				
African American	0.89	0.85	0.67	1.09	0.58				
Native/Pacific	1.28	1.24	1.32	1.08	2.49				
12th Grade Math	1.10***	1.11***	1.12***	1.12***	1.11**	1.12***	1.03	1.10**	1.13***
Expects BA (only)	1.08	1.36	0.89	1.20	0.86	1.18	0.09**	1.31	1.06
Expects Advanced Degree	2.19***	2.08***	2.39*	1.78*	4.28*	1.73*	0.26	1.88	2.70+
Did Not Apply to College	1.10	1.11	1.07	1.08	1.16	1.29	2.00	0.58	0.89
No FAFSA b/c high income	1.45	1.37	0.44	1.06	25.94*	1.06	7.40*	0.74	2.85
Parent has BA	1.69***			1.88***	1.98	1.70**	2.68+	2.69*	
School Characteristics									
% Transition to College	1.02*	1.02**	1.01	1.03***	0.99	1.02**	1.05*	0.99	0.99
% FRPL	1.01	0.99	1.02	0.99	1.05*	1.01	1.02	1.03	1.03
Private School	1.74	1.18	3.14+	1.25	15.21*	1.14	3.56	1.00	10.75*
Counselor Caseload	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
N	5,470	3,820	1,650	4,200	740	4,180	550	520	900

Note: Data from HSLS restricted-use data file, using (3-wave + transcript) longitudinal student weights. Exponentiated coefficients

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A5.

Sensitivity Analysis: OLS Models of 2-Year College Going

	(1) Parent Has BA	(2) No Parent BA	(3) Not Poor	(4) Poor	(5) White	(6) African American	(7) Latino/a	(8) Multiple Disadvantage	(9) Minority
College Knowledge									
Actual FAFSA Submission	4.31***	4.21***	5.36***	4.35***	4.73***	2.63*	3.80***	3.50***	3.09***
11th Grader planned FAFSA	0.63+	1.25	0.93	1.32	1.14	1.05	1.67	1.23	1.34
Grades Imp for Col	0.70	1.29	1.07	1.20	1.02	3.29*	0.57	1.32	1.12
SAT/ACT Imp for Col	0.87	0.94	1.13	0.88	0.89	0.96	0.96	0.93	0.88
Courses Imp for Col	0.82	0.94	0.85	0.82	0.95	0.82	1.06	0.96	0.95
College Eligible									
College Eligible in Math	1.75*	1.31+	1.37	1.51*	1.56**	1.14	1.68	1.28	1.47+
Took ACT/SAT 1+	1.05	1.21	0.81	1.33	1.06	1.46	1.25	1.27	1.16
College-Going Supports									
Made Ed Plan in 9th Grade	1.27	1.11	1.23	0.86	1.14	1.01	1.31	1.08	1.24
Counseled as Senior	2.41***	1.22	1.99***	1.17	1.44**	1.67+	0.88	1.16	1.21
College Tour	1.00	1.07	0.94	1.08	1.00	1.43	0.82	1.14	1.03
Student Characteristics									
Female	1.30	1.17	1.31+	1.18	1.15	1.33	1.09	1.16	1.17
Latino	1.65	1.24	1.66	1.59*				1.41+	
African American	0.89	1.21	0.98	1.57+				1.39+	
Native/Pacific	1.09	0.93	0.69	1.03				1.09	
12th Grade Math	1.01	1.03**	1.01	1.02	1.02*	1.02	1.01	1.03*	1.02+
Expects BA (only)	1.34	1.36+	1.47*	1.34	1.52**	1.29	0.98	1.22	1.08
Expects Advanced Degree	1.78**	1.43+	1.73**	1.27	1.57**	1.49	1.22	1.47+	1.39
Did Not Apply to College	0.11***	0.14***	0.10***	0.13***	0.13***	0.17***	0.15***	0.16***	0.16***
No FAFSA b/c high income	1.75*	1.31	1.66*	0.76	1.55**	1.03	1.10	1.00	1.20
Parent has BA			1.63**	1.28	1.39*	0.83	1.73	1.41	1.24
School Characteristics									
% Transition to College	0.98+	1.00	0.99+	0.99	0.99	0.99	0.98	0.99	1.00
% FRPL	0.97**	1.00	0.99+	1.00	0.99	0.99	0.99	1.00	0.99+
Private School	1.75	2.73**	2.10*	2.10	2.16**	1.98	2.62	2.52+	1.56
Counselor Caseload	1.00*	1.00	1.00+	1.00	1.00	1.00	1.00	1.00	1.00
missPlanReview									0.64
N	2,070	4,130	3,020	2,030	4,710	1,020	1,130	2,750	2,450

Note: Data from HSLS restricted-use data file, using (3-wave + transcript) longitudinal student weights. Exponentiated coefficients

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A6.

Sensitivity Analysis: OLS Models of 4-Year College Going

	(1) Parent Has BA	(2) No Parent BA	(3) Not Poor	(4) Poor	(5) White	(6) African American	(7) Latino/a	(8) Multiple Disadvantage	(9) Minority
College Knowledge									
Actual FAFSA Submission	2.81***	2.17***	2.92***	1.44	2.74***	2.40+	1.89	1.94**	2.28***
11th Grader planned FAFSA	1.13	1.21	1.25+	1.26	1.16	1.46	0.84	1.31+	1.13
Grades Imp for Col	1.23	1.23	1.30+	0.81	1.21	0.74	1.96+	1.08	1.30
SAT/ACT Imp for Col	0.86	1.00	0.91	1.25	0.95	0.87	0.72	0.87	0.83
Courses Imp for Col	1.07	1.10	1.06	1.37	1.05	1.19	0.89	1.06	1.03
College Eligible									
College Eligible in Math	1.96***	1.69**	1.47*	2.12**	1.86***	1.67	1.90	1.85**	1.64*
Took ACT/SAT 1+	1.59***	1.03	1.58***	0.87	1.33**	0.79	1.11	0.90	1.01
College-Going Supports									
Made Ed Plan in 9th Grade	0.94	0.98	0.82*	1.40+	0.98	0.95	1.24	1.12	1.03
Counseled as Senior	1.25+	1.73***	1.55***	1.83**	1.38**	2.06*	1.63	1.98**	1.73**
College Tour	1.63***	1.36*	1.56***	1.21	1.34**	1.94*	1.24	1.36+	1.62**
Student Characteristics									
Female	1.23+	0.73**	1.05	0.86	1.00	0.66	0.81	0.69**	0.77+
Latino	0.78	0.88	0.74+	0.91				0.95	
African American	0.94	0.88	1.05	0.76				0.92	
Native/Pacific	0.96	0.69*	0.69*	0.82				0.73+	
12th Grade Math	1.06***	1.04***	1.06***	1.05***	1.05***	1.03	1.05***	1.04***	1.04***
Expects BA (only)	2.07***	2.63***	2.33***	2.86***	2.24***	2.72**	2.84**	2.67***	2.45***
Expects Advanced Degree	3.60***	3.80***	3.69***	3.86***	3.66***	4.62***	4.98***	3.79***	4.27***
Did Not Apply to College	1.93***	1.38+	1.39*	2.12**	1.64***	1.67	1.85+	1.55+	1.64*
No FAFSA b/c high income	1.55**	1.17	1.35*	1.28	1.32*	2.43	0.75	1.40	1.25
Parent has BA			1.88***	1.33	1.78***	2.28***	1.83*	1.45	2.05***
School Characteristics									
% Transition to College	1.02***	1.03***	1.03***	1.03*	1.02***	1.04**	1.05***	1.04***	1.04***
% FRPL	1.00	0.99	1.00	1.00	0.99*	1.00	1.00	1.00	1.00
Private School	1.12	1.09	1.15	1.32	1.24	0.82	0.70	0.88	0.85
Counselor Caseload	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
N	5,700	4,500	6,810	2,110	7,670	1,390	1,370	2,780	3,230

Note: Data from HSLS restricted-use data file, using (3-wave + transcript) longitudinal student weights. Exponentiated coefficients

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A7.

Sensitivity Analysis: OLS Models of Selective College Attendance (college eligible math) for Disadvantaged Students

	(1) Parent Has BA	(2) No Parent BA	(3) Not Poor	(4) Poor	(5) White	(6) African American	(7) Latino/a	(8) Multiple Disadvantage	(9) Minority
College Knowledge									
Actual FAFSA Submission	0.76	0.25*	0.83	0.16+	0.68*	1.06	0.10*	0.26	0.21*
11th Grader planned FAFSA	1.10	1.27	1.01	1.68	1.14	2.49+	1.53	1.42	1.46
Grades Imp for Col	1.00	1.85	1.08	2.51	1.23	2.41	0.90	2.40	1.61
SAT/ACT Imp for Col	0.80	1.06	0.80	1.17	0.90	0.77	1.52	1.16	0.88
Courses Imp for Col	1.36*	1.21	1.30*	1.28	1.40**	0.80	1.37	1.08	1.05
College Eligible									
College Eligible in Math	1.29	0.92	1.26	0.88	1.28	0.72	0.49	0.69	0.74
Took ACT/SAT 1+	1.49**	1.20	1.39*	1.25	1.43**	1.19	2.76+	1.54	1.50
College-Going Supports									
Made Ed Plan in 9th Grade	0.89	1.03	0.91	1.59	0.93	1.23	0.80	1.34	0.99
Counseled as Senior	1.23	2.01*	1.23	3.67*	1.30+	6.11*	3.54+	3.92*	2.61**
College Tour	1.10	1.04	1.18	0.91	1.13	0.94	0.76	0.75	0.95
Student Characteristics									
Female	1.23+	0.81	1.14	1.02	1.19	0.40	1.56	0.79	0.88
Latino	1.13	0.98	1.12	0.92				0.90	
African American	0.71	0.49+	0.70	0.48				0.47*	
Native/Pacific	0.75	0.95	0.76	0.83				0.88	
12th Grade Math	1.10***	1.10***	1.11***	1.08**	1.11***	1.07	1.12**	1.09**	1.08***
Expects BA (only)	0.97	1.01	0.99	0.95	1.29	0.35	2.52	1.17	0.96
Expects Advanced Degree	1.40+	1.76	1.39	1.70	1.77**	0.82	1.49	2.32	1.31
Did Not Apply to College	1.05	1.04	0.96	1.33	1.10	1.42	0.75	1.16	0.88
No FAFSA b/c high income	1.73**	0.21**	1.44*	0.90	1.40+	3.30	0.22	0.43	0.63
Parent has BA			1.68***	1.57	1.69***	1.95	1.77	1.15	1.58+
School Characteristics									
% Transition to College	1.01+	1.01	1.02*	1.02	1.01*	1.01	0.99	1.01	1.00
% FRPL	1.00	1.00	0.98	1.01	1.00	1.00	1.01	1.00	1.00
Private School	1.09	1.25	1.06	0.86	1.00	5.81*	2.02	2.04	3.14**
Counselor Caseload	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
N	3,820	1,650	4,200	740	4,180	550	520	900	1,330

Note: Data from HSLS restricted-use data file, using (3-wave + transcript) longitudinal student weights. Exponentiated coefficients

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A8.

Sensitivity Analysis: OLS Models of Selective College Attendance for Disadvantaged Students with Advanced Math

	(1) All Students	(2) Parent Has BA	(3) No Parent BA	(4) Not Poor	(5) Poor	(6) White	(7) African American	(8) Latino/a	(9) 2 of minority, low-ed, poor
College Knowledge									
Actual FAFSA Submission	0.75	0.24*	0.83	0.15+	0.68*	0.79	0.08*	0.21	0.17**
11th Grader planned FAFSA	1.09	1.26	1.00	1.68	1.14	2.49+	1.54	1.37	1.43
Grades Imp for Col	1.01	1.84	1.09	2.51	1.23	2.57	0.87	2.35	1.68
SAT/ACT Imp for Col	0.81	1.07	0.81	1.16	0.91	0.67	1.46	1.15	0.87
Courses Imp for Col	1.34*	1.20	1.28*	1.26	1.39**	0.78	1.44	1.06	1.06
College Eligible									
Advanced Math	1.64**	1.44	1.57*	1.27	1.51*	2.65	1.68	1.93	1.96*
Took ACT/SAT 1+	1.47**	1.20	1.39*	1.21	1.43**	1.06	2.63+	1.46	1.45
College-Going Supports									
Made Ed Plan in 9th Grade	0.89	1.03	0.90	1.60	0.92	1.19	0.79	1.37	0.97
Counseled as Senior	1.23	1.99*	1.23	3.70*	1.30+	5.85*	3.63+	3.95*	2.60**
College Tour	1.10	1.03	1.17	0.91	1.13	0.93	0.74	0.75	0.95
Student Characteristics									
Female	1.23+	0.82	1.14	1.03	1.20	0.40	1.68	0.83	0.92
Latino	1.12	0.96	1.12	0.90				0.84	
African American	0.71	0.48*	0.70	0.47				0.45*	
Native/Pacific	0.75	0.94	0.76	0.82				0.85	
12th Grade Math	1.09***	1.09***	1.10***	1.08*	1.10***	1.06	1.12**	1.08*	1.07***
Expects BA (only)	0.98	0.95	0.99	0.92	1.27	0.34	2.05	1.04	0.91
Expects Advanced Degree	1.40+	1.63	1.36	1.63	1.72**	0.72	1.14	2.00	1.16
Did Not Apply to College	1.04	1.05	0.95	1.30	1.10	1.31	0.74	1.13	0.86
No FAFSA b/c high income	1.71**	0.21**	1.44*	0.87	1.40+	2.98	0.18	0.37	0.56
Parent has BA			1.65***	1.55	1.68***	2.01	1.81	1.08	1.59+
School Characteristics									
% Transition to College	1.01+	1.01	1.02*	1.02	1.01*	1.00	0.99	1.01	0.99
% FRPL	1.00	1.00	0.98+	1.01	1.00	1.00	1.01	1.00	1.00
Private School	1.09	1.27	1.06	0.89	1.01	6.89*	2.18	2.16	3.35**
Counselor Caseload	1.00	1.00	1.00	1.00+	1.00	1.00	1.00	1.00	1.00
N	3,820	1,650	4,200	740	4,180	550	520	900	1,330

Note: Data from HSLS restricted-use data file, using (3-wave + transcript) longitudinal student weights. Exponentiated coefficients

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A9.

Sensitivity Analysis: 2-Year College Going for Disadvantaged Students with School Fixed Effects

	(1) Parent Has BA	(2) No Parent BA	(3) Not Poor	(4) Poor	(5) White	(6) African American	(7) Latino/a	(8) Multiple Disadvantage	(9) Minority
College Knowledge									
Actual FAFSA Submission	10.87	6.27	11.44	11.33	7.82	5.06	6.43	5.38	4.31
11th Grader planned FAFSA	0.69	1.37	1.39	1.45	1.44	0.94	1.25	1.06	1.20
Grades Imp for Col	0.66	1.21	1.09	0.86	1.11	7.58	0.96	1.53	1.38
SAT/ACT Imp for Col	1.18	0.79	1.26	0.55	0.83	1.82	0.49	0.68	0.83
Courses Imp for Col	0.48	0.99	0.81	0.68	0.88	1.12	1.68	1.28	1.11
College Eligible									
College Eligible in Math	1.74	1.98	1.58	1.54	2.22	0.50	6.93	2.11	2.58
Took ACT/SAT 1+	1.47	1.51	1.02	1.85	1.35	1.46	2.71	1.65	1.58
College-Going Supports									
Made Ed Plan in 9th Grade	1.69	1.27	1.56	1.06	1.28	1.76	2.19	1.39	1.78
Counseled as Senior	4.19	1.40	2.68	2.25	1.71	2.58	1.09	1.47	1.54
College Tour	1.02	1.20	0.64	2.17	0.90	4.00	0.82	1.57	1.26
Student Characteristics									
Female	1.01	1.55	1.42	1.32	1.24	3.62	1.07	1.72	1.63
Latino	1.79	0.71	0.79	1.30				0.92	
African American	0.83	0.99	0.56	1.95				1.37	
Native/Pacific	1.42	0.67	0.43	0.79				0.81	
12th Grade Math	0.98	1.03	0.99	1.03	1.02	1.04	1.01	1.04	1.03
Expects BA (only)	1.10	1.40	1.22	1.16	1.52	1.49	0.67	1.13	0.78
Expects Advanced Degree	2.38	1.69	1.83	1.75	1.94	0.67	2.27	1.80	1.46
Did Not Apply to College	0.01	0.06	0.03	0.03	0.07	0.04	0.08	0.07	0.08
No FAFSA b/c high income	4.27	1.24	2.67	0.82	1.63	1.20	1.06	0.81	0.90
Parent has BA			1.88	1.77	1.67	0.74	2.16	1.68	1.43
School Characteristics									
% Transition to College	1.45	-	1.32	30.69	1089.92	1.10	0.05	1.06	0.03
% FRPL	0.91	0.98	0.97	0.95	0.98	0.96	0.92	0.97	0.97
Private School	9.44	0.00	0.00	0.00	0.00	0.47	-	-	-
Counselor Caseload	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00
N	2,070	4,130	3,020	2,030	4,710	1,020	1,130	2,750	2,450

Note: Data from HSLS restricted-use data file, using (3-wave + transcript) longitudinal student weights. Exponentiated coefficients

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A10.

Sensitivity Analysis: 4-Year College Going for Disadvantaged Students with School Fixed Effects

	(1) Parent Has BA	(2) No Parent BA	(3) Not Poor	(4) Poor	(5) White	(6) African American	(7) Latino/a	(8) Multiple Disadvantage	(9) Minority
College Knowledge									
Actual FAFSA Submission	4.18	2.48	3.81	2.90	3.42***	7.52	1.57	2.67	2.37
11th Grader planned FAFSA	0.99	1.26	1.25	1.58	1.08	2.13	0.76	1.32	1.14
Grades Imp for Col	1.20	1.71	1.34	0.91	1.16	1.06	1.99	1.43	2.20
SAT/ACT Imp for Col	0.83	1.07	1.08	0.96	1.00	0.19	0.66	0.69	0.59
Courses Imp for Col	1.18	1.13	1.10	1.98	1.08	1.87	1.07	1.32	1.34
College Eligible									
College Eligible in Math	2.65	1.97	1.98	3.58	2.21***	2.34	1.62	2.13	1.96
Took ACT/SAT 1+	1.83	1.13	1.83	0.88	1.47***	0.71	0.82	0.83	1.06
College-Going Supports									
Made Ed Plan in 9th Grade	0.90	0.95	0.85	1.78	0.95	0.47	1.48	1.08	0.98
Counseled as Senior	1.25	2.40	1.70	2.87	1.48***	3.31	3.30	3.71	2.91
College Tour	1.99	1.60	1.79	1.99	1.47***	1.69	2.40	1.59	2.08
Student Characteristics									
Female	1.49	0.71	1.12	1.36	1.10	0.40	0.74	0.76	0.68
Latino	0.71	0.93	0.66	1.01				1.06	
African American	1.10	0.58	0.95	0.29				0.49	
Native/Pacific	1.00	0.66	0.65	0.56				0.73	
12th Grade Math	1.08	1.07	1.07	1.15	1.07***	1.08	1.11	1.08	1.08
Expects BA (only)	2.90	2.91	2.81	3.40	2.55***	10.24	2.96	3.51	4.18
Expects Advanced Degree	5.79	4.83	4.99	4.92	4.63***	13.67	7.86	5.59	6.76
Did Not Apply to College	2.23	1.82	1.69	3.22	1.90***	5.21	2.52	2.87	2.20
No FAFSA b/c high income	1.58	1.04	1.53	2.71	1.37*	2.21	0.94	1.08	1.14
Parent has BA			2.01	1.20	1.96***	2.90	3.91	1.17	3.46
School Characteristics									
% Transition to College	0.93	0.00	0.81	0.00	0.96	0.00	51.75	0.00	0.00
% FRPL	1.05	1.01	1.05	0.96	1.02	1.06	1.00	1.01	1.03
Counselor Caseload	1.00	1.00	1.00	1.00	1.00*	1.00	1.01	1.00	1.00
N	5,700	4,500	6,810	2,110	7,670	1,390	1,370	2,780	3,230

Note: Data from HSLS restricted-use data file, using (3-wave + transcript) longitudinal student weights. Exponentiated coefficients

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A11.

Sensitivity Analysis: Selective College Attendance for Disadvantaged Students with School Fixed Effects (college eligible math)

	(1) Parent Has BA	(2) No Parent BA	(3) Not Poor	(4) Poor	(5) White	(6) African American	(7) Latino/a	(8) Multiple Disadvantage	(9) Minority
College Knowledge									
Actual FAFSA Submission	0.88	0.20^{+}	1.02	0.05	0.70^{+}	3.19	0.06	0.01*	0.10
11th Grader planned FAFSA	1.00	1.70	1.03	1.51	1.21	0.64	16.92	5.50^{+}	1.70
Grades Imp for Col	0.99	2.46	0.91	0.40	1.23	22.59	8.16	1.17	1.50
SAT/ACT Imp for Col	0.85	1.02	0.80	6.79	1.18	0.81	3.91	1.99	1.21
Courses Imp for Col	1.39	1.39	1.14	33.48	1.36*	2.61	8.77	35.45***	1.65
College Eligible									
College Eligible in Math	1.49	0.96	1.30	-	1.55	2.66	60.39	314.61*	0.86
Took ACT/SAT 1+	1.75	3.70**	1.75***	130.97	1.74***	0.77	0.80	1.98	1.49
College-Going Supports									
Made Ed Plan in 9th Grade	0.94	0.54^{+}	0.96	2.06	1.02	0.41	0.11	0.37	0.67
Counseled as Senior	1.15	0.81	1.14	27.40	1.09	1.32	0.80	3.53	0.85
College Tour	0.92	1.16	1.08	10.27	0.89	6.77	3.79	2.33	2.01
Student Characteristics									
Female	1.22	1.31	1.08	1.02	1.24	1.00	18.00	3.24^{+}	1.04
Latino	1.24	1.83	1.64^{+}	5.02				3.61	
African American	0.57	0.50	0.76	0.00				0.71	
Native/Pacific	0.86	0.59	0.78	0.27				0.16*	
12th Grade Math	1.13	1.25***	1.15***	1.22	1.14***	1.49	1.44	1.43***	1.22
Expects BA (only)	1.37	0.49	1.19	28.72	1.36	1.80	-	48.00^{+}	2.54
Expects Advanced Degree	2.09	2.02	2.12**	6.35	2.38***	0.40	-	15.69	2.29
Did Not Apply to College	1.00	0.86	0.86	2.14	0.98	3.09	0.31	0.03*	0.52
No FAFSA b/c high income	1.86	0.12*	1.60*	16.67	1.56*	0.55	0.65	0.12	0.27
Parent has BA			1.92***	0.98	1.71***	0.10	50.79	1.90	0.92
School Characteristics									
% Transition to College	1.69	19.98**	2.78**	0.61	2.21^{+}	-	0.00	-	27.70
% FRPL	1.02	0.89*	1.01	0.47	1.01	0.79	2.25	0.73***	0.96
Counselor Caseload	1.00	0.97**	0.99*	1.05	1.00	0.91	0.91	0.96*	0.97
N	3,820	1,650	4,200	740	4,180	550	520	900	1,330

Note: Data from HSLS restricted-use data file, using (3-wave + transcript) longitudinal student weights. Exponentiated coefficients

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A12.

Sensitivity Analysis: Selective College Attendance for Disadvantaged Students with School Fixed Effects and Advanced Math

	(1) All Students	(2) Parent Has BA	(3) No Parent BA	(4) Not Poor	(5) Poor	(6) White	(7) African American	(8) Latino/a	(9) 2 of minority, low-ed, poor
College Knowledge									
Actual FAFSA Submission	0.87	0.20^{+}	0.99	0.02	0.69^{+}	4.22	0.03	0.01	0.11
11th Grader planned FAFSA	0.98	1.69	1.02	1.18	1.21	0.57	16.47	3.56	1.57
Grades Imp for Col	1.03	2.40	0.92	0.74	1.26	19.85	7.41	2.67	1.98
SAT/ACT Imp for Col	0.88	1.02	0.81	4.61	1.19	0.90	3.72	1.64	1.30
Courses Imp for Col	1.33	1.38	1.11	26.94	1.32*	2.60	5.96	21.92**	1.78
College Eligible									
Advanced Math	2.56	0.85	1.79**	40.38	2.00***	2.09	17.60	6.93^{+}	10.02
Took ACT/SAT 1+	1.67	3.71**	1.72***	118.44	1.71***	0.67	0.63	1.92	1.18
College-Going Supports									
Made Ed Plan in 9th Grade	0.95	0.54^{+}	0.97	1.51	1.01	0.46	0.13	0.35	0.62
Counseled as Senior	1.13	0.80	1.14	91.44	1.09	1.55	0.47	1.66	0.93
College Tour	0.90	1.16	1.07	12.28	0.88	6.51	3.12	2.54	1.97
Student Characteristics									
Female	1.21	1.30	1.07	1.09	1.23	1.04	21.69	3.21	1.12
Latino	1.16	1.82	1.58^{+}	4.94				3.55	
African American	0.60	0.51	0.77	0.00				0.85	
Native/Pacific	0.87	0.60	0.79	0.33				0.13*	
12th Grade Math	1.12	1.25***	1.14***	1.18	1.13***	1.48	1.45	1.41***	1.19
Expects BA (only)	1.38	0.50	1.20	72.23	1.35	1.77	-	54.33*	2.76
Expects Advanced Degree	2.06	2.05	2.09**	18.32	2.33***	0.38	-	17.46	2.39
Did Not Apply to College	0.97	0.86	0.85	2.92	0.97	3.11	0.36	0.04*	0.46
No FAFSA b/c high income	1.82	0.12*	1.59*	20.84	1.55*	0.58	0.67	0.11	0.27
Parent has BA			1.91***	0.79	1.68**	0.13	43.60	5.29	0.90
School Characteristics									
% Transition to College	1.66	20.41**	2.71**	0.24	2.15^{+}	-	0.00	0.29	31.19
% FRPL	1.02	0.89*	1.01	0.56	1.01	0.78	2.27	0.77***	0.96
Private School	0.00	0.00**	0.00**	-	0.00^{+}	0.00	-	0.00	0.00
Counselor Caseload	1.00	0.97**	1.00*	1.05	1.00	0.91	0.92	0.97^{+}	0.97
N	3,820	1,650	4,200	740	4,180	550	520	900	1,330

Note: Data from HSLS restricted-use data file, using (3-wave + transcript) longitudinal student weights. Exponentiated coefficients

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A13.

Sensitivity Analysis: 2-year College Attendance for Disadvantaged Students, 2-level OLS (linear probability model)

	(1) All Students	(2) Parent Has BA	(3) No Parent BA	(4) Not Poor	(5) Poor	(6) White	(7) African American	(8) Latino/a	(9) Multiple Disadvantage	(10) Minority
College Knowledge										
Actual FAFSA Submission	0.24***	0.16***	0.28***	0.25***	0.33***	0.26***	0.22**	0.22***	0.28***	0.25***
	(0.02)	(0.04)	(0.03)	(0.03)	(0.05)	(0.03)	(0.07)	(0.07)	(0.04)	(0.05)
11th Grader planned FAFSA	0.01	-0.11*	0.02	-0.02	0.06	0.01	0.00	0.08	0.02	0.05
	(0.02)	(0.04)	(0.03)	(0.04)	(0.04)	(0.03)	(0.06)	(0.07)	(0.04)	(0.04)
Grades Imp for Col	0.08**	0.04	0.10**	0.07+	0.13*	0.07*	0.28**	-0.13	0.12*	0.02
	(0.03)	(0.04)	(0.04)	(0.04)	(0.06)	(0.03)	(0.10)	(0.08)	(0.05)	(0.06)
SAT/ACT Imp for Col	-0.00	-0.05	-0.00	0.06	-0.03	-0.05+	-0.21*	-0.01	-0.04	-0.08
	(0.04)	(0.04)	(0.05)	(0.06)	(0.05)	(0.03)	(0.08)	(0.06)	(0.05)	(0.06)
Courses Imp for Col	-0.01	-0.05	0.01	-0.02	-0.03	-0.04	-0.03	-0.03	-0.01	-0.01
	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.06)	(0.07)	(0.04)	(0.04)
College Eligible										
College Eligible in Math	0.07**	0.10*	0.04	0.07+	0.04	0.11***	0.02	0.13*	0.05	0.05
	(0.03)	(0.05)	(0.03)	(0.04)	(0.04)	(0.03)	(0.06)	(0.06)	(0.04)	(0.04)
Took ACT/SAT 1+	0.06**	0.04	0.06*	0.01	0.09**	0.06*	0.09+	0.06	0.08*	0.08*
	(0.02)	(0.03)	(0.02)	(0.03)	(0.03)	(0.02)	(0.05)	(0.05)	(0.03)	(0.03)
College-Going Supports										
Made Ed Plan in 9th Grade	-0.01	-0.00	-0.01	0.01	-0.06	-0.00	-0.00	0.07	-0.03	-0.00
	(0.02)	(0.03)	(0.03)	(0.03)	(0.04)	(0.02)	(0.05)	(0.05)	(0.03)	(0.03)
Counseled as Senior	0.08***	0.09**	0.04	0.08**	0.03	0.08***	0.05	-0.01	0.03	0.03
	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)	(0.06)	(0.06)	(0.04)	(0.04)
College Tour	0.04+	0.04	0.05+	0.02	0.05	0.02	0.10+	0.03	0.06+	0.06
	(0.02)	(0.03)	(0.02)	(0.03)	(0.04)	(0.02)	(0.05)	(0.06)	(0.03)	(0.04)
Student Characteristics										
Female	0.06**	0.12***	0.04	0.07**	0.01	0.05+	0.06	0.03	0.03	0.05
	(0.02)	(0.03)	(0.03)	(0.02)	(0.04)	(0.02)	(0.05)	(0.05)	(0.04)	(0.05)
Latino	0.02	0.01	0.02	0.05	0.01				0.03	
	(0.03)	(0.07)	(0.04)	(0.04)	(0.05)				(0.04)	
African American	0.04	-0.08	0.06+	0.00	0.02				0.10**	
	(0.03)	(0.05)	(0.03)	(0.04)	(0.05)				(0.04)	
Native/Pacific	-0.01	0.04	-0.04	-0.06	0.01				0.01	
	(0.02)	(0.04)	(0.04)	(0.04)	(0.05)				(0.04)	

Table A13 (cont'd)

12th Grade Math	0.00***	0.00	0.01***	0.00	0.00*	0.00	0.01+	0.00	0.01**	0.01**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Expects BA (only)	0.05	0.07+	0.05	0.03	-0.03	0.08**	-0.08	-0.05	0.01	-0.06
	(0.03)	(0.04)	(0.03)	(0.04)	(0.04)	(0.03)	(0.07)	(0.06)	(0.04)	(0.05)
Expects Advanced Degree	0.06*	0.10**	0.04	0.06	0.06	0.09**	0.05	-0.00	0.07+	0.06
	(0.03)	(0.04)	(0.03)	(0.04)	(0.04)	(0.03)	(0.06)	(0.07)	(0.04)	(0.04)
Did Not Apply to College	-0.38***	-0.40***	-0.37***	-0.41***	-0.32***	-0.37***	-0.34***	-0.31***	-0.33***	-0.32***
	(0.02)	(0.04)	(0.03)	(0.03)	(0.04)	(0.03)	(0.06)	(0.07)	(0.04)	(0.04)
No FAFSA b/c high income	0.09**	0.07+	0.03	0.12***	-0.04	0.07**	0.06	-0.03	-0.03	0.02
	(0.03)	(0.04)	(0.05)	(0.04)	(0.09)	(0.03)	(0.09)	(0.10)	(0.07)	(0.06)
Parent has BA	0.03			0.09***	0.10+	0.05*	-0.11+	0.02	0.01	0.04
	(0.03)			(0.02)	(0.05)	(0.03)	(0.06)	(0.09)	(0.10)	(0.05)
School Characteristics										
% Transition to College	-0.00	0.00	-0.00**	-0.00	-0.00	-0.00+	-0.01*	-0.00	-0.01***	-0.00*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
% FRPL	-0.00***	-0.01**	-0.00*	-0.00	-0.00	-0.00***	-0.00	-0.00+	-0.00+	-0.00+
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Private School	0.08+	-0.01	0.22***	0.09+	0.07	0.08+	0.19*	0.17	0.27***	0.18*
	(0.04)	(0.06)	(0.05)	(0.05)	(0.09)	(0.04)	(0.09)	(0.15)	(0.07)	(0.08)
Counselor Caseload	0.00+	0.00	0.00	0.00+	-0.00	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Level 2 cons	0.09***	0.15***	0.08***	0.06*	-0.07	0.09***	0.00	0.10	0.05	0.06
	(0.02)	(0.02)	(0.02)	(0.02)	(0.05)	(0.02)	(0.00)	(0.07)	(0.04)	(0.05)
N	6,200	2,070	4,130	3,020	2,030	4,710	1,020	1,130	2,750	2,450

Standard errors in parentheses

Note: Data from HSLS restricted-use data file, using (3-wave + transcript) longitudinal student weights.

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A14.

Sensitivity Analysis: 4-year College Attendance for Disadvantaged Students, 2-level OLS (linear probability model)

	(1) All Students	(2) Parent Has BA	(3) No Parent BA	(4) Not Poor	(5) Poor	(6) White	(7) African American	(8) Latino/a	(9) Multiple Disadvantage	(10) Minority
College Knowledge										
Actual FAFSA Submission	0.15***	0.19***	0.13***	0.18***	0.03	0.15***	0.04	0.19**	0.09*	0.11*
	(0.02)	(0.03)	(0.03)	(0.03)	(0.05)	(0.03)	(0.07)	(0.06)	(0.04)	(0.05)
11th Grader planned FAFSA	0.04*	0.08***	0.01	0.05*	0.09	0.04*	0.07	-0.01	0.06	0.02
	(0.02)	(0.02)	(0.03)	(0.02)	(0.06)	(0.02)	(0.08)	(0.05)	(0.04)	(0.04)
Grades Imp for Col	0.01	0.02	-0.00	0.03	-0.06	0.02	-0.14*	0.18*	-0.01	0.02
	(0.02)	(0.02)	(0.03)	(0.02)	(0.05)	(0.02)	(0.07)	(0.08)	(0.05)	(0.06)
SAT/ACT Imp for Col	0.01	-0.01	0.03	0.00	0.05	0.03	0.02	-0.09	0.02	-0.03
	(0.02)	(0.03)	(0.04)	(0.03)	(0.07)	(0.03)	(0.10)	(0.08)	(0.06)	(0.05)
Courses Imp for Col	0.03+	0.02	0.06*	0.02	0.06	0.02	-0.01	-0.06	0.02	0.02
	(0.02)	(0.02)	(0.03)	(0.02)	(0.05)	(0.02)	(0.06)	(0.05)	(0.05)	(0.05)
College Eligible										
College Eligible in Math	0.10***	0.11**	0.09*	0.07*	0.23***	0.09**	0.12*	0.14*	0.14**	0.12**
	(0.03)	(0.04)	(0.04)	(0.03)	(0.06)	(0.03)	(0.06)	(0.06)	(0.06)	(0.04)
Took ACT/SAT 1+	0.06*	0.10***	0.01	0.09***	-0.06+	0.08**	-0.05	-0.06	-0.05	-0.04
	(0.02)	(0.02)	(0.03)	(0.02)	(0.04)	(0.03)	(0.05)	(0.04)	(0.03)	(0.04)
College-Going Supports										
Made Ed Plan in 9th Grade	-0.01	-0.01	-0.03	-0.01	0.01	0.02	-0.06	0.03	-0.07+	-0.01
	(0.01)	(0.02)	(0.03)	(0.02)	(0.04)	(0.02)	(0.06)	(0.04)	(0.03)	(0.03)
Counseled as Senior	0.08***	0.08**	0.12***	0.09***	0.13**	0.07**	0.15*	0.10*	0.15***	0.15**
	(0.02)	(0.02)	(0.03)	(0.02)	(0.05)	(0.02)	(0.07)	(0.05)	(0.04)	(0.05)
College Tour	0.06**	0.05*	0.04	0.04+	0.05	0.06*	0.14*	0.05	0.08*	0.08*
	(0.02)	(0.02)	(0.03)	(0.02)	(0.05)	(0.02)	(0.05)	(0.05)	(0.03)	(0.03)
Student Characteristics										
Female	-0.01	0.02	-0.06*	0.01	0.01	-0.01	-0.04	-0.15**	-0.03	-0.05
	(0.02)	(0.02)	(0.03)	(0.02)	(0.04)	(0.02)	(0.06)	(0.05)	(0.04)	(0.04)
Latino	-0.02	-0.04	-0.03	-0.09**	0.02				-0.03	
	(0.02)	(0.04)	(0.03)	(0.03)	(0.05)				(0.03)	
African American	-0.03	0.03	-0.05	0.01	0.02				-0.00	
	(0.02)	(0.04)	(0.03)	(0.03)	(0.07)				(0.05)	
Native/Pacific	-0.06*	-0.08*	-0.05	-0.05	-0.08				-0.05	
	(0.03)	(0.03)	(0.04)	(0.03)	(0.05)				(0.04)	

Table A14 (cont'd)

12th Grade Math	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.00	0.01***	0.01***	0.01***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Expects BA (only)	0.14***	0.10**	0.16***	0.14***	0.20***	0.12***	0.15+	0.16*	0.18***	0.15***
	(0.02)	(0.03)	(0.03)	(0.03)	(0.05)	(0.03)	(0.09)	(0.07)	(0.04)	(0.04)
Expects Advanced Degree	0.24***	0.20***	0.26***	0.22***	0.19***	0.22***	0.22***	0.29***	0.20***	0.28***
	(0.02)	(0.03)	(0.03)	(0.03)	(0.05)	(0.03)	(0.06)	(0.06)	(0.04)	(0.04)
Did Not Apply to College	0.07*	0.08***	0.05	0.05*	0.15***	0.05	0.16*	0.07	0.11*	0.12+
	(0.03)	(0.02)	(0.03)	(0.02)	(0.04)	(0.03)	(0.07)	(0.07)	(0.05)	(0.06)
No FAFSA b/c high income	0.05*	0.08**	0.03	0.06*	0.09	0.05+	0.08	0.03	0.16**	0.06
	(0.02)	(0.03)	(0.04)	(0.03)	(0.07)	(0.02)	(0.09)	(0.10)	(0.06)	(0.07)
Parent has BA	0.11***			0.13***	0.06	0.12***	0.18***	0.14**	0.06	0.15***
	(0.02)			(0.02)	(0.04)	(0.02)	(0.05)	(0.05)	(0.06)	(0.03)
School Characteristics										
% Transition to College	0.00**	0.00	0.01***	0.00**	0.00	0.00**	0.00	0.01**	0.01**	0.00*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
% FRPL	-0.00	-0.00	0.00	0.00	-0.00	-0.00	0.00	0.00+	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Private School	0.03	0.03	0.02	0.01	0.07	0.02	0.06	-0.08	-0.01	-0.05
	(0.04)	(0.04)	(0.05)	(0.04)	(0.06)	(0.04)	(0.08)	(0.11)	(0.08)	(0.08)
Counselor Caseload	-0.00	-0.00+	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00+	-0.00	-0.00+
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Level 2 cons	0.06***	-0.08***	-0.00	-0.06**	-0.00	0.07***	-0.00	0.00*	0.00	-0.02
	(0.01)	(0.02)	(0.00)	(0.02)	(0.00)	(0.02)	(0.00)	(0.00)	(0.00)	(0.10)
N	10,190	5,700	4,500	6,810	2,110	7,670	1,390	1,370	2,780	3,230

Standard errors in parentheses

Note: Data from HSLS restricted-use data file, using (3-wave + transcript) longitudinal student weights.

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A15.

Sensitivity Analysis: Selective College Attendance for Disadvantaged Students, 2-level OLS (linear probability model, college eligible math)

	(1) All Students	(2) Parent Has BA	(3) No Parent BA	(4) Not Poor	(5) Poor	(6) White	(7) African American	(8) Latino/a	(9) Multiple Disadvantage	(10) Minority
College Knowledge										
Actual FAFSA Submission	-0.67**	-0.25	-0.54	0.02	-1.81	-0.71**	1.29+	-1.69+	-1.02	-1.50*
	(0.25)	(0.26)	(0.61)	(0.29)	(1.29)	(0.25)	(0.73)	(0.94)	(1.18)	(0.72)
11th Grader planned FAFSA	0.19	0.02	0.44	0.03	1.21*	0.07	0.35	1.00*	0.63	0.25
	(0.15)	(0.16)	(0.28)	(0.16)	(0.54)	(0.16)	(0.71)	(0.50)	(0.51)	(0.32)
Grades Imp for Col	0.15	0.15	1.06**	0.26	0.84	0.38+	0.45	1.53**	1.56**	0.68
	(0.19)	(0.22)	(0.39)	(0.23)	(0.68)	(0.21)	(0.84)	(0.52)	(0.55)	(0.47)
SAT/ACT Imp for Col	-0.27	-0.18	-0.32	-0.32	0.25	-0.11	-0.56	-0.58	-0.62	-0.95*
	(0.21)	(0.25)	(0.36)	(0.21)	(0.65)	(0.21)	(0.77)	(0.58)	(0.49)	(0.47)
Courses Imp for Col	0.42*	0.29+	0.37	0.32*	0.38	0.33*	-0.05	0.44	0.35	0.34
	(0.16)	(0.16)	(0.31)	(0.16)	(0.56)	(0.16)	(0.61)	(0.36)	(0.49)	(0.35)
College Eligible										
College Eligible in Math	0.34	0.40	0.21	0.55	-0.89	0.15	1.31	2.35	-0.71	0.57
	(0.49)	(0.58)	(0.73)	(0.54)	(1.10)	(0.49)	(1.18)	(1.54)	(0.98)	(0.82)
Took ACT/SAT 1+	0.38*	0.35+	0.38	0.38*	0.93	0.52**	0.02	1.38**	0.93+	0.33
	(0.15)	(0.19)	(0.30)	(0.16)	(0.60)	(0.17)	(0.65)	(0.44)	(0.48)	(0.36)
College-Going Supports										
Made Ed Plan in 9th Grade	0.10	-0.11	0.32	-0.00	0.60	0.12	1.48*	-0.37	0.86*	0.20
	(0.14)	(0.13)	(0.24)	(0.13)	(0.46)	(0.13)	(0.59)	(0.51)	(0.40)	(0.29)
Counseled as Senior	0.29	0.25	1.04**	0.30	1.80*	0.33	3.87***	1.99**	1.84*	1.69**
	(0.18)	(0.20)	(0.39)	(0.19)	(0.91)	(0.20)	(0.93)	(0.68)	(0.74)	(0.53)
College Tour	0.07	0.11	0.17	0.38*	-0.67	0.13	0.82	-0.30	-0.32	0.06
	(0.15)	(0.16)	(0.32)	(0.15)	(0.54)	(0.14)	(0.84)	(0.55)	(0.54)	(0.37)
Student Characteristics										
Female	0.02	0.12	-0.29	0.11	0.43	0.08	-1.25*	0.93+	0.49	0.58+
	(0.13)	(0.15)	(0.27)	(0.15)	(0.62)	(0.14)	(0.54)	(0.52)	(0.42)	(0.32)
Latino	0.07	0.52	0.26	0.27	-0.24					
	(0.26)	(0.36)	(0.42)	(0.33)	(0.65)					
African American	-0.14	0.02	-0.40	0.02	-0.72					
	(0.28)	(0.33)	(0.43)	(0.28)	(0.65)					

Table A15 (cont'd)

Native/Pacific	0.12	0.12	0.17	-0.02	0.98					
	(0.25)	(0.27)	(0.44)	(0.24)	(0.91)					
12th Grade Math	0.12***	0.11***	0.12***	0.12***	0.13***	0.12***	0.06	0.10***	0.14***	0.08***
	(0.01)	(0.01)	(0.02)	(0.01)	(0.04)	(0.01)	(0.04)	(0.03)	(0.04)	(0.02)
Expects BA (only)	0.08	0.40+	-0.08	0.20	0.08	0.25	-2.23*	0.39	0.14	-0.24
	(0.24)	(0.23)	(0.42)	(0.29)	(0.78)	(0.24)	(0.88)	(0.82)	(0.65)	(0.47)
Expects Advanced Degree	0.68**	0.85***	0.80*	0.60*	1.59+	0.64**	-1.06	0.69	0.99+	0.95+
	(0.23)	(0.22)	(0.39)	(0.25)	(0.82)	(0.22)	(0.90)	(0.80)	(0.58)	(0.49)
Did Not Apply to College	0.13	0.14	0.19	0.07	0.32	0.20	0.97*	-0.49	0.06	-0.31
	(0.16)	(0.17)	(0.29)	(0.19)	(0.54)	(0.17)	(0.48)	(0.45)	(0.42)	(0.38)
No FAFSA b/c high income	0.00	0.21	-1.24	0.23	3.17*	0.10	2.48*	-0.18	1.11	0.13
	(0.23)	(0.23)	(0.76)	(0.23)	(1.42)	(0.23)	(0.98)	(0.92)	(0.93)	(0.63)
Parent has BA	0.63***			0.58***	0.59	0.48**	1.04+	1.08*		0.66+
	(0.14)			(0.18)	(0.65)	(0.16)	(0.54)	(0.50)		(0.34)
School Characteristics										
% Transition to College	0.02	0.02**	0.01	0.03***	-0.01	0.02**	0.06**	-0.01	-0.01	0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.03)	(0.01)	(0.02)	(0.02)	(0.02)	(0.01)
% FRPL	0.00	-0.01	0.02+	-0.01	0.06*	0.01	0.01	0.03+	0.03	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)	(0.01)
Private School	0.59	0.14	0.87+	0.26	2.66*	0.21	1.19	-0.04	2.32*	1.08*
	(0.38)	(0.28)	(0.52)	(0.28)	(1.16)	(0.29)	(0.86)	(0.58)	(0.93)	(0.55)
Counselor Caseload	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00+	-0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Level 2 cons	0.98***	0.74***	0.89***	0.72***	1.91**	0.77***	0.97+	-0.00	1.29*	1.03*
	(0.15)	(0.13)	(0.26)	(0.13)	(0.60)	(0.12)	(0.57)	(0.00)	(0.55)	(0.42)
N	5,470	3,820	1,650	4,200	740	4,180	550	520	900	1,330

Standard errors in parentheses

Note: Data from HSLS restricted-use data file, using (3-wave + transcript) longitudinal student weights.

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A16.

Sensitivity Analysis: Selective College Attendance for Disadvantaged Students, 2-level OLS (linear probability model, advanced math)

	(1) All Students	(2) Parent Has BA	(3) No Parent BA	(4) Not Poor	(5) Poor	(6) White	(7) African American	(8) Latino/a	(9) Multiple Disadvantage	(10) Minority
College Knowledge										
Actual FAFSA Submission	-0.34	-0.55*	-0.57	-0.18	-1.59	-0.75**	1.06	-1.81+	-1.14	-1.65*
	(0.37)	(0.28)	(0.61)	(0.31)	(1.06)	(0.25)	(0.78)	(0.97)	(0.98)	(0.70)
11th Grader planned FAFSA	0.04	-0.02	0.42	0.02	1.21*	0.13	0.24	0.87+	0.56	0.14
	(0.18)	(0.18)	(0.27)	(0.17)	(0.48)	(0.16)	(0.65)	(0.50)	(0.48)	(0.32)
Grades Imp for Col	0.13	0.07	0.94*	0.26	0.88	0.29	-0.01	1.48**	1.45**	0.75
	(0.20)	(0.23)	(0.40)	(0.22)	(0.62)	(0.21)	(0.74)	(0.53)	(0.52)	(0.49)
SAT/ACT Imp for Col	-0.22	-0.15	-0.35	-0.38+	0.18	-0.10	-0.35	-0.64	-0.58	-0.98*
	(0.21)	(0.21)	(0.35)	(0.21)	(0.62)	(0.21)	(0.75)	(0.58)	(0.45)	(0.48)
Courses Imp for Col	0.24	0.30*	0.41	0.32+	0.22	0.28+	-0.04	0.45	0.25	0.35
	(0.17)	(0.15)	(0.31)	(0.16)	(0.50)	(0.17)	(0.54)	(0.38)	(0.47)	(0.35)
College Eligible										
Advanced Math	0.52*	0.50+	0.65	0.55+	0.44	0.48*	1.79*	0.54	1.25+	1.00*
	(0.25)	(0.31)	(0.43)	(0.30)	(0.72)	(0.22)	(0.77)	(0.96)	(0.67)	(0.49)
Took ACT/SAT 1+	0.61**	0.27	0.45	0.28+	0.41	0.43*	-0.59	1.28**	0.71+	0.28
	(0.21)	(0.18)	(0.30)	(0.17)	(0.46)	(0.18)	(0.64)	(0.47)	(0.41)	(0.35)
College-Going Supports										
Made Ed Plan in 9th Grade	-0.01	-0.05	0.27	-0.09	0.77+	0.12	1.32*	-0.29	0.94*	0.13
	(0.14)	(0.16)	(0.24)	(0.13)	(0.42)	(0.13)	(0.53)	(0.50)	(0.40)	(0.28)
Counseled as Senior	0.35+	0.24	1.06**	0.32+	1.75*	0.39*	3.91***	2.29**	2.11**	1.71***
	(0.21)	(0.21)	(0.38)	(0.19)	(0.75)	(0.20)	(0.86)	(0.72)	(0.71)	(0.52)
College Tour	0.11	0.09	0.08	0.21	-0.61	0.13	0.88	-0.28	-0.45	-0.04
	(0.17)	(0.19)	(0.33)	(0.19)	(0.47)	(0.15)	(0.69)	(0.54)	(0.50)	(0.37)
Student Characteristics										
Female	0.17	0.17	-0.30	0.01	0.38	0.16	-0.83+	1.20*	0.45	0.50
	(0.16)	(0.18)	(0.29)	(0.17)	(0.50)	(0.15)	(0.50)	(0.58)	(0.42)	(0.33)
Latino	0.21	0.60+	0.22	0.34	-0.40					
	(0.32)	(0.36)	(0.41)	(0.33)	(0.57)					
African American	-0.02	-0.33	-0.35	0.06	-0.48					
	(0.30)	(0.35)	(0.45)	(0.27)	(0.58)					
Native/Pacific	0.04	0.19	0.22	0.06	0.71					
	(0.25)	(0.28)	(0.48)	(0.26)	(0.79)					

Table A16 (cont'd)

12th Grade Math	0.10***	0.11***	0.12***	0.12***	0.10***	0.11***	0.03	0.09**	0.11***	0.08***
	(0.01)	(0.01)	(0.02)	(0.01)	(0.03)	(0.01)	(0.04)	(0.03)	(0.03)	(0.02)
Expects BA (only)	0.03	0.37	-0.05	0.24	-0.03	0.17	-2.72**	0.17	-0.14	-0.16
	(0.27)	(0.23)	(0.41)	(0.32)	(0.70)	(0.24)	(0.85)	(0.81)	(0.60)	(0.46)
Expects Advanced Degree	0.73*	0.86***	0.85*	0.67*	1.26+	0.56*	-1.61+	0.65	0.97+	1.12*
	(0.28)	(0.23)	(0.39)	(0.27)	(0.71)	(0.22)	(0.83)	(0.78)	(0.57)	(0.48)
Did Not Apply to College	0.05	0.15	0.14	0.12	0.26	0.19	0.71	-0.68	-0.05	-0.29
	(0.20)	(0.17)	(0.30)	(0.19)	(0.44)	(0.17)	(0.45)	(0.44)	(0.38)	(0.36)
No FAFSA b/c high income	0.31	0.20	-1.19	0.00	2.12+	0.07	1.99*	-0.36	0.88	0.15
	(0.27)	(0.23)	(0.78)	(0.25)	(1.13)	(0.23)	(0.96)	(0.96)	(0.88)	(0.64)
Parent has BA	0.52***			0.68***	0.47	0.55***	0.98+	1.08*		0.66+
	(0.15)			(0.18)	(0.55)	(0.17)	(0.53)	(0.53)		(0.34)
School Characteristics										
% Transition to College	0.01	0.03***	0.00	0.03***	-0.02	0.02**	0.05*	-0.01	-0.02	-0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)	(0.01)
% FRPL	0.01	-0.01	0.02+	-0.01	0.04*	0.01	0.02	0.03	0.02	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)	(0.01)
Private School	0.69+	0.18	0.97+	0.21	2.08*	0.20	1.21	-0.18	2.20*	1.29*
	(0.40)	(0.29)	(0.54)	(0.27)	(0.95)	(0.31)	(0.76)	(0.57)	(0.88)	(0.57)
Counselor Caseload	0.00	0.00	-0.00	0.00	-0.00	-0.00	0.00	-0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Level 2 cons	1.02***	0.74***	0.93***	0.66***	1.43**	0.80***	0.70	0.00	1.05+	0.97*
	(0.14)	(0.12)	(0.26)	(0.13)	(0.51)	(0.13)	(0.70)	(0.00)	(0.58)	(0.49)
N	5,470	3,820	1,650	4,200	740	4,180	550	520	900	1,330

Standard errors in parentheses

Note: Data from HSLS restricted-use data file, using (3-wave + transcript) longitudinal student weights.

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Tables A1-A16 show that the conclusions in Chapter 2 are not sensitive to the model used for analysis. The pattern of results always shows that college knowledge matters for whether students attend college, that college eligibility matters for the quality of college attended, and that the college readiness measures are particularly important for disadvantaged students. Another way of confirming the robustness of the findings is to calculate what share of students would need to be replaced with null hypothesis cases or what share of the estimate would need to be due to bias in order to invalidate the conclusion (Frank, 2000; Frank, Maroulis, Duong, & Kelcey, 2013). The point estimates of the LPM analyses in A13-A16 are generally the smallest, so they represent a particularly stringent application of this test.

Available tools make it easy to calculate these robustness measures for completed analyses (Frank, 2014). For the all-students estimate of how FAFSA submission relates to any enrollment, 84% of the estimated effect would have to be due to bias to invalidate the inference (or 84% of cases would need to be replaced with cases with no relationship between FAFSA and enrollment). For the first-generation estimate of how FAFSA submission relates to any enrollment, 79% of the estimated effect would need to be due to bias to invalidate the conclusion. For all students' enrollment in 4-year institutions, the figure for FAFSA submission is 74% and the figure for math eligibility is 41%. For minority students' enrollment in 4-year institutions, the figure for FAFSA submission is 11% and for math eligibility is 35%. The relationships of college eligibility measures to institution selectivity are somewhat less robust, using this type of analysis. For all students' enrollment in highly selective institution, the figure for advanced math is 6%, while for ACT it is 33%, . For African-American students' enrollment in highly selective institution, the figure for advanced math is 15%. The ACT figure is of similar robustness to the overall sample for the two groups with the largest estimates in Table A4: for

White students, at 18%, and for Latina/o students, at 28%. Using this type of robustness analysis reveals that most of my findings are quite robust to possible bias in the models, but that the relationship of advanced math course-taking to highly-selective enrollment could be invalidated by a smaller change in sample or bias than the other estimates. That introduces cause for caution in interpreting that one relationship, which would not have been apparent without using this specific robustness check.

Appendix B

Characteristics of Studies Included in Final Sample of YRE meta-analysis

Table B1.

Measurement, Identification Strategy, and Analysis Characteristics of Studies in Final Sample of YRE Meta-Analysis

Study Author and Year	Achievement Measure	Identification Strategy	Analytic Approach
Abakwue 2011	TCAP (standards-based)	Demographically similar schools, geographically proximate	2-group MANOVA for scores of 30 randomly-selected students (/subject/schl)
Beazley 2001	% proficient on district-generated criterion-referenced test	Cohort comparison within school; 3 years before change vs. first 3 years YRE	Descriptive analysis of means and 3-year trends; descriptive comparison to district.
Beringer 2002	ACT	Cohort comparison within school (7 schools), for the most recent 3 years versus the last 3 years the school was on TR	
Carl 2009	WI Knowledge and Concepts Examination (criterion-referenced)	Compared YRE schools' performance to the balance of Milwaukee Public Schools	Year-over-year percent proficient; average growth in score.
Cary 2006	SOL, criterion-referenced	Title 1 schools matched on FRPL and race	MANOVA
Coopersmith 2011	TAKS (norm-referenced) raw score	School-level pairing within TEA campus comparison group, matched on ethnicity, economic status, LEP, and mobility	Independent samples t-test (mean difference)
Corbett 2003	Stanford 9 (norm-referenced)	Cohort comparison within school (28 schools in 9 districts), omitting the year in which the calendar was changed; 1 year before/after	Dependent samples t-test (mean difference)
Crow 2009, Crow & Johnson 2010	TAKS (standards-referenced)	TEA campus comparison group matched on % African American, % Hispanic, % white, % economically disadvantaged, % LEP, % mobile [<10% differences]	Independent samples t-test (mean difference)
Evans 2007	% Passing ISTEP+, criterion-references	School-level matching on FRPL, minority, ELL	T-test of average percent passing

Table B1 (cont'd)

Ferguson 2001	% passing SOL	Cohort comparison of 1 year before and 1 year after conversion	Descriptive comparison of % passing
Fritts-Scott 2005	ACTAAP Primary Benchmark Exam (criterion-referenced) scaled score	School-level within-state 3-stage 2:1 matching of 9 YRE schools based on school size, %FRPL, grade span; % minority, region, district size; random selection	One-way ANOVA for students enrolled at the same school for 3 years
Graves 2009, 2010	Average student national percentile rank	Uses school fixed effects and school-specific time trends in order to estimate the effect of within-school differences in calendar type	Regression (OLS) with extensive controls; OLS with school fixed effects; OLS with school-specific time trends (primary specification)
Helton 2001	% Proficient FCAT	23 schools matched to in-district comparison school with similar FRPL	ANOVA controlling for FRPL and LEP
Kellems 2006, Oppel 2007	% passing ISTEP+	Cohort comparison, 2 years before and after conversion.	Descriptive analysis of pass rates before and after calendar conversion
Lindsay-Brown 2010	PACT (norm-referenced) and MAP	District-level matching on % not ready for first grade and FRPL; schools randomly selected.	ANCOVA
Malicsi 2009	Stanford 9 (norm-referenced)	Cohort comparison within schools, omitting the year in which the calendar was changed and 1 other; 2 years before on each side of policy change	Descriptive analysis of means of percentile rank stanine and comparison of those means to the district-level means
Marks 2006	TCAP (standards-based)	Cohort comparison within school; 1 year before change vs. first 2 years YRE	Repeated measure ANOVA
Marlett 2007	ISAT (standards-based) standard scores	Cohort comparison within school, omitting the year in which the calendar was changed; 2 years before/after	4-way ANOVA controlling for calendar, grade, gender, and IEP status
McLean 2002	TCAP (norm-referenced) NCE.	Cohort comparison within school; also year-over year NCE change within cohorts across YRE/traditional calendar years	Descriptive and trend analysis

Table B1 (cont'd)

McMillan 2005	TCAP TerraNova (norm- and criterion-referenced items)	School-level matching on FRPL, rurality, and % minority	Independent samples t-test (mean difference) of NCE (national curve equivalent) score
Merill 2012	ISAT (standards-based) standard scores	Within-district comparison schools matched based on % African American and % FRPL	2-way between subjects factorial ANOVA
Mitchell-Hoefer 2010	% proficient, PACT	Within-district comparison school based on Title I status	Z-test of percent proficient, estimated separately for three consecutive years
Moore 2002, Moore & Verstegen 2004	SOL (criterion-referenced) and Stanford 9 (norm-referenced)	School-within-a-school with parent opt-in. Comparable on descriptive characteristics, but treated group slightly less likely to receive FRPL and more likely to live with both parents	T-test (mean difference)
Ramos 2006, 2011	National Percentile Rank on ITBS, CAT-5, and ISAT	3 school-within-schools	T-test; ANCOVA controlling for gender, ethnicity, gifted, IEP, FRPL
Schumacher 2015	% meeting standards, Nebraska State Assessments	Within-district match based on % FRPL	One-way ANOVA
Sexton 2003	SOL (criterion-referenced)	School-within-a-school	One-way ANCOVA controlling for 5th-grade Degrees of Reading Power scores and attendance for non-IEP students
Thigpen 2004	% Proficient, Mississippi Curriculum Test	Within the same district; similar rates of FRPL, minority, and low-performing students	Chi-square analysis of mean % proficient in 3 consecutive years, only for the students who remained on the same calendar all 3 years.
Thomas 2002	TLI scores from TAAS (criterion-referenced)	4 treatment schools matched to TEA campus comparison group on ethnicity, %ED, % mobility, % LEP.	ANOVA controlling for ED, ethnicity, gender, and school size

Table B1 (cont'd)

Tittermary et al. 2013	SOL (criterion-referenced)	Within-district (division) traditional calendar schools	Compared average SOL growth at YRE schools to (a) average growth at traditional-calendar schools and (b) growth predicted by regression analysis of traditional-calendar students
Trent 2007	TCAP TerraNova (norm- and criterion-referenced items)	Counties selected based on similar rurality, % FRPL, rurality, ethnicity	Independent samples t-test (mean difference) of NCE (national curve equivalent) score for students enrolled at the same school for 3 years
Varner 2003	TerraNova median percentile rank	Within-district comparison schools, comparable on % African American and % FRPL	Descriptive analysis of means and 4-year trend.
Wilmore & Slate 2012, Wilmore-Dafonte 2013	TAKS (standards-referenced)	2:1 match from campus comparison group using % Black, % Hispanic, % White, %ED, % LEP, and % mobile	MANOVA and follow-up ANOVA
Winkelmann 2010	% Passing ISAT	Within-Chicago match based on city region, enrollment total, and low-income %.	Paired t-tests of mean % passing.

Note: Tennessee Comprehensive Assessment Program; Texas Assessment of Knowledge and Skills; Arkansas Comprehensive Testing; Assessment, and Accountability Program; Palmetto Achievement Challenge Test; Measures of Academic Progress; Illinois Standards Achievement Test; Iowa Test of Basic Skills; California Achievement Test-5; Idaho Standards Assessment Test; Texas Learning Index; Texas Assessment of Academic Skills

APPENDIX C

Detailed Output of Counseling, College Readiness, and College-Going

Table C1.

Correlation Table for Chapter 4 Variables

	Taking Classes	Submit Plan	Annual+ Review	Counselor Helped 9th Plan	No Ed Plan	Hispanic	Black	Other Race	Parent BA	Female
Taking Classes	1									
Submit Plan	0.0173	1								
Annual+ Review	0.0309	0.7549	1							
Cnslr Helped	0.0201	0.1322	0.1209	1						
No Ed Plan	-0.0673	-0.1251	-0.1077	-0.2707	1					
Hispanic	-0.0506	-0.0331	-0.037	-0.0243	0.008	1				
Black	-0.0307	0.0495	0.029	0.0322	-0.0935	-0.0502	1			
Other Race	-0.048	0.033	0.0096	-0.0013	0.005	0.2084	0.0819	1		
Parent BA	0.2002	-0.0286	-0.0011	0.0098	-0.0116	-0.1947	-0.1178	-0.0827	1	
female	0.0955	0.0525	0.0464	-0.0188	-0.0631	0.0107	0.0463	-0.0012	-0.0195	1
9th Math Score	0.2463	-0.0017	0.016	0.0262	-0.0054	-0.1183	-0.2213	-0.0603	0.2927	-0.0263
Expects BA	0.0857	0.013	0.0035	0.0158	-0.0153	-0.0437	-0.0425	-0.0378	0.0682	-0.0234
Expects Adv.	0.213	0.0583	0.0743	0.0258	-0.0901	-0.0539	0.0296	-0.0364	0.1456	0.1006
MajorityFr~l	0.2291	0.0539	0.0609	-0.0009	-0.0538	-0.0933	-0.0173	-0.0245	0.2226	0.0618
Counseled 9thG	0.035	0.1075	0.0933	0.277	-0.1108	-0.0468	0.0679	0.0206	-0.0125	0.0432
Mom talked col.	0.148	0.0408	0.0438	0.0445	-0.1387	-0.0119	0.0088	-0.0109	0.0726	0.1177
Counseled 12th	0.2786	0.0557	0.0565	0.0186	-0.0393	-0.0222	-0.0061	-0.0151	0.112	0.0465
Counselor Infl.	-0.0196	0.042	0.0703	0.0137	0.0243	-0.0012	0.0449	0.0271	-0.0587	0.0162
Caseload	-0.035	0.0238	0.0027	0.0008	-0.054	0.1107	0.0007	0.0444	-0.0446	0.0129
Experienced Cnslr	0.0018	0.0293	0.0233	0.0182	0.0034	-0.0677	0.0185	-0.0005	0.0035	-0.0123
One Counselor	-0.0138	-0.0108	-0.0124	-0.0102	-0.0067	-0.0733	-0.0417	-0.0499	-0.0176	0.0172
Private	0.1149	-0.0219	0.0102	-0.0388	0.0359	-0.0673	-0.0654	-0.0468	0.2018	0.009
% FRPL	-0.1521	-0.0052	-0.0159	0.015	-0.0459	0.2325	0.2654	0.1155	-0.3208	0.0176
% 4 Year	0.1353	-0.0124	0.0071	-0.0091	0.0319	-0.1149	-0.0063	-0.0541	0.2307	0.0098

Table C1 (cont'd)

	Math 9th Grade	Expects BA	Expects Adv	Majority Friends College	Counseled 9thG	Mom talked col.	Counseled 12th	Cnslr Infl.	Counselor Caseload	Exper Cnsl
9th Math Score	1									
Expects BA	0.0712	1								
Expects Adv.	0.2315	-0.4958	1							
Majority Friend	0.2479	0.0332	0.2615	1						
Counseled 9thG	0.0054	0.0107	0.0511	0.0404	1					
Mom talked col.	0.1456	0.0374	0.1389	0.1271	0.125	1				
Counseled 12th	0.1434	0.0271	0.1456	0.1575	0.0368	0.0878	1			
Counselor Infl.	-0.052	-0.0435	-0.0209	0.0206	0.0205	-0.0191	-0.0108	1		
Caseload	0.0053	-0.0187	-0.0224	-0.0449	-0.0374	-0.0084	-0.0931	-0.0243	1	
Experienced Cnslr	-0.0205	0.0206	-0.0043	0.0174	-0.0104	0.0007	-0.0046	-0.0099	0.0807	1
One Counselor	-0.0167	-0.0051	-0.0012	-0.0215	-0.0147	0.0026	0.0025	-0.0064	0.0635	-0.0666
Private	0.1064	0.0125	0.0771	0.1484	-0.0207	0.0302	0.1004	0.0171	-0.3331	-0.0197
% FRPL	-0.3019	-0.0507	-0.0873	-0.1841	0.0566	-0.0588	-0.0833	0.0276	0.0694	-0.036
% 4 Year	0.2286	0.0169	0.1252	0.2101	-0.0052	0.0389	0.1201	0.0124	-0.1739	0.0016

	One Cnslr	Private	% FRPL
One Counselor	1		
Private	0.0712	1	
% FRPL	0.2315	-0.4958	1

Table C2.

FAFSA Intent for Disadvantaged Students

	(1) All Students	(2) Poor Students	(3) Minority Students	(4) Poor Minorities	(5) Students in Poverty	(6) No Parent BA	(7) Poor No Parent BA	(8) Minority No Parent BA
Counseling Activities								
Submitted Education Plan	0.86	0.84	1.22	0.80	0.91	0.75^{+}	0.71	1.07
Annual+ Review of Plan	1.70***	2.29**	1.27	2.59*	1.57	2.07***	2.33**	1.49
Counselor Helped make 9th Grade Ed Plan	0.96	1.37	1.10	0.84	1.59	1.27	1.50	1.30
Made no Ed plan	0.89	0.96	0.84	1.04	0.88	0.98	1.02	1.02
Other College Supports								
Met w/Cnslr re College	1.28*	1.19	1.02	1.15	1.14	1.30^{+}	1.35	0.97
Mom Talked to 9th Grader About College	0.95	0.68^{+}	1.02	0.73	0.86	0.89	0.68^{+}	0.93
Counseled on Aid as Senior						1.03		
Counselor biggest Aid infl	1.29	1.05	1.53	1.18	1.64	1.37	1.21	1.86*
Student Characteristics								
Female	1.87***	2.53***	2.04***	2.83***	2.59***	1.85***	2.23***	1.87**
African American	1.00	0.97			0.79	1.07	1.06	
Latino	1.11	1.12			0.87	1.16	0.94	
Native/Pacific	1.07	0.89			1.16	0.86	1.10	
9th Grade Math	1.02*	1.01	1.03**	1.01	1.00	1.02*	1.02	1.03*
Majority Friends Expect Col	1.01	1.42*	1.00	1.65*	1.86*	1.25*	1.61**	1.26
Expects BA (only)	2.19***	1.62*	2.09***	1.71^{+}	2.02*	2.07***	1.50^{+}	1.78**
Expects Advanced Degree	2.33***	2.27***	2.37***	1.95*	2.02*	2.42***	2.03**	2.34***
Parent has BA	0.84*	0.96	0.80	0.89	0.28**			
FAFSA Previously	0.41***	0.47**	0.58**	1.25	0.32**	0.44***	0.45**	0.61^{+}
No FAFSA because high income	0.27***	0.14***	0.31***	0.14**	0.14*	0.33***	0.16**	0.50^{+}
School Demographics								
% Transition to College	1.00^{+}	1.00	1.00	1.00	1.01	1.01*	1.01	1.00
% FRPL	1.01***	1.01^{+}	1.01^{+}	1.00	1.00	1.01**	1.01*	1.01^{+}
Private School	0.89	1.19	1.26	1.06	0.68	0.73	1.09	0.93
Counselor Qualities								
Counselor Caseload	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Experienced Counselor	1.00	0.78	0.94	0.94	0.86	0.97	0.79	1.05
1 Counselor at School	1.24^{+}	1.40^{+}	1.02	1.26	1.56	1.39*	1.50^{+}	1.16
N	13,160	3,120	4,360	1,530	1,360	6,560	2,560	2,660

Note: Data from HSLS restricted data file, using (3-wave+transcript) longitudinal student weights. $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table C3.

Math College Readiness for Disadvantaged Students

	(1) All Students	(2) Poor Students	(3) Minority Students	(4) Poor Minorities	(5) Students in Poverty	(6) No Parent BA	(7) Poor No Parent BA	(8) Minority No Parent BA
Counseling Activities								
Submitted Education Plan	1.06	1.26	1.43	1.38	1.04	1.30	1.19	1.60
Annual+ Review of Plan	1.21	1.77	0.84	1.40	2.65	1.17	2.07	1.03
Counselor Helped make 9th Grade Ed Plan	1.03	0.87	1.69	1.32	1.16	1.23	1.00	1.86
Made no Ed plan	0.92	1.19	0.69	0.73	1.31	1.10	1.39	0.74
Other College Supports								
Met w/Cnslr re College	0.82	0.70	0.83	0.72	0.92	0.62^{+}	0.66	0.74
Mom Talked to 9th Grader About College	1.28	1.34	1.07	1.59	0.80	1.26	1.30	0.97
Counseled on College as Senior	2.08^{***}	2.31^{**}	2.16^{***}	2.13^{*}	2.90^{**}	1.96^{***}	1.80^{*}	1.93^{*}
Counselor biggest College infl	0.89	2.13	1.86	2.76	4.61	1.11	1.42	3.16
Student Characteristics								
Female	1.10	1.22	1.15	1.37	1.69^{+}	1.03	1.05	1.05
African American	0.71^{*}	0.93			1.38	0.82	1.10	
Latino	0.92	0.59^{+}			0.68	0.93	0.71	
Native/Pacific	0.94	1.43			1.01	1.26	1.60	
9th Grade Math	1.10^{***}	1.09^{***}	1.08^{***}	1.08^{**}	1.08^{**}	1.09^{***}	1.09^{***}	1.07^{***}
Majority Friends Expect Col	1.57^{***}	1.35	1.66^{*}	1.70	1.66	1.62^{**}	1.46	1.86^{*}
Expects BA (only)	2.33^{***}	2.19^{**}	1.78^{*}	1.83^{+}	2.01	2.47^{***}	2.73^{***}	1.92^{*}
Expects Advanced Degree	2.61^{***}	2.92^{***}	1.92^{*}	2.11^{+}	2.07^{+}	2.93^{***}	2.95^{**}	2.68^{**}
Parent has BA	1.62^{***}	2.49^{**}	1.15	1.31	3.02^{*}			
School Demographics								
% Transition to College	1.02^{**}	1.02	1.01	1.01	1.02^{+}	1.02^{*}	1.02^{+}	1.02
% FRPL	1.01	1.01	1.01	1.00	1.00	1.01^{*}	1.01	1.01
Private School	1.40	0.72	2.05	0.35	0.38	1.11	0.51	0.97
Counselor Qualities								
Counselor Caseload	1.00	1.00^{*}	1.00	1.00^{**}	1.00	1.00^{**}	1.00^{**}	1.00^{***}
Experienced Counselor	0.93	0.66	0.49^{*}	0.61	0.61	0.76	0.74	0.58
1 Counselor at School	2.00^{*}	2.34^{*}	1.25	2.27	4.84^{**}	2.04	2.28^{+}	1.31
N	13,160	3,120	4,360	1,530	1,360	6,560	2,560	2,660

Note: Data from HSLS restricted-use data file, using (3-wave + transcript) longitudinal student weights. Exponentiated coefficients

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table C4.

Actual FAFSA Submission for Disadvantaged Students

	(1) All Students	(2) Poor Students	(3) Minority Students	(4) Poor Minorities	(5) Students in Poverty	(6) Poor No Parent BA	(7) Minority No Parent BA
Counseling Activities							
Submitted Education Plan	0.83	1.32	0.77	1.00	1.69	1.37	0.75
Annual+ Review of Plan	1.48*	1.28	1.71+	1.84	1.08	1.17	1.54
Counselor Helped make 9th Grade Ed Plan	0.85	1.03	0.65	1.16	0.84	1.46	0.78
Made no Ed plan	0.93	0.74	1.02	0.70	0.83	0.90	0.95
Other College Supports							
Met w/Cnslr re College	1.02	0.59+	0.93	0.79	0.82	0.59+	0.79
Mom Talked to 9th Grader About College	1.43**	1.76**	1.86**	2.39**	2.38**	1.72**	1.43
Counseled on Aid as Senior	4.83***	5.68***	5.02***	5.88***	7.30***	5.45***	5.99***
Counselor biggest Aid infl	0.71	0.73	0.80	0.57	0.98	0.82	0.95
Student Characteristics							
Female	1.52***	1.37+	1.65**	1.38	2.12**	1.17	1.55*
African American	0.90	1.38			1.41	1.28	
Latino	0.79	0.94			0.67	1.14	
Native/Pacific	1.02	1.06			1.22	1.19	
9th Grade Math	1.03***	1.04***	1.05***	1.03+	1.05**	1.04**	1.05***
Majority Friends Expect Col	1.68***	1.36	1.17	1.16	0.84	1.47+	1.38
Expects BA (only)	1.89***	1.36	1.89**	1.16	1.46	1.56+	1.61+
Expects Advanced Degree	2.30***	2.84***	2.83***	2.81**	1.71+	2.92***	3.21***
Parent has BA	1.31*	0.93	1.31	0.69	0.82		
FAFSA Previously	0.50***	0.62	0.51*	0.73	0.68	0.76	0.92
No FAFSA because high income	0.13***	0.20***	0.13***	0.20***		0.24***	0.14***
School Demographics							
% Transition to College	1.00	1.00	1.00	1.00	1.00	1.00	1.00
% FRPL	1.00	1.00	1.00	0.99+	1.00	1.00	0.99
Private School	0.96	3.28*	1.23	1.33	4.22*	2.18	0.97
Counselor Qualities							
Counselor Caseload	1.00+	1.00	1.00	1.00	1.00	1.00	1.00
Experienced Counselor	0.93	0.71	1.07	0.62	0.66	0.80	1.10
1 Counselor at School	0.93	0.79	0.57*	0.49*	0.69	0.83	0.53*
N	13,160	3,120	4,360	1,530	1,360	2,560	2,660

Note: Data from HSLS restricted data file, using (3-wave+transcript) longitudinal student weights. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table C5.

Advanced Math Course-taking for Disadvantaged Students

	(1) All Students	(2) Poor Students	(3) Minority Students	(4) Poor Minorities	(5) Students in Poverty	(6) No Parent BA	(7) Poor No Parent BA	(8) Minority No Parent BA
Counseling Activities								
Submitted Education Plan	1.17	1.01	1.77*	0.87	0.72	1.14	1.07	2.00**
Annual+ Review of Plan	0.88	1.15	0.71	1.62	2.65+	0.93	1.29	0.90
Counselor Helped make 9th Grade Ed Plan	0.97	0.57+	0.73	0.41+	0.52	0.95	0.52+	0.68
Made no Ed plan	0.88	0.86	0.74	0.59+	0.92	0.93	0.84	0.74
Other College Supports								
Met w/Cnslr re College	0.97	1.24	1.12	1.13	2.11*	0.87	1.28	1.18
Mom Talked to 9th Grader About College	1.09	1.22	1.40	1.90+	1.07	1.45*	1.27	2.10**
Counseled on College as Senior	1.72***	1.66*	1.69*	1.67	1.93*	1.47**	1.48+	1.34
Counselor biggest College infl	0.62	0.95	0.94	0.55	2.08	0.52+	0.93	1.28
Student Characteristics								
Female	0.98	1.12	1.12	1.23	1.33	0.93	1.04	0.99
African American	0.78	0.81			0.80	0.84	0.86	
Latino	0.73*	0.91			1.03	0.88	1.22	
Native/Pacific	0.87	0.94			0.37**	1.07	0.92	
9th Grade Math	1.13***	1.11***	1.10***	1.08***	1.09***	1.11***	1.11***	1.09***
Majority Friends Expect Col	1.80***	1.32	1.62+	1.21	2.12**	1.56**	1.42+	1.38
Expects BA (only)	1.78***	2.17***	1.31	1.64	1.63	1.70***	2.54***	1.38
Expects Advanced Degree	2.97***	2.83***	1.96*	1.47	1.83+	3.06***	2.50***	2.22**
Parent has BA	1.49***	2.07**	1.27	1.88+	3.07**			
School Demographics								
% Transition to College	1.01*	1.01+	1.01*	1.02*	1.02*	1.01	1.01	1.01*
% FRPL	1.01+	1.01+	1.01+	1.01	1.01	1.01+	1.01+	1.01*
Private School	1.51	0.56	1.54	0.49	0.84	1.35	1.04	1.23
Counselor Qualities								
Counselor Caseload	1.00**	1.00***	1.00***	1.00**	1.00+	1.00***	1.00***	1.00***
Experienced Counselor	1.12	0.95	1.08	0.77	0.78	0.98	0.95	1.06
1 Counselor at School	1.28	1.28	0.95	1.21	1.27	1.20	1.44	0.85
N	13,160	3,120	4,360	1,530	1,360	6,560	2,560	2,660

Note: Data from HSLS restricted-use data file, using (3-wave + transcript) longitudinal student weights. Exponentiated coefficients

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table C6.

Precalculus Course-taking for Disadvantaged Students

	(1) All Students	(2) Poor Students	(3) Minority Students	(4) Poor Minorities	(5) Students in Poverty	(6) No Parent BA	(7) Poor No Parent BA	(8) Minority No Parent BA
Counseling Activities								
Submitted Education Plan	1.31^{+}	1.64	2.74***	1.59	1.20	1.37	1.28	2.77***
Annual+ Review of Plan	0.85	0.76	0.65	1.44	1.43	0.90	1.13	0.82
Counselor Helped make 9th Grade Ed Plan	1.02	0.66	0.66	0.45^{+}	0.59	0.96	0.53^{+}	0.56
Made no Ed plan	0.84^{+}	0.97	0.79	0.76	1.30	0.96	0.88	0.80
Other College Supports								
Met w/Cnslr re College	1.01	1.57^{+}	1.34	1.47	2.71**	1.01	1.58^{+}	1.51
Mom Talked to 9th Grader About College	1.29^{+}	1.59^{+}	1.88**	2.49*	1.68	1.49*	1.51	1.85^{+}
Counseled on College as Senior	1.47**	1.62*	1.62*	1.51	1.54	1.36*	1.46	1.27
Counselor biggest College infl	0.64	0.40	0.71	0.24	0.49	0.65	0.35	0.85
Student Characteristics								
Female	0.86	0.77	0.92	0.89	1.06	0.75*	0.91	0.81
African American	0.86	0.98			0.71	0.95	0.96	
Latino	0.78*	1.09			0.90	0.84	1.24	
Native/Pacific	1.01	1.07			0.30**	1.13	0.97	
9th Grade Math	1.10***	1.09***	1.07***	1.07**	1.08**	1.08***	1.09***	1.06***
Majority Friends Expect Col	1.65***	1.38	1.31	1.13	2.28*	1.48**	1.32	1.12
Expects BA (only)	1.32*	1.82*	1.03	1.34	1.62	1.41*	1.88*	1.41
Expects Advanced Degree	2.45***	2.63***	1.89*	1.16	1.38	2.35***	2.03*	1.99*
Parent has BA	1.16	0.89	0.87	0.99	1.62			
School Demographics								
% Transition to College	1.01*	1.01*	1.02*	1.02**	1.01	1.01*	1.01	1.02**
% FRPL	1.01	1.00	1.00	1.01	1.00	1.01	1.01	1.01^{+}
Private School	1.00	0.59	1.14	0.43	1.74	1.00	1.07	1.28
Counselor Qualities								
Counselor Caseload	1.00^{+}	1.00**	1.00^{+}	1.00^{+}	1.00	1.00*	1.00*	1.00*
Experienced Counselor	1.00	0.79	1.00	0.63	0.55	0.92	0.95	0.84
1 Counselor at School	1.01	1.23	0.89	1.05	1.06	1.03	1.25	0.60
N	13,160	3,120	4,360	1,530	1,360	6,560	2,560	2,660

Note: Data from HSLS restricted-use data file, using (3-wave + transcript) longitudinal student weights. Exponentiated coefficients

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table C7.

Applying to 2+ Colleges for Disadvantaged Students

	(1) All Students	(2) Poor Students	(3) Minority Students	(4) Poor Minorities	(5) Students in Poverty	(6) No Parent BA	(7) Poor No Parent BA	(8) Minority No Parent BA
Counseling Activities								
Submitted Education Plan	1.29	1.18	1.36	1.29	1.47	1.31	0.84	1.12
Annual+ Review of Plan	0.83	0.88	0.81	0.77	0.68	0.71	1.10	0.85
Counselor Helped make 9th Grade Ed Plan	1.40*	1.46	1.28	1.44	1.32	1.36	1.53	1.19
Made no Ed plan	0.97	0.88	1.19	1.04	0.72	0.98	1.00	1.09
Other College Supports								
Met w/Cnslr re College	1.12	1.33	0.94	1.44	1.15	1.13	1.20	1.02
Mom Talked to 9th Grader About College	1.06	0.93	1.36	1.32	1.21	1.10	0.82	0.96
Counseled on College as Senior	2.77***	3.37***	3.15***	3.23***	3.20***	2.89***	3.22***	3.11***
Counselor biggest College infl	0.82	0.69	0.88	1.20	1.70	0.70	0.69	0.77
Student Characteristics								
Female	1.40***	0.96	1.16	1.09	1.01	1.19+	1.08	1.25
African American	1.35*	1.29			1.60	1.23	1.43	
Latino	1.11	1.12			1.21	1.19	1.19	
Native/Pacific	0.97	1.21			0.72	0.95	1.27	
9th Grade Math	1.05***	1.04***	1.04***	1.04**	1.04*	1.03***	1.03**	1.03**
Majority Friends Expect Col	1.79***	1.82***	1.44*	1.93*	1.32	1.71***	1.65**	1.48+
Expects BA (only)	1.68***	1.38	1.49*	1.06	1.26	1.55**	1.58+	1.27
Expects Advanced Degree	2.23***	2.22***	2.63***	2.03*	1.76+	2.41***	2.21***	2.20**
Parent has BA	1.23*	1.00	1.09	0.98	1.11			
School Demographics								
% Transition to College	1.01*	1.01	1.01	1.01	1.01	1.01+	1.00	1.01
% FRPL	1.00	1.01	1.01	1.01	1.01	1.01+	1.01	1.01
Private School	1.85**	1.93+	2.78**	1.40	2.32	1.93**	1.88	2.26*
Counselor Qualities								
Counselor Caseload	1.00+	1.00	1.00	1.00	1.00	1.00+	1.00	1.00
Experienced Counselor	0.90	0.88	0.85	0.68	0.76	0.98	0.95	0.90
1 Counselor at School	1.06	0.97	1.11	0.71	0.84	1.22	1.07	1.06
N	12,250	2,850	3,970	1,380	1,220	5,990	2,320	2,420

Note: Data from HSLS restricted-use data file, using (3-wave + transcript) longitudinal student weights. Exponentiated coefficients

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table C8.

Post-Secondary Enrollment for Disadvantaged Students

	(1) All Students	(2) Poor Students	(3) Minority Students	(4) Poor Minorities	(5) Students in Poverty	(6) No Parent BA	(7) Poor No Parent BA	(8) Minority No Parent BA
Counseling Activities								
Submitted Education Plan	0.77^{+}	0.99	0.69	0.91	1.25	0.78	0.95	0.79
Annual+ Review of Plan	1.30	1.35	1.81*	1.75	1.20	1.26	1.38	1.80*
Counselor Helped make 9th Grade Ed Plan	1.16	1.38	0.88	1.33	1.11	1.07	1.75^{+}	1.04
Made no Ed plan	1.07	1.43^{+}	1.03	1.32	1.84*	1.08	1.45^{+}	1.03
Other College Supports								
Met w/Cnslr re College	1.05	0.93	1.25	1.25	1.22	1.22	0.95	1.11
Mom Talked to 9th Grader About College	1.36*	1.46^{+}	1.58*	1.74^{+}	1.31	1.33*	1.41	1.38
Counseled on College as Senior	2.80***	2.58***	3.10***	2.27**	2.34***	2.66***	2.45***	2.91***
Counselor biggest College infl	0.91	0.85	1.51	1.63	0.59	0.76	0.62	1.72
Student Characteristics								
Female	1.58***	1.36	1.47^{+}	1.29	1.55	1.39*	1.19	1.35
African American	1.14	1.23			1.16	1.25	1.31	
Latino	0.85	0.83			1.01	0.92	1.02	
Native/Pacific	0.84	0.93			1.05	0.82	0.91	
9th Grade Math	1.04***	1.04**	1.03**	1.02	1.03*	1.03***	1.03**	1.02
Majority Friends Expect Col	1.74***	1.89***	1.26	1.29	2.10**	1.82***	1.98***	1.23
Expects BA (only)	2.20***	1.64*	1.49^{+}	1.41	1.81^{+}	2.16***	1.94**	2.02**
Expects Advanced Degree	2.94***	2.99***	2.75***	2.83***	2.33**	2.67***	2.79***	2.88***
Parent has BA	1.84***	1.60	1.20	1.17	1.18			
School Demographics								
% Transition to College	1.00	1.01	1.01**	1.01*	1.01	1.00	1.00	1.01*
% FRPL	0.99	1.00	1.00	1.01	1.01	1.00	1.01	1.00
Private School	2.02*	3.36**	2.59*	1.79	4.06*	3.73***	4.21*	3.23*
Counselor Qualities								
Counselor Caseload	1.00*	1.00	1.00*	1.00	1.00	1.00**	1.00	1.00*
Experienced Counselor	0.72	0.60	0.70	0.65	0.55*	0.81	0.65	0.91
1 Counselor at School	0.98	0.98	0.79	0.64	0.87	1.05	1.01	0.90
N	13,160	3,120	4,360	1,530	1,360	6,560	2,560	2,660

Note: Data from HSLS restricted-use data file, using (3-wave + transcript) longitudinal student weights. Exponentiated coefficients

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table C9.

Enrollment in 4-year Program for Disadvantaged Students

	(1) All Students	(2) Poor Students	(3) Minority Students	(4) Poor Minorities	(5) Students in Poverty	(6) No Parent BA	(7) Poor No Parent BA	(8) Minority No Parent BA
Counseling Activities								
Submitted Education Plan	0.98	0.96	1.15	1.52	1.29	0.95	0.79	1.29
Annual+ Review of Plan	1.05	1.33	0.95	0.92	1.49	1.17	1.60	1.20
Counselor Helped make 9th Grade Ed Plan	0.95	1.23	0.63	0.63	0.48	0.96	1.31	0.65
Made no Ed plan	1.01	1.09	0.88	0.91	1.86^{+}	1.06	1.21	1.28
Other College Supports								
Met w/Cnslr re College	1.08	0.94	1.19	0.85	1.22	1.09	1.05	0.98
Mom Talked to 9th Grader About College	1.24	1.49	1.37	3.49**	1.78	1.48*	1.28	1.20
Counseled on College as Senior	2.29***	2.43***	3.14***	2.64*	2.76**	2.54***	2.58***	3.36***
Counselor biggest College infl	1.20	0.51	0.57	0.16	0.27	1.04	0.61	0.41
Student Characteristics								
Female	1.16	1.10	0.93	0.69	2.75***	1.01	1.03	0.96
African American	0.83	0.78			1.45	0.67*	0.76	
Latino	0.78^{+}	1.02			0.84	0.92	1.28	
Native/Pacific	0.73^{+}	0.65			0.29**	0.66*	0.63	
9th Grade Math	1.06***	1.08***	1.06***	1.09***	1.10***	1.04***	1.07***	1.05***
Majority Friends Expect Col	2.35***	2.17***	2.43***	2.77**	2.82**	2.36***	2.04***	2.46***
Expects BA (only)	2.80***	3.58***	2.24***	3.12**	4.69***	3.57***	5.03***	2.88***
Expects Advanced Degree	4.63***	5.01***	4.30***	4.53***	5.32***	4.64***	5.33***	4.50***
Parent has BA	2.00***	2.08**	1.87***	1.90^{+}	3.35**			
School Demographics								
% Transition to College	1.01***	1.01	1.01^{+}	1.00	1.01	1.01**	1.00	1.01
% FRPL	1.00	1.00	1.00	0.99	0.99	1.00	1.00	1.00
Private School	1.22	2.07^{+}	1.49	3.22^{+}	2.17	1.72*	2.86*	2.13^{+}
Counselor Qualities								
Counselor Caseload	1.00^{+}	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Experienced Counselor	0.98	0.70	0.74	0.58	0.35*	1.02	0.75	0.80
1 Counselor at School	1.01	1.23	0.90	1.06	1.72	0.95	1.27	0.98
N	13,160	3,120	4,360	1,530	1,360	6,560	2,560	2,660

Note: Data from HSLS restricted-use data file, using (3-wave + transcript) longitudinal student weights. Exponentiated coefficients

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table C10.

Highly Selective College Attendance for Disadvantaged Students

	(1) All Students	(2) Poor Students	(3) Minority Students	(4) Poor Minorities	(5) Students in Poverty	(6) No Parent BA	(7) Poor No Parent BA	(8) Minority No Parent BA
Counseling Activities								
Submitted Education Plan	0.95	0.13**	1.54	0.13	0.14*	0.87	0.10*	2.19
Annual+ Review of Plan	0.82	5.32*	0.55	8.81	11.96*	0.89	13.24*	0.69
Counselor Helped make 9th Grade Ed Plan	0.98	0.25*	1.50	0.03	0.33	0.86	0.26+	1.50
Made no Ed plan	0.98	0.37*	0.88	0.26+	0.12**	0.72	0.21**	0.37*
Other College Supports								
Met w/Cnslr re College	1.29	1.38	0.99	2.23	0.28*	1.38	1.64	0.98
Mom Talked to 9th Grader About College	1.34	1.00	1.12	3.61	1.51	1.11	1.07	2.05
Counseled on College as Senior	1.56*	4.84*	3.64*	47.50*	0.87	2.87**	9.42**	9.21*
Counselor biggest College infl	1.66		4.77+			1.82		1.20
Student Characteristics								
Female	1.14	1.93	1.45	2.18	1.37	1.02	1.76	1.22
African American	1.03	0.28*			0.36	0.86	0.20*	
Latino	1.54+	0.82			1.52	1.39	0.79	
Native/Pacific	0.87	1.42			2.22	0.81	2.06	
9th Grade Math	1.09***	1.07*	1.09***	1.06	1.00	1.08***	1.06	1.10**
Majority Friends Expect Col	1.87***	2.99*	2.20*	5.26	9.04**	1.55	2.41	3.06
Expects BA (only)	0.96	0.67	0.69	0.05+	0.48	0.69	0.79	0.14*
Expects Advanced Degree	1.86**	2.69+	2.45+	1.26	1.32	1.73	2.41	1.45
Parent has BA	1.86***	1.19	1.42	0.94	0.78			
School Demographics								
% Transition to College	1.01	1.01	1.01	1.01	1.03*	1.00	1.01	1.01
% FRPL	1.00	1.04**	1.01	1.05+	1.02+	1.01*	1.05**	1.03+
Private School	1.97+	5.62*	3.62+	7.16	7.07*	2.62*	6.51	8.46+
Counselor Qualities								
Counselor Caseload	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Experienced Counselor	1.00	4.84*	2.05	7.95	1.18	1.14	3.30	2.46
1 Counselor at School	0.60+	0.31+	0.55	1.73	0.63	0.74	0.59	0.87
N	5,640	760	1,380	300	290	1,710	530	570

Note: Data from HSLS restricted-use data file, using (3-wave + transcript) longitudinal student weights. Exponentiated coefficients

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table C11.

Knowing Course Selection is Important for Disadvantaged Students

	(1) All Students	(2) Poor Students	(3) Minority Students	(4) Poor Minorities	(5) Students in Poverty	(6) No Parent BA	(7) Poor No Parent BA	(8) Minority No Parent BA
Counseling Activities								
Submitted Education Plan	1.14	1.40	1.50^{+}	1.39	1.71	1.13	1.60^{+}	1.49
Annual+ Review of Plan	0.97	0.71	1.04	0.58	0.75	1.10	0.64	0.96
Counselor Helped make 9th Grade Ed Plan	0.99	1.07	0.80	1.23	1.42	1.00	0.81	0.88
no_ed_plan	0.84*	0.99	0.81	0.93	0.77	0.75**	0.87	0.75
Other College Supports								
Met w/Cnslr re College	0.89	0.90	0.95	0.89	0.65	0.82	0.94	0.93
Mom Talked to 9th Grader About College	1.21*	1.40^{+}	1.50**	1.63^{+}	1.65^{+}	1.24^{+}	1.68**	1.87**
Counselor biggest Aid infl	1.02	0.98	1.17	1.16	1.35	1.09	1.01	1.08
Student Characteristics								
Female	1.19**	1.08	0.97	0.98	0.81	1.04	1.09	0.98
African American	1.04	0.80			1.47	0.80	0.76	
Latino	1.03	1.11			1.32	1.00	1.15	
Native/Pacific	1.03	0.85			0.60	0.96	0.95	
9th Grade Math	1.00	0.97**	0.99	0.95**	0.96**	0.98**	0.96***	0.98*
Majority Friends Expect Col	1.21^{+}	1.26	0.85	1.27	1.37	1.12	1.23	0.87
Expects BA (only)	1.24^{+}	1.58*	1.65**	2.10*	1.15	1.47**	1.49^{+}	2.24***
Expects Advanced Degree	1.72***	1.87**	2.20***	1.46	1.28	1.85***	1.83*	1.85**
Parent has BA	1.00	0.87	1.22	0.89	0.63			
School Demographics								
% Transition to College	1.00	1.00	0.99	0.99*	0.99	1.00	1.00	1.00
% FRPL	1.00^{+}	1.00	1.00	0.99	0.99*	1.00*	1.00	1.00
Private School	0.97	1.12	1.07	1.14	1.54	1.19	0.90	1.07
Counselor Qualities								
Counselor Caseload	1.00	1.00	1.00^{+}	1.00	1.00	1.00	1.00^{+}	1.00
Experienced Counselor	1.04	0.74	1.00	0.84	0.70	1.10	0.75	1.05
1 Counselor at School	0.78*	0.89	0.59*	0.64	1.17	0.76*	0.90	0.51*
N	13,160	3,120	4,360	1,530	1,360	6,560	2,560	2,660

Note: Data from HSLS restricted-use data file, using (3-wave + transcript) longitudinal student weights. Exponentiated coefficients

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

APPENDIX D

Sensitivity Analyses for Counseling: OLS Analyses

Table D1.

OLS Sensitivity Analysis of Selected Models

	(1) FAFSA Intent, Poor Students	(2) FAFSA Intent, Poor Minority	(3) FAFSA Intent, No Parent BA	(4) FAFSA Intent, Poor No Par BA	(5) Precalc, Poor	(6) Precalc, Minority	(7) Precalc, Poverty
Counseling Activities							
Submitted Education Plan	0.84	0.76	0.99	0.86	1.57^{+}	1.68*	1.06
Annual+ Review of Plan	1.92*	2.00^{+}	1.46**	2.00**	0.82	0.81	1.36
Counselor Helped make 9th Grade Ed Plan	1.14	1.02	1.15	0.98	0.92	0.93	0.89
Made no Ed plan	1.04	1.31	1.00	1.15	0.94	0.88	1.33
Other College Supports							
Met w/Cnslr re College	1.64**	2.00**	1.39**	1.75**	1.31	1.20	1.33
Mom Talked to 9th Grader About College	1.21	1.68^{+}	1.20	1.35	1.25	1.26	1.03
Counseled as Senior			1.07		1.53**	1.49**	1.79*
Counselor biggest infl	1.22	0.95	1.19	1.23	0.30*	0.40^{+}	0.18
Student Characteristics							
Female	1.75***	1.88**	1.71***	1.74**	1.08	1.11	1.17
African American	1.57*		1.52**	1.70*	1.25		1.19
Latino	1.29		1.24^{+}	1.34	1.07		1.06
Native/Pacific	0.86		0.83	0.84	0.75		0.60
9th Grade Math	1.01^{+}	1.00	1.02***	1.02**	1.09***	1.08***	1.08***
Majority Friends Expect Col	1.21	1.29	1.24*	1.40*	1.05	1.00	1.38
Expects BA (only)	1.58**	1.81*	1.67***	1.72***	1.51*	1.40^{+}	1.39
Expects Advanced Degree	1.58**	1.55^{+}	1.64***	1.46*	1.85***	1.97***	1.31
Parent has BA	0.83	0.73			1.15	1.12	1.54
FAFSA Previously	0.70	0.78	0.62**	0.73			
No FAFSA because high income	0.27**	0.25*	0.34***	0.27**			
School Demographics							
% Transition to College	1.00	1.00	1.01*	1.00	1.00	1.01**	1.01
% FRPL	1.01*	1.01	1.01***	1.01*	1.00	1.00	1.00
Private School	1.29	1.69	1.02	1.69	1.11	1.10	1.66
Counselor Qualities							
Counselor Caseload	1.00	1.00	1.00	1.00	1.00	1.00^{+}	1.00
Experienced Counselor	0.86	0.89	1.06	0.93	1.17	1.54*	1.20
1 Counselor at School	0.98	0.70	1.07	1.09	1.12	1.05	0.81
N	3,120	1,530	6,560	2,560	3,120	4,360	1,360

Note: Data from HSLS restricted data file, using (3-wave+transcript) longitudinal student weights. $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table D2.

OLS Sensitivity Analysis of FAFSA Intent for Disadvantaged Students

	(1) All Students	(2) Poor Students	(3) Minority Students	(4) Poor Minorities	(5) Students in Poverty	(6) No Parent BA	(7) Poor No Parent BA	(8) Minority No Parent BA
Counseling Activities								
Submitted Education Plan	1.01	0.84	1.05	0.76	0.58	0.99	0.86	1.08
Annual+ Review of Plan	1.37**	1.92*	1.30	2.00+	2.33*	1.46**	2.00**	1.30
Counselor Helped make 9th Grade Ed Plan	1.10	1.14	1.11	1.02	0.82	1.15	0.98	1.09
Made no Ed plan	0.95	1.04	1.01	1.31	0.99	1.00	1.15	1.04
Other College Supports								
Met w/Cnslr re College	1.24**	1.64**	1.27+	2.00**	1.47	1.39**	1.75**	1.42+
Mom Talked to 9th Grader About College	1.15+	1.21	1.31	1.68+	1.36	1.20	1.35	1.41
Counseled on Aid as Senior						1.07		
Counselor biggest Aid infl	1.15	1.22	1.12	0.95	1.28	1.19	1.23	1.19
Student Characteristics								
Female	1.76***	1.75***	1.90***	1.88**	1.97**	1.71***	1.74**	1.76***
African American	1.34*	1.57*			1.72	1.52**	1.70*	
Latino	1.13	1.29			1.27	1.24+	1.34	
Native/Pacific	0.94	0.86			0.96	0.83	0.84	
9th Grade Math	1.02***	1.01+	1.01	1.00	1.01	1.02***	1.02**	1.02+
Majority Friends Expect Col	1.05	1.21	0.97	1.29	1.51+	1.24*	1.40*	1.12
Expects BA (only)	1.71***	1.58**	1.69**	1.81*	1.96**	1.67***	1.72***	1.68*
Expects Advanced Degree	1.79***	1.58**	1.89***	1.55+	1.36	1.64***	1.46*	1.68*
Parent has BA	0.77***	0.83	0.70**	0.73	0.46*			
FAFSA Previously	0.57***	0.70	0.70+	0.78	0.79	0.62**	0.73	0.78
No FAFSA because high income	0.27***	0.27**	0.26***	0.25*	0.44	0.34***	0.27**	0.35**
School Demographics								
% Transition to College	1.00*	1.00	1.00	1.00	1.00	1.01*	1.00	1.01+
% FRPL	1.01***	1.01*	1.01**	1.01	1.00	1.01***	1.01*	1.01***
Private School	1.01	1.29	1.24	1.69	1.27	1.02	1.69	1.41
Counselor Qualities								
Counselor Caseload	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Experienced Counselor	1.04	0.86	0.97	0.89	0.78	1.06	0.93	1.03
1 Counselor at School	1.00	0.98	0.87	0.70	1.16	1.07	1.09	0.85
N	13,160	3,120	4,360	1,530	1,360	6,560	2,560	2,660

Note: Data from HSLS restricted data file, using (3-wave+transcript) longitudinal student weights. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.00$

Table D3.

OLS Sensitivity Analysis of Math College Readiness for Disadvantaged Students

	(1) All Students	(2) Poor Students	(3) Minority Students	(4) Poor Minorities	(5) Students in Poverty	(6) No Parent BA	(7) Poor No Parent BA	(8) Minority No Parent BA
Counseling Activities								
Submitted Education Plan	1.35*	1.36	1.30	1.21	0.88	1.40*	1.28	1.37
Annual+ Review of Plan	0.87	1.22	0.96	1.36	1.77	0.89	1.33	1.11
Counselor Helped make 9th Grade Ed Plan	1.06	0.99	1.53	1.53	1.35	1.27	1.16	1.96*
Made no Ed plan	1.04	1.03	0.98	0.98	1.02	1.05	1.08	1.01
Other College Supports								
Met w/Cnslr re College	0.92	1.03	1.11	1.48	0.98	0.88	1.02	1.14
Mom Talked to 9th Grader About College	1.14	1.36+	0.96	1.31	1.13	1.14	1.33	0.99
Counseled on College as Senior	1.78***	2.00***	2.01***	2.20**	2.37**	1.95***	2.03***	2.28***
Counselor biggest College infl	1.09	2.15	1.23	2.32	2.80	1.22	1.73	1.32
Student Characteristics								
Female	1.25**	1.29+	1.47**	1.51*	1.17	1.29*	1.20	1.44*
African American	0.93	1.11			1.28	1.01	1.13	
Latino	0.87	0.84			0.82	0.83	0.86	
Native/Pacific	0.87	0.87			1.02	0.94	0.93	
9th Grade Math	1.08***	1.07***	1.07***	1.06***	1.07***	1.07***	1.07***	1.07***
Majority Friends Expect Col	1.45***	1.46+	1.32	1.49	1.48	1.39**	1.52*	1.36
Expects BA (only)	1.44***	1.38	1.40+	1.15	1.40	1.49**	1.40	1.22
Expects Advanced Degree	1.94***	1.84**	1.65**	1.70+	1.52	1.91***	1.80**	1.63*
Parent has BA	1.33**	1.40	1.24	1.19	1.98			
School Demographics								
% Transition to College	1.00	1.00	1.00	1.00	1.01	1.00	1.00	1.00
% FRPL	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Private School	1.50	0.80	1.29	0.54	0.66	1.38	0.67	1.07
Counselor Qualities								
Counselor Caseload	1.00	1.00	1.00+	1.00	1.00	1.00	1.00	1.00*
Experienced Counselor	0.91	1.01	1.01	1.10	1.05	0.98	1.11	1.10
1 Counselor at School	1.29	1.46	1.31	1.52	1.41	1.25	1.44	1.18
N	13,160	3,120	4,360	1,530	1,360	6,560	2,560	2,660

Note: Data from HSLS restricted data file, using (3-wave+transcript) longitudinal student weights. $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table D4.

OLS Sensitivity Analysis of Actual FAFSA Submission for Disadvantaged Students

	(1) All Students	(2) Poor Students	(3) Minority Students	(4) Poor Minorities	(5) Students in Poverty	(6) Poor No Parent BA	(7) Minority No Parent BA
Counseling Activities							
Submitted Education Plan	1.11	1.27	1.33	1.33	1.43	1.47	1.55
Annual+ Review of Plan	1.02	0.98	1.00	0.94	1.07	0.93	0.86
Counselor Helped make 9th Grade Ed Plan	1.07	1.53	1.31	1.87	1.18	1.53	1.19
Made no Ed plan	0.88	0.78	0.85	0.75	0.61	0.80	0.83
Other College Supports							
Met w/Cnslr re College	0.88	0.81	0.79	1.07	0.96	0.84	0.76
Mom Talked to 9th Grader About College	1.30*	1.28	1.28	1.23	2.34**	1.31	1.26
Counseled on Aid as Senior	4.74***	5.52***	4.30***	5.46***	6.19***	5.57***	4.53***
Counselor biggest Aid infl	0.82	1.00	0.97	0.84	0.99	1.17	1.11
Student Characteristics							
Female	1.51***	1.64**	1.59***	1.85*	2.27**	1.60**	1.45*
African American	1.01	0.98			1.06	0.93	
Latino	0.83	0.87			0.77	0.96	
Native/Pacific	0.90	0.83			0.90	0.86	
9th Grade Math	1.02***	1.01	1.02+	0.99	1.02	1.01	1.01
Majority Friends Expect Col	1.45***	1.10	1.19	0.81	0.82	1.25	1.30
Expects BA (only)	1.90***	1.90***	1.64**	1.85*	1.90*	2.02***	1.67*
Expects Advanced Degree	2.18***	2.42***	2.45***	2.81**	1.71+	2.42***	2.71***
Parent has BA	1.41***	1.69*	1.61*	1.43	1.30		
FAFSA Previously	0.51***	0.49**	0.49**	0.42+	0.41*	0.50*	0.56+
No FAFSA because high income	0.14***	0.28***	0.16***	0.24*		0.35**	0.19***
School Demographics							
% Transition to College	1.00	1.00	1.00	1.00	1.00	1.00	1.00
% FRPL	1.00	1.00	1.00	1.00	1.00	1.00	0.99
Private School	1.08	2.54*	1.31	2.57	6.06**	2.41*	1.45
Counselor Qualities							
Counselor Caseload	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Experienced Counselor	1.03	0.85	1.05	0.80	0.75	0.94	1.12
1 Counselor at School	0.87	0.77	0.66+	0.52	0.92	0.80	0.77
N	13,160	3,120	4,360	1,530	1,360	2,560	2,660

Note: Data from HSLS restricted data file, using (3-wave+transcript) longitudinal student weights. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table D5.

OLS Sensitivity Analysis of Advanced Math Course-taking for Disadvantaged Students

	(1) All Students	(2) Poor Students	(3) Minority Students	(4) Poor Minorities	(5) Students in Poverty	(6) No Parent BA	(7) Poor No Parent BA	(8) Minority No Parent BA
Counseling Activities								
Submitted Education Plan	1.32*	1.47	1.44+	1.36	1.05	1.41*	1.50	1.56+
Annual+ Review of Plan	0.81	0.82	0.78	0.81	1.32	0.82	0.86	0.88
Counselor Helped make 9th Grade Ed Plan	0.86	0.83	0.90	0.86	0.82	0.86	0.87	0.84
Made no Ed plan	0.93	0.83	0.85	0.81	0.95	0.93	0.83	0.89
Other College Supports								
Met w/Cnslr re College	1.08	1.26	1.18	1.34	1.52	1.13	1.27	1.36
Mom Talked to 9th Grader About College	1.11	1.20	1.29	1.58+	0.88	1.27+	1.30	1.45+
Counseled on College as Senior	1.58***	1.73**	1.61**	1.72*	2.05*	1.62***	1.75**	1.65**
Counselor biggest College infl	0.61	0.34+	0.33+	0.24*	0.24+	0.60	0.30+	0.32
Student Characteristics								
Female	1.09	1.11	1.17	1.18	1.02	1.11	1.05	1.15
African American	1.06	1.36+			1.69+	1.09	1.31	
Latino	1.09	1.32+			1.46	1.17	1.46*	
Native/Pacific	0.74**	0.60**			0.42**	0.77*	0.61*	
9th Grade Math	1.11***	1.11***	1.10***	1.10***	1.12***	1.10***	1.11***	1.09***
Majority Friends Expect Col	1.37***	1.17	1.19	1.07	1.71*	1.26*	1.14	1.12
Expects BA (only)	1.62***	1.66*	1.66**	1.47	1.34	1.75***	1.80**	1.61*
Expects Advanced Degree	2.59***	2.27***	2.21***	1.88*	1.49	2.53***	2.28***	2.08***
Parent has BA	1.33***	1.55*	1.12	1.44	1.82+			
School Demographics								
% Transition to College	1.00	1.00	1.01	1.00	1.00	1.00	1.00	1.01
% FRPL	1.00+	1.01	1.01+	1.01	1.00	1.01+	1.01+	1.01+
Private School	1.40+	0.98	1.28	0.70	1.61	1.39	1.10	1.07
Counselor Qualities								
Counselor Caseload	1.00***	1.00+	1.00**	1.00	1.00	1.00**	1.00	1.00**
Experienced Counselor	1.20	1.34	1.56*	1.49	1.41	1.33*	1.50+	1.78**
1 Counselor at School	1.10	1.06	1.02	0.94	0.81	1.08	1.11	1.10
N	13,160	3,120	4,360	1,530	1,360	6,560	2,560	2,660

Exponentiated coefficients

Note: Data from HSLS restricted data file, using (3-wave+transcript) longitudinal student weights. $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table D6.

OLS Sensitivity Analysis of Precalculus Course-taking for Disadvantaged Students

	(1) All Students	(2) Poor Students	(3) Minority Students	(4) Poor Minorities	(5) Students in Poverty	(6) No Parent BA	(7) Poor No Parent BA	(8) Minority No Parent BA
Counseling Activities								
Submitted Education Plan	1.34*	1.57+	1.68*	1.59	1.06	1.48*	1.50	1.86*
Annual+ Review of Plan	0.81	0.82	0.81	0.93	1.36	0.86	1.00	0.93
Counselor Helped make 9th Grade Ed Plan	0.96	0.92	0.93	0.93	0.89	0.99	1.11	0.93
Made no Ed plan	0.94	0.94	0.88	1.08	1.33	0.97	1.02	0.96
Other College Supports								
Met w/Cnslr re College	1.03	1.31	1.20	1.45	1.33	1.05	1.21	1.28
Mom Talked to 9th Grader About College	1.08	1.25	1.26	1.53	1.03	1.19	1.30	1.37
Counseled on College as Senior	1.46***	1.53**	1.49**	1.71*	1.79*	1.49***	1.63**	1.50*
Counselor biggest College infl	0.73	0.30*	0.40+	0.21**	0.18	0.66	0.20**	0.39
Student Characteristics								
Female	1.02	1.08	1.11	1.15	1.17	1.03	1.02	1.14
African American	1.08	1.25			1.19	1.05	1.13	
Latino	0.93	1.07			1.06	0.96	1.05	
Native/Pacific	0.93	0.75			0.60	0.91	0.76	
9th Grade Math	1.09***	1.09***	1.08***	1.08***	1.08***	1.08***	1.09***	1.07***
Majority Friends Expect Col	1.19*	1.05	1.00	0.92	1.38	1.12	0.95	0.94
Expects BA (only)	1.39***	1.51*	1.40+	1.33	1.39	1.46**	1.55*	1.38
Expects Advanced Degree	2.23***	1.85***	1.97***	1.58+	1.31	2.15***	1.77**	1.79**
Parent has BA	1.13*	1.15	1.12	1.42	1.54			
School Demographics								
% Transition to College	1.00+	1.00	1.01**	1.01*	1.01	1.00	1.01	1.01*
% FRPL	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.01
Private School	1.01	1.11	1.10	0.71	1.66	1.04	1.09	1.12
Counselor Qualities								
Counselor Caseload	1.00*	1.00	1.00+	1.00	1.00	1.00+	1.00	1.00
Experienced Counselor	1.13	1.17	1.54*	1.25	1.20	1.26	1.37	1.65*
1 Counselor at School	1.12	1.12	1.05	1.04	0.81	1.09	1.09	1.09
N	13,160	3,120	4,360	1,530	1,360	6,560	2,560	2,660

Note: Data from HSLS restricted data file, using (3-wave+transcript) longitudinal student weights. $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table D7.

OLS Sensitivity Analysis of Applying to 2+ Colleges for Disadvantaged Students

	(1) All Students	(2) Poor Students	(3) Minority Students	(4) Poor Minorities	(5) Students in Poverty	(6) No Parent BA	(7) Poor No Parent BA	(8) Minority No Parent BA
Counseling Activities								
Submitted Education Plan	1.02	0.85	1.04	0.70	1.17	1.05	0.71	0.97
Annual+ Review of Plan	0.95	1.20	0.93	1.45	0.98	0.91	1.38	0.99
Counselor Helped make 9th Grade Ed Plan	1.07	1.34	1.22	1.56	1.73	1.07	1.26	1.26
Made no Ed plan	0.93	0.96	1.00	1.05	1.01	0.92	0.99	0.99
Other College Supports								
Met w/Cnslr re College	1.02	1.32	1.03	1.48	1.60	1.06	1.28	1.05
Mom Talked to 9th Grader About College	1.04	0.90	1.01	0.92	0.92	1.02	0.89	1.05
Counseled on College as Senior	2.57***	3.35***	2.79***	3.11***	3.41***	2.75***	3.72***	2.93***
Counselor biggest College infl	0.69	0.48	0.67	0.43	0.54	0.61+	0.47	0.57
Student Characteristics								
Female	1.29***	1.12	1.12	0.97	1.04	1.22*	1.10	1.12
African American	1.32*	1.10			1.04	1.41*	1.16	
Latino	1.09	1.08			1.09	1.10	1.07	
Native/Pacific	0.92	0.81			0.77	0.96	0.82	
9th Grade Math	1.04***	1.03***	1.03***	1.03+	1.04**	1.03***	1.03**	1.02*
Majority Friends Expect Col	1.67***	2.04***	1.57***	1.98**	1.76*	1.68***	2.03***	1.72***
Expects BA (only)	1.66***	1.26	1.57**	1.12	1.23	1.53***	1.19	1.39+
Expects Advanced Degree	2.24***	2.07***	2.40***	2.16**	2.42**	2.17***	1.86**	2.22***
Parent has BA	1.20*	0.93	1.05	0.91	0.85			
School Demographics								
% Transition to College	1.01**	1.01	1.01*	1.00	1.00	1.00+	1.01	1.01+
% FRPL	1.00+	1.01	1.01+	1.01	1.01+	1.00	1.01	1.01
Private School	1.68***	1.78+	2.23**	2.25	2.15	1.65*	1.66	1.94*
Counselor Qualities								
Counselor Caseload	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Experienced Counselor	1.04	1.18	1.07	1.34	1.02	1.07	1.23	1.11
1 Counselor at School	0.94	1.03	1.04	0.90	0.83	1.01	1.06	1.08
N	12,250	2,850	3,970	1,380	1,220	5,990	2,320	2,420

Note: Data from HSLS restricted data file, using (3-wave+transcript) longitudinal student weights. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table D8.

OLS Sensitivity Analysis of Post-Secondary Enrollment for Disadvantaged Students

	(1) All Students	(2) Poor Students	(3) Minority Students	(4) Poor Minorities	(5) Students in Poverty	(6) No Parent BA	(7) Poor No Parent BA	(8) Minority No Parent BA
Counseling Activities								
Submitted Education Plan	0.86	1.11	0.84	1.01	1.00	0.96	1.24	0.89
Annual+ Review of Plan	1.07	0.91	1.24	0.95	0.85	1.03	0.87	1.24
Counselor Helped make 9th Grade Ed Plan	1.04	1.04	1.24	1.13	0.88	1.03	1.12	1.23
Made no Ed plan	0.87	0.94	0.81	0.86	1.04	0.87	0.86	0.80
Other College Supports								
Met w/Cnslr re College	1.03	1.28	1.06	1.61^{+}	1.51	1.07	1.27	1.05
Mom Talked to 9th Grader About College	1.31**	1.18	1.22	1.10	1.16	1.24^{+}	1.12	1.12
Counseled on College as Senior	2.84***	2.38***	2.54***	2.25**	2.04*	2.51***	2.34***	2.47***
Counselor biggest College infl	1.05	0.91	1.19	1.00	0.40	0.88	0.78	1.06
Student Characteristics								
Female	1.42***	1.37^{+}	1.32^{+}	1.43	1.52	1.36**	1.25	1.32
African American	1.09	1.19			1.64^{+}	1.16	1.16	
Latino	1.11	1.23			1.21	1.13	1.27	
Native/Pacific	0.85	0.89			1.29	0.84	0.88	
9th Grade Math	1.03***	1.02*	1.02**	1.01	1.01	1.03***	1.02*	1.02*
Majority Friends Expect Col	1.60***	1.60**	1.21	1.19	1.98**	1.54***	1.66**	1.13
Expects BA (only)	2.05***	2.03***	1.57**	1.66^{+}	2.39**	2.18***	2.12***	1.79**
Expects Advanced Degree	2.74***	2.54***	2.60***	2.65***	1.99**	2.57***	2.43***	2.61***
Parent has BA	1.67***	1.58*	1.60*	1.85	1.65			
School Demographics								
% Transition to College	1.00	1.00	1.01	1.01	1.00	1.00	1.00	1.01
% FRPL	1.00	1.01	1.00	1.01	1.01	1.00	1.01	1.00
Private School	2.20***	2.94*	1.91*	2.28	2.81	2.95***	3.27*	2.13^{+}
Counselor Qualities								
Counselor Caseload	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Experienced Counselor	1.00	0.99	1.10	1.07	1.15	1.12	1.11	1.25
1 Counselor at School	0.89	0.96	0.79	0.63	0.82	0.91	0.96	0.77
N	13,160	3,120	4,360	1,530	1,360	6,560	2,560	2,660

Note: Data from HSLS restricted data file, using (3-wave+transcript) longitudinal student weights. $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table D9.

OLS Sensitivity Analysis of Enrollment in 4-year Program for Disadvantaged Students

	(1) All Students	(2) Poor Students	(3) Minority Students	(4) Poor Minorities	(5) Students in Poverty	(6) No Parent BA	(7) Poor No Parent BA	(8) Minority No Parent BA
Counseling Activities								
Submitted Education Plan	1.01	0.86	0.94	0.74	1.01	1.01	0.83	0.90
Annual+ Review of Plan	0.91	1.12	0.99	1.22	0.94	0.96	1.22	1.19
Counselor Helped make 9th Grade Ed Plan	0.90	0.97	1.04	1.07	0.93	0.91	1.01	1.05
Made no Ed plan	0.99	0.81	0.89	0.73	1.17	0.96	0.80	0.92
Other College Supports								
Met w/Cnslr re College	1.11	1.04	1.08	0.98	1.11	1.08	0.96	0.96
Mom Talked to 9th Grader About College	1.20^{+}	1.38	1.18	1.40	1.03	1.15	1.20	1.12
Counseled on College as Senior	2.31***	2.79***	2.66***	2.97**	2.04*	2.61***	3.07***	2.97***
Counselor biggest College infl	0.83	0.36^{+}	0.41^{+}	0.20	0.22^{+}	0.68	0.30	0.30^{+}
Student Characteristics								
Female	1.13^{+}	1.05	1.02	0.95	1.37	0.94	0.94	0.90
African American	0.97	0.96			0.90	0.97	0.93	
Latino	0.86	1.02			0.81	0.96	1.09	
Native/Pacific	0.76*	0.73			0.84	0.70*	0.71	
9th Grade Math	1.06***	1.06***	1.04***	1.05**	1.07***	1.05***	1.06***	1.04**
Majority Friends Expect Col	2.04***	2.48***	1.94***	2.29**	2.43**	1.87***	2.27***	1.77**
Expects BA (only)	2.63***	2.86***	2.64***	2.89***	3.58***	3.12***	3.19***	3.02***
Expects Advanced Degree	4.27***	3.91***	4.87***	4.53***	4.30***	4.63***	4.12***	5.24***
Parent has BA	1.77***	1.35	1.90***	1.47	1.54			
School Demographics								
% Transition to College	1.01***	1.01	1.01*	1.00	1.01	1.01*	1.01	1.01^{+}
% FRPL	1.00^{+}	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Private School	1.54**	2.06^{+}	1.66*	1.86	4.07^{+}	1.64*	2.15	1.54
Counselor Qualities								
Counselor Caseload	1.00	1.00	1.00^{+}	1.00	1.00	1.00	1.00	1.00
Experienced Counselor	1.25*	1.26	1.23	1.31	1.13	1.43*	1.34	1.38
1 Counselor at School	0.92	0.99	0.72	0.76	0.92	0.96	1.06	0.80
N	13,160	3,120	4,360	1,530	1,360	6,560	2,560	2,660

Note: Data from HSLS restricted data file, using (3-wave+transcript) longitudinal student weights. $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table D10.

OLS Sensitivity Analysis of Highly Selective College Attendance for Disadvantaged Students

	(1) All Students	(2) Poor Students	(3) Minority Students	(4) Poor Minorities	(5) Students in Poverty	(6) No Parent BA	(7) Poor No Parent BA	(8) Minority No Parent BA
Counseling Activities								
Submitted Education Plan	0.71^{+}	0.26*	0.61	0.18	0.22	0.65	0.27	0.63
Annual+ Review of Plan	1.33	2.32	1.38	3.29	2.11	1.38	3.18	1.71
Counselor Helped make 9th Grade Ed Plan	1.07	0.88	1.12	2.32	1.05	0.95	1.02	1.44
Made no Ed plan	1.07	0.59	0.94	0.42	0.52	1.02	0.41^{+}	0.70
Other College Supports								
Met w/Cnslr re College	1.05	0.90	0.79	1.02	0.31	1.17	1.20	1.02
Mom Talked to 9th Grader About College	0.99	0.49	0.39*	0.14	0.45	0.88	0.39	0.28
Counseled on College as Senior	1.45*	2.92*	2.47*	5.53	3.97	2.04*	4.05^{+}	3.44
Counselor biggest College infl	0.99		0.90			1.06		0.72
Student Characteristics								
Female	1.01	1.16	0.94	1.01	1.01	0.81	0.99	0.85
African American	0.65*	0.43^{+}			0.46	0.54^{+}	0.39	
Latino	1.30	1.00			1.28	1.17	1.18	
Native/Pacific	0.82	0.86			0.53	0.82	1.02	
9th Grade Math	1.09***	1.07*	1.07***	1.08	1.03	1.10***	1.06	1.09*
Majority Friends Expect Col	1.62***	1.79	1.76^{+}	1.69	3.59	1.68*	2.06	1.58
Expects BA (only)	0.96	1.49	1.13	0.95	0.53	0.98	1.54	1.30
Expects Advanced Degree	1.64**	2.73^{+}	1.74	2.20	1.11	1.86^{+}	2.85	2.55
Parent has BA	1.55***	1.35	1.39	0.94	1.00			
School Demographics								
% Transition to College	1.01^{+}	1.01	1.00	1.00	1.03	1.01	1.01	1.00
% FRPL	1.00	1.01	1.00	1.02	1.01	1.01^{+}	1.02	1.02
Private School	1.23	1.55	2.95**	4.21	1.06	1.49	1.90	5.30*
Counselor Qualities								
Counselor Caseload	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Experienced Counselor	1.11	2.78^{+}	1.19	2.51	2.72	1.54	2.71	2.27
1 Counselor at School	0.81	0.51	0.95	1.97	0.90	1.09	0.69	1.27
N	5,640	760	1,380	300	290	1,710	530	570

Note: Data from HSLS restricted data file, using (3-wave+transcript) longitudinal student weights. $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table D11.

OLS Sensitivity Analysis of Not Knowing to Complete FAFSA for Disadvantaged Students

	(1) All Students	(2) Poor Students	(3) Minority Students	(4) Poor Minorities	(5) Students in Poverty	(6) No Parent BA	(7) Poor No Parent BA	(8) Minority No Parent BA
Counseling Activities								
Submitted Education Plan	1.13	1.17	1.10	1.00	1.13	1.20	1.28	1.20
Annual+ Review of Plan	1.05	0.92	1.05	0.85	0.81	1.07	0.84	1.05
Counselor Helped make 9th Grade Ed Plan	1.06	1.17	1.05	1.20	0.87	1.05	1.03	0.95
no_ed_plan	0.82**	0.96	0.80	0.95	0.75	0.80*	0.99	0.76
Other College Supports								
Met w/Cnslr re College	1.14+	1.15	1.25	1.21	1.14	1.16	1.22	1.33
Mom Talked to 9th Grader About College	1.14+	1.13	1.11	1.12	0.95	1.19+	1.29+	1.19
Counselor biggest Aid infl	1.05	1.15	1.03	1.10	1.15	1.04	1.01	0.98
Student Characteristics								
Female	1.10	1.05	1.08	0.99	1.01	1.12	1.04	1.15
African American	1.26*	1.13			1.09	1.13	1.08	
Latino	1.25*	1.37+			1.33	1.26+	1.40+	
Native/Pacific	1.05	1.03			1.22	1.11	1.06	
9th Grade Math	1.00	0.98*	0.99	0.98+	0.98	0.99+	0.98*	0.99
Majority Friends Expect Col	1.24**	1.19	1.13	1.46	1.51+	1.18*	1.28	1.10
Expects BA (only)	1.01	1.00	1.15	0.98	1.09	1.01	0.92	1.20
Expects Advanced Degree	1.39***	1.40*	1.58**	1.21	1.44	1.36*	1.35+	1.44+
Parent has BA	0.99	0.77	1.05	0.77	0.87			
School Demographics								
% Transition to College	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
% FRPL	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Private School	0.92	0.67	0.69+	0.37*	0.70	0.87	0.63	0.60
Counselor Qualities								
Counselor Caseload	1.00	1.00	1.00	1.00+	1.00	1.00	1.00	1.00
Experienced Counselor	1.22*	0.98	1.26+	0.97	0.96	1.26*	1.00	1.20
1 Counselor at School	0.88	1.09	0.78	0.98	1.00	0.85	1.09	0.67
N	13,160	3,120	4,360	1,530	1,360	6,560	2,560	2,660

Note: Data from HSLS restricted data file, using (3-wave+transcript) longitudinal student weights. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

APPENDIX E

Sensitivity Analyses for Counseling: School Fixed-Effects Analyses

Table E1.

FE Sensitivity Analysis of Selected Models

	(1) FAFSA Intent, Poor Students	(2) FAFSA Intent, Poor Minority	(3) FAFSA Intent, No Parent BA	(4) FAFSA Intent, Poor No Par BA	(5) Precalc, Poor	(6) Precalc, Minority	(7) Precalc, Poverty
Counseling Activities							
Submitted Education Plan	0.63	0.63	1.07	0.64	1.74	2.08	1.03
Annual+ Review of Plan	3.94	8.80	1.66	4.66	0.91	0.78	2.05
Counselor Helped make 9th Grade Ed Plan	1.36	3.12	1.26	1.12	0.75	0.80	1.38
Made no Ed plan	1.20	2.04	0.91	1.61	0.94	0.83	1.55
Other College Supports							
Met w/Cnslr re College	2.38	3.37	1.42	2.56	1.09	1.44	1.53
Mom Talked to 9th Grader About College	1.57	4.09	1.29	1.83	1.32	1.02	0.72
Counseled as Senior			1.05		2.14	2.09	2.34
Counselor biggest influence	1.39	0.90	1.16	1.55	0.26	0.47	0.26
Student Characteristics							
Female	2.25	2.22	1.85	1.92	0.86	1.20	1.19
African American	1.57		1.42	1.86	0.55		0.78
Latino	1.19		0.98	1.17	1.13		1.97
Native/Pacific	0.70		0.75	0.69	1.50		1.89
9th Grade Math	1.03	1.01	1.03	1.04	1.16	1.13	1.16
Majority Friends Expect Col	1.49	2.41	1.25	2.00	1.50	1.04	2.27
Expects BA (only)	2.11	2.74	2.03	2.43	1.49	1.28	1.67
Expects Advanced Degree	2.44	2.48	1.97	2.16	2.10	2.07	1.12
Parent has BA	0.68	0.49			1.20	1.13	4.90
FAFSA Previously	0.56	0.63	0.56	0.54			
No FAFSA because high income	0.13	0.09	0.24	0.16			
School Demographics							
% Transition to College	0.97	0.95	0.99	0.98	1.10	1.02	1.02
% FRPL	0.98	0.92	0.97	0.99	1.09	1.06	1.11
Private School	0.00	0.02	0.00	0.00	0.00	0.00	0.00
Counselor Qualities							
Counselor Caseload	1.00	0.99	1.00	1.00	1.00	1.00	1.02
Experienced Counselor	-	-	-	-	11.82	-	0.00
1 Counselor at School	-	-	0.34	-	1.05	-	0.46
N	3,120	1,530	6,560	2,560	3,120	4,360	1,360

Note: Data from HSLS restricted file, using (3-wave + transcript) longitudinal student weights. Fixed effects

Table E2.

FE Sensitivity Analysis of FAFSA Intent for Disadvantaged Students

	(1) All Students	(2) Poor Students	(3) Minority Students	(4) Poor Minorities	(5) Students in Poverty	(6) No Parent BA	(7) Poor No Parent BA	(8) Minority No Parent BA
Counseling Activities								
Submitted Education Plan	1.07	0.63	1.15	0.63	0.49	1.07	0.64	1.38
Annual+ Review of Plan	1.46**	3.94	1.35	8.80	3.51	1.66	4.66	1.64
Counselor Helped make 9th Grade Ed Plan	1.18	1.36	1.56	3.12	1.59	1.26	1.12	1.75
Made no Ed plan	0.91	1.20	0.98	2.04	1.87	0.91	1.61	1.05
Other College Supports								
Met w/Cnslr re College	1.29**	2.38	1.42	3.37	1.91	1.42	2.56	1.61
Mom Talked to 9th Grader About College	1.23+	1.57	1.63	4.09	1.22	1.29	1.83	2.07
Counseled on Aid as Senior						1.05		
Counselor biggest Aid infl	1.11	1.39	0.99	0.90	2.38	1.16	1.55	0.91
Student Characteristics								
Female	1.92***	2.25	2.41	2.22	4.72	1.85	1.92	1.94
African American	1.30*	1.57			2.46	1.42	1.86	
Latino	1.01	1.19			0.95	0.98	1.17	
Native/Pacific	0.92	0.70			0.59	0.75	0.69	
9th Grade Math	1.02***	1.03	1.02	1.01	1.00	1.03	1.04	1.02
Majority Friends Expect Col	1.08	1.49	1.06	2.41	2.88	1.25	2.00	1.19
Expects BA (only)	1.97***	2.11	2.03	2.74	2.75	2.03	2.43	1.98
Expects Advanced Degree	2.07***	2.44	2.20	2.48	3.45	1.97	2.16	2.08
Parent has BA	0.79**	0.68	0.68	0.49	0.35			
FAFSA Previously	0.50***	0.56	0.61	0.63	0.61	0.56	0.54	0.87
No FAFSA because high income	0.22***	0.13	0.19	0.09	0.30	0.24	0.16	0.28
School Demographics								
% Transition to College	0.99	0.97	0.99	0.95	1.05	0.99	0.98	1.00
% FRPL	1.00	0.98	1.00	0.92	0.97	0.97	0.99	0.92
Private School	0.93	0.00	9.38e+10	0.02	1.19e+08	0.00	0.00	0.01
Counselor Qualities								
Counselor Caseload	1.00+	1.00	1.00	0.99	0.92	1.00	1.00	1.00
Experienced Counselor	10.84*	-	3.25	-	0.00	-	-	-
1 Counselor at School	0.57	-	0.13	-	-	0.34	-	-
N	13,160	3,120	4,360	1,530	1,360	6,560	2,560	2,660

Note: Data from HSLS restricted file, using (3-wave + transcript) longitudinal student weights. Fixed effects

Table E3.

FE Sensitivity Analysis of Math College Readiness for Disadvantaged Students

	(1) All Students	(2) Poor Students	(3) Minority Students	(4) Poor Minorities	(5) Students in Poverty	(6) No Parent BA	(7) Poor No Parent BA	(8) Minority No Parent BA
Counseling Activities								
Submitted Education Plan	1.18	0.89	1.05	0.50	1.31	1.21	0.98	0.76
Annual+ Review of Plan	0.98	1.82	1.18	4.25	1.73	1.07	1.81	2.26
Counselor Helped make 9th Grade Ed Plan	1.23	1.13	1.60	3.55	2.09	1.64	1.26	3.20
Made no Ed plan	1.08	1.23	1.04	1.02	1.68	1.03	1.20	1.08
Other College Supports								
Met w/Cnslr re College	0.86	0.87	1.42	2.52	1.43	0.76	0.88	1.56
Mom Talked to 9th Grader About College	1.23	1.41	0.85	1.34	1.18	1.10	1.62	0.70
Counseled on College as Senior	2.10	4.80	2.95	8.26	9.19***	2.65	6.16	5.01
Counselor biggest College infl	1.17	3.31	1.67	2.62	2.44	1.33	3.31	2.39
Student Characteristics								
Female	1.34	1.34	1.74	1.97	1.75	1.39	1.20	1.75
African American	0.80	0.89			0.79	0.86	0.87	
Latino	0.77	0.73			0.77	0.68	0.70	
Native/Pacific	0.99	1.37			1.22	1.19	1.36	
9th Grade Math	1.12	1.13	1.11	1.16	1.13***	1.12	1.13	1.12
Majority Friends Expect Col	1.53	1.69	1.51	3.19	1.46	1.61	1.61	1.78
Expects BA (only)	1.85	1.62	1.76	1.27	2.00	2.01	1.28	1.37
Expects Advanced Degree	2.58	2.32	2.10	1.60	1.17	2.61	2.32	2.26
Parent has BA	1.32	1.23	1.17	1.01	1.96			
School Demographics								
% Transition to College	1.01	1.04	1.02	1.03	1.07*	1.00	1.04	1.02
% FRPL	0.99	0.94	1.06	0.01	0.83	0.95	0.85	1.04
Private School	-	-	0.46	0.00	0.00*	-	-	2.34
Counselor Qualities								
Counselor Caseload	1.00	1.01	1.01	1.01	1.02*	1.00	1.00	1.01
Experienced Counselor	0.08	0.12	0.09	0.00	-	0.20	0.09	0.03
1 Counselor at School	6.16	0.26	15.74	0.19	0.20	0.64	0.11	-
N	13,160	3,120	4,360	1,530	1,360	6,560	2,560	2,660

Note: Data from HSLS restricted file, using (3-wave + transcript) longitudinal student weights. Fixed effects

Table E4.

FE Sensitivity Analysis of Actual FAFSA Submission for Disadvantaged Students

	(1) All Students	(2) Poor Students	(3) Minority Students	(4) Poor Minorities	(5) Students in Poverty	(6) Poor No Parent BA	(7) Minority No Parent BA
Counseling Activities							
Submitted Education Plan	1.11	1.73	1.25	2.15	1.15	1.63	1.54
Annual+ Review of Plan	1.13	0.97	1.29	1.20	0.80	1.20	1.30
Counselor Helped make 9th Grade Ed Plan	1.01	1.56	1.42	2.10	0.79	1.36	1.27
Made no Ed plan	0.88	0.55	0.83	0.52	0.47	0.58	0.81
Other College Supports							
Met w/Cnslr re College	0.90	0.56	0.85	0.69	0.51	0.55	0.78
Mom Talked to 9th Grader About College	1.45**	1.56	1.61	2.51	2.10	1.57	1.90
Counseled on Aid as Senior	5.75***	13.07	6.94	15.91	17.49	15.15	8.90
Counselor biggest Aid infl	0.77	0.87	0.76	0.65	0.51	0.98	0.83
Student Characteristics							
Female	1.71***	2.66	2.19	4.24	2.66	2.80	2.02
African American	1.19	0.98			5.21	0.87	
Latino	0.76+	0.36			0.41	0.39	
Native/Pacific	0.93	0.75			1.15	0.84	
9th Grade Math	1.03***	1.01	1.02	0.99	1.09	1.00	1.00
Majority Friends Expect Col	1.55***	1.07	1.28	0.55	0.86	1.00	1.36
Expects BA (only)	2.23***	3.83	1.91	4.20	2.61	5.04	2.44
Expects Advanced Degree	2.65***	4.23	3.44	12.00	1.82	6.05	5.23
Parent has BA	1.41***	2.11	1.55	1.75	0.52		
FAFSA Previously	0.49***	0.67	0.39	0.33	0.81	0.68	0.37
No FAFSA because high income	0.10***	0.09	0.10	0.13		0.16	0.12
School Demographics							
% Transition to College	1.01	1.02	1.02	1.15	0.95	1.05	1.05
% FRPL	0.99	1.03	1.00	1.02	0.99	1.17	1.16
Private School	0.27	4.54	0.10	0.00	0.00	0.00	0.08
Counselor Qualities							
Counselor Caseload	1.00	1.00	1.00	1.01	1.01	1.00	1.00
Experienced Counselor	0.17	0.00	0.00	0.00	0.08	0.00	0.00
1 Counselor at School	2.35	-	1.99	-	-	-	-
N	13,160	3,120	4,360	1,530	1,360	6,560	2,560

Note: Data from HSLS restricted file, using (3-wave + transcript) longitudinal student weights. Fixed effects

Table E5.

FE Sensitivity Analysis of Advanced Math Course-taking for Disadvantaged Students

	(1) All Students	(2) Poor Students	(3) Minority Students	(4) Poor Minorities	(5) Students in Poverty	(6) No Parent BA	(7) Poor No Parent BA	(8) Minority No Parent BA
Counseling Activities								
Submitted Education Plan	1.27^{+}	1.56	1.50	1.84	1.05	1.30	1.82	1.70
Annual+ Review of Plan	0.82	0.71	0.76	1.09	1.54	0.90	0.91	1.06
Counselor Helped make 9th Grade Ed Plan	0.91	0.90	0.82	0.88	1.31	0.86	0.88	0.71
Made no Ed plan	0.98	0.73	0.82	0.60	0.86	0.89	0.74	0.75
Other College Supports								
Met w/Cnslr re College	1.08	0.71	1.31	0.96	1.95	1.04	0.80	1.86
Mom Talked to 9th Grader About College	1.25*	1.47	1.25	1.59	0.69	1.49**	1.92	1.47
Counseled on College as Senior	1.77***	2.85	2.58	5.23	4.12	2.00***	3.72	3.53
Counselor biggest College infl	0.70	0.36	0.41	0.24	0.13	0.64	0.23	0.37
Student Characteristics								
Female	1.18*	1.01	1.30	0.70	0.71	1.14	0.74	1.12
African American	0.82	0.79			1.53	0.85	0.89	
Latino	0.97	1.16			1.36	0.98	1.37	
Native/Pacific	0.80^{+}	0.96			0.47	0.86	0.87	
9th Grade Math	1.16***	1.20	1.15	1.20	1.24	1.16***	1.21	1.15
Majority Friends Expect Col	1.48***	1.58	1.34	1.53	2.85	1.38**	1.56	1.17
Expects BA (only)	1.94***	1.76	1.65	1.08	1.49	2.21***	1.74	1.32
Expects Advanced Degree	3.47***	2.60	2.79	1.14	1.87	3.59***	2.13	2.39
Parent has BA	1.40***	1.65	1.26	1.32	4.49			
School Demographics								
% Transition to College	1.00	1.08	1.03	1.10	1.11	1.01	1.08	1.06
% FRPL	0.99	1.00	0.99	1.02	0.99	1.00	1.02	0.99
Private School	0.05	0.00	0.00	0.00	0.00	0.35	0.00	0.00
Counselor Qualities								
Counselor Caseload	1.00	1.00	1.00	1.00	1.02	1.00	1.00	1.00
Experienced Counselor	0.57	3.53	3.55	0.19	0.00	3.47	12.17	-
1 Counselor at School	2.99	0.48	-	0.79	0.10	0.22	0.31	-
N	13,160	3,120	4,360	1,530	1,360	6,560	2,560	2,660

Note: Data from HSLS restricted file, using (3-wave + transcript) longitudinal student weights. Fixed effects

Table E6.

FE Sensitivity Analysis of Precalculus Course-taking for Disadvantaged Students

	(1) All Students	(2) Poor Students	(3) Minority Students	(4) Poor Minorities	(5) Students in Poverty	(6) No Parent BA	(7) Poor No Parent BA	(8) Minority No Parent BA
Counseling Activities								
Submitted Education Plan	1.38*	1.74	2.08	2.63	1.03	1.58	1.85	2.84
Annual+ Review of Plan	0.78+	0.91	0.78	1.53	2.05	0.88	1.34	0.99
Counselor Helped make 9th Grade Ed Plan	1.03	0.75	0.80	0.89	1.38	0.84	0.91	0.61
Made no Ed plan	0.94	0.94	0.83	1.22	1.55	0.88	1.14	0.81
Other College Supports								
Met w/Cnslr re College	1.04	1.09	1.44	1.17	1.53	1.08	1.01	1.99
Mom Talked to 9th Grader About College	1.19+	1.32	1.02	0.93	0.72	1.28	1.41	0.88
Counseled on College as Senior	1.59***	2.14	2.09	4.16	2.34	1.78	2.77	2.95
Counselor biggest College infl	0.89	0.26	0.47	0.15	0.26	0.74	0.16	0.39
Student Characteristics								
Female	1.08	0.86	1.20	0.59	1.19	1.00	0.67	1.04
African American	0.87	0.55			0.78	0.79	0.55	
Latino	0.89	1.13			1.97	0.82	0.98	
Native/Pacific	1.09	1.50			1.89	1.27	1.39	
9th Grade Math	1.14***	1.16	1.13	1.17	1.16	1.12	1.17	1.13
Majority Friends Expect Col	1.28**	1.50	1.04	1.29	2.27	1.30	1.40	1.05
Expects BA (only)	1.53***	1.49	1.28	0.73	1.67	1.58	1.41	0.96
Expects Advanced Degree	2.60***	2.10	2.07	0.65	1.12	2.54	1.35	1.68
Parent has BA	1.19*	1.20	1.13	2.05	4.90			
School Demographics								
% Transition to College	1.01	1.10	1.02	1.10	1.02	1.02	1.10	1.05
% FRPL	1.03+	1.09	1.06	1.08	1.11	1.04	1.13	1.98
Private School	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Counselor Qualities								
Counselor Caseload	1.00	1.00	1.00	1.00	1.02	1.00	1.00	1.01
Experienced Counselor	0.74	11.82	-	17.01	0.00	0.90	25.93	119.62
1 Counselor at School	1.46	1.05	-	2.38	0.46	-	0.77	0.20
N	13,160	3,120	4,360	1,530	1,360	6,560	2,560	2,660

Note: Data from HSLS restricted file, using (3-wave + transcript) longitudinal student weights. Fixed effects

Table E7.

FE Sensitivity Analysis of Applying to 2+ Colleges for Disadvantaged Students

	(1) All Students	(2) Poor Students	(3) Minority Students	(4) Poor Minorities	(5) Students in Poverty	(6) No Parent BA	(7) Poor No Parent BA	(8) Minority No Parent BA
Counseling Activities								
Submitted Education Plan	1.12	0.96	1.31	1.55	1.09	1.14	0.66	1.14
Annual+ Review of Plan	1.06	1.62	1.04	1.23	0.94	1.11	2.42	1.57
Counselor Helped make 9th Grade Ed Plan	1.13	1.50	1.23	1.40	1.26	1.10	1.38	1.20
Made no Ed plan	0.97	0.97	1.15	0.83	0.88	0.98	1.02	1.33
Other College Supports								
Met w/Cnslr re College	1.02	1.78	1.20	3.64	1.20	1.10	1.73	1.17
Mom Talked to 9th Grader About College	1.07	1.01	0.88	1.41	0.94	1.11	1.10	1.18
Counseled on College as Senior	2.82***	5.54	3.67	6.15	3.14***	3.45	5.88	4.21
Counselor biggest College infl	0.60*	0.21	0.51	0.15	1.22	0.52	0.22	0.48
Student Characteristics								
Female	1.45***	1.34	1.30	1.03	1.27+	1.37	1.43	1.25
African American	1.30*	0.92			1.30+	1.33	0.91	
Latino	1.08	0.63			1.24	0.93	0.56	
Native/Pacific	0.92	0.91			0.98	0.94	0.88	
9th Grade Math	1.04***	1.06	1.04	1.09	1.04***	1.04	1.06	1.03
Majority Friends Expect Col	1.69***	2.19	1.47	1.95	1.53**	1.70	2.02	1.64
Expects BA (only)	1.88***	1.48	2.18	1.34	1.21	1.85	1.30	2.01
Expects Advanced Degree	2.63***	2.49	4.05	2.42	1.66**	3.00	2.17	4.28
Parent has BA	1.25**	1.11	1.07	1.10	1.14			
School Demographics								
% Transition to College	1.00	1.03	1.01	1.02	1.00	1.01	1.04	1.02
% FRPL	1.01	0.98	0.99	0.19	1.01*	1.00	0.92	0.98
Private School	0.33	0.00	0.00	0.00	1.86*	0.00	0.00	0.00
Counselor Qualities								
Counselor Caseload	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Experienced Counselor	2.70	1.13	-	0.00	0.72*	0.96	0.10	-
1 Counselor at School	2.04	-	2.27	-	0.85	-	-	-
N	13,160	3,120	4,360	1,530	1,360	6,560	2,560	2,660

Note: Data from HSLS restricted file, using (3-wave + transcript) longitudinal student weights. Fixed effects

Table E8.

FE Sensitivity Analysis of Post-Secondary Enrollment for Disadvantaged Students

	(1) All Students	(2) Poor Students	(3) Minority Students	(4) Poor Minorities	(5) Students in Poverty	(6) No Parent BA	(7) Poor No Parent BA	(8) Minority No Parent BA
Counseling Activities								
Submitted Education Plan	0.90	1.92	0.86	2.20	1.79	1.09	2.25	1.07
Annual+ Review of Plan	1.19	0.67	1.55	0.50	0.95	1.06	0.67	1.56
Counselor Helped make 9th Grade Ed Plan	1.11	1.12	1.55	0.81	1.55	1.14	1.26	1.47
Made no Ed plan	0.87	0.93	0.86	1.07	1.85	0.85	0.73	0.85
Other College Supports								
Met w/Cnslr re College	1.05	1.20	1.29	2.28	0.92	1.10	1.16	1.45
Mom Talked to 9th Grader About College	1.45***	1.23	1.60	1.49	2.07	1.36	1.11	1.48
Counseled on College as Senior	3.43***	5.09	4.10	7.57	12.20	3.35	5.09	4.39
Counselor biggest College infl	1.35	1.32	1.88	2.30	0.81	1.17	1.30	1.91
Student Characteristics								
Female	1.59***	1.48	1.37	1.55	1.15	1.47	1.37	1.26
African American	0.99	1.01			1.08	0.98	0.82	
Latino	0.85	0.79			1.19	0.75	0.73	
Native/Pacific	0.84	1.17			1.90	0.83	1.13	
9th Grade Math	1.04***	1.04	1.04	1.04	1.01	1.04	1.04	1.03
Majority Friends Expect Col	1.79***	2.41	1.40	1.98	2.22	1.82	2.39	1.33
Expects BA (only)	2.18***	2.53	1.38	1.33	6.23	2.38	2.63	1.43
Expects Advanced Degree	3.44***	3.96	4.09	9.94	3.41	3.69	4.15	5.06
Parent has BA	1.74***	1.77	2.00	5.87	2.29			
School Demographics								
% Transition to College	1.01	1.03	1.01	1.42	1.02	1.00	1.02	1.00
% FRPL	0.99	1.03	0.99	3.23	0.99	1.00	1.05	1.04
Private School	2.43	0.11	1.38	66.29	-	-	-	0.54
Counselor Qualities								
Counselor Caseload	1.00*	1.00	1.00	1.00	1.01	1.00	1.00	1.00
Experienced Counselor	1.85	4.64	0.55	-	0.02	-	2.88	0.61
1 Counselor at School	0.31	-	0.09	-	0.12	0.00	0.06	0.10
N	13,160	3,120	4,360	1,530	1,360	6,560	2,560	2,660

Note: Data from HSLS restricted file, using (3-wave + transcript) longitudinal student weights. Fixed effects

Table E9.

FE Sensitivity Analysis of Enrollment in 4-year Program for Disadvantaged Students

	(1) All Students	(2) Poor Students	(3) Minority Students	(4) Poor Minorities	(5) Students in Poverty	(6) No Parent BA	(7) Poor No Parent BA	(8) Minority No Parent BA
Counseling Activities								
Submitted Education Plan	1.04	0.95	1.06	1.36	0.64	1.06	0.84	1.03
Annual+ Review of Plan	0.89	0.90	0.89	1.02	0.24	0.91	1.23	1.26
Counselor Helped make 9th Grade Ed Plan	0.92	0.57	1.38	0.74	0.47	0.95	0.82	1.74^{+}
Made no Ed plan	1.01	0.61	0.89	0.29	0.49	0.97	0.50	0.98
Other College Supports								
Met w/Cnslr re College	1.14	0.90	1.08	0.64	0.78	1.20	0.71	1.03
Mom Talked to 9th Grader About College	1.32**	1.58	1.32	1.33	0.37	1.44*	1.45	1.49
Counseled on College as Senior	2.47***	3.93	3.48	5.41	1.25	3.33***	5.14	4.86***
Counselor biggest College infl	0.82	0.25	0.34	0.12	0.02	0.57^{+}	0.21	0.25*
Student Characteristics								
Female	1.20*	1.27	1.00	1.03	5.29	0.90	1.12	0.74
African American	0.94	0.56			0.48	0.74	0.40	
Latino	0.85	0.84			0.25	0.81	0.66	
Native/Pacific	0.81^{+}	0.89			0.50	0.74^{+}	0.87	
9th Grade Math	1.07***	1.12	1.07	1.14	1.11	1.07***	1.13	1.07***
Majority Friends Expect Col	2.12***	4.05	2.43	4.87	11.73	1.99***	3.44	2.01**
Expects BA (only)	2.92***	3.30	3.26	3.27	3.51	3.55***	3.48	3.18***
Expects Advanced Degree	5.26***	6.00	8.44	8.64	8.12	6.83***	6.64	10.64***
Parent has BA	1.88***	1.14	2.66	1.67	2.73			
School Demographics								
% Transition to College	1.01	1.06	1.02	1.10	1.39	1.01	1.06	1.03*
% FRPL	1.01	1.01	1.04	1.04	1.28	1.01	1.09	1.24
Private School	3.13	0.00	3.48	1.40e+19	0.00	0.73	0.00	-
Counselor Qualities								
Counselor Caseload	1.00**	1.00	1.00	1.00	1.17	1.00	1.00	1.00
Experienced Counselor	1.30	0.00	0.00	0.00	-	1.17	0.00	0.00***
1 Counselor at School	0.42	-	0.19	-	-	0.95	-	-
N	13,160	3,120	4,360	1,530	1,360	6,560	2,560	2,660

Note: Data from HSLS restricted file, using (3-wave + transcript) longitudinal student weights. Fixed effects

Table E10.

FE Sensitivity Analysis of Highly Selective College Attendance for Disadvantaged Students

	(1) All Students	(2) Poor Students	(3) Minority Students	(4) Poor Minorities	(5) Students in Poverty	(6) No Parent BA	(7) Poor No Parent BA	(8) Minority No Parent BA
Counseling Activities								
Submitted Education Plan	0.85	0.02^{+}	0.28	182.12	1.66e+15	0.60	0.52	0.02
Annual+ Review of Plan	1.11	21.62	1.80	0.00	40.38	2.38	23.74	112.90
Counselor Helped make 9th Grade Ed Plan	1.51*	0.27	4.33	-	-	5.31	36.29	86.74
Made no Ed plan	1.11	0.38	1.42	0.00	-	1.74	8.04	2.35
Other College Supports								
Met w/Cnslr re College	1.03	0.84	1.60	-	0.00	1.60	47.43	0.68
Mom Talked to 9th Grader About College	1.11	7.36^{+}	0.15	0.00	-	2.78	58.37	0.06
Counseled on College as Senior	1.23	2.88	2.09	-	35.68	0.80	0.00^{+}	0.14
Counselor biggest College infl	1.04		1.22			28.81		4.78
Student Characteristics								
Female	1.03	9.06*	1.32	-	-	0.83	2.66	1.64
African American	0.48**	0.00***			-	0.14	0.00*	
Latino	1.66*	14.87*			0.00	3.30	941.86	
Native/Pacific	0.77	0.17			0.00	0.38	0.01^{+}	
9th Grade Math	1.11***	1.20**	1.16	0.59	991.68***	1.20	1.42**	1.31
Majority Friends Expect Col	1.74***	4.60^{+}	2.32	6.18	-	2.08	0.34	0.72
Expects BA (only)	0.97	2.58	4.06	0.00	0.00	0.30	2350.51**	12.68
Expects Advanced Degree	2.17***	7.50	4.39	0.00	0.00	1.26	519.33*	10.01
Parent has BA	1.61***	0.44	0.96	4.01e+30	0.00			
School Demographics								
% Transition to College	1.01	1.03	0.91	-	1938.79***	1.01	6.59***	0.00
% FRPL	1.03*	1.04	2.53	0.05	-	15.23	0.15***	2.94e+10
Private School	2.87	-	-	0.00	0.00	-	0.00*	.
Counselor Qualities								
Counselor Caseload	1.00	1.06***	1.00	0.59	0.08***	1.00	1.03	1.08
Experienced Counselor	7.92^{+}	0.00***	16513.40	0.00	-	-	0.00***	0.00
1 Counselor at School	0.31	-	0.17	0.00	0.00	-	-	0.00
N	13,160	3,120	4,360	1,530	1,360	6,560	2,560	2,660

Note: Data from HSLS restricted file, using (3-wave + transcript) longitudinal student weights. Fixed effects

Table E11.

FE Sensitivity Analysis of Not Knowing to Complete FAFSA for Disadvantaged Students

	(1) All Students	(2) Poor Students	(3) Minority Students	(4) Poor Minorities	(5) Students in Poverty	(6) No Parent BA	(7) Poor No Parent BA	(8) Minority No Parent BA
Counseling Activities								
Submitted Education Plan	1.18^{+}	1.40	1.18	0.98	0.96	1.33	1.62	1.63^{+}
Annual+ Review of Plan	1.02	0.80	1.10	0.75	0.79	1.02	0.81	0.93
Counselor Helped make 9th Grade Ed Plan	1.05	1.00	1.03	1.02	0.48	1.03	0.63	0.82
no_ed_plan	0.81**	0.82	0.69	0.67	0.39	0.72	0.79	0.54**
Other College Supports								
Met w/Cnslr re College	1.09	1.42	1.23	1.65	0.41	1.19	1.74	1.47
Mom Talked to 9th Grader About College	1.15^{+}	0.93	1.01	0.91	0.83	1.17	1.04	1.01
Counselor biggest Aid infl	1.14	1.22	1.15	1.01	1.16	1.12	1.12	1.06
Student Characteristics								
Female	1.11^{+}	1.02	1.12	0.70	0.94	1.14	1.12	1.15
African American	1.21^{+}	0.99			1.27	1.10	0.90	
Latino	1.32*	1.55			1.08	1.37	1.52	
Native/Pacific	1.01	1.27			0.88	1.14	1.49	
9th Grade Math	1.00	0.97	0.99	0.95	0.96	0.99	0.95	0.98^{+}
Majority Friends Expect Col	1.28***	1.42	1.20	2.28	1.07	1.14	1.59	1.02
Expects BA (only)	1.09	1.24	1.54	1.29	1.43	1.11	1.07	1.59^{+}
Expects Advanced Degree	1.48***	1.60	1.77	1.42	2.58	1.46	1.72	1.77*
Parent has BA	0.98	0.65	1.12	0.44	0.41			
School Demographics								
% Transition to College	1.00	1.00	0.99	0.97	1.00	1.00	1.00	0.98
% FRPL	0.99	0.98	0.97	0.91	1.04	0.98	1.01	0.96
Private School	0.28	0.00	-	0.00	-	0.05	0.00	0.00***
Counselor Qualities								
Counselor Caseload	1.00*	0.99	1.00	0.98	1.00	1.00	1.00	1.00
Experienced Counselor	0.85	-	1.26	-	86.15	-	-	-
1 Counselor at School	1.99	-	1.08	-	0.39	5.67	0.66	0.00***
N	13,160	3,120	4,360	1,530	1,360	6,560	2,560	2,660

Note: Data from HSLS restricted file, using (3-wave + transcript) longitudinal student weights. Fixed effects

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