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Three Essays on High School Social Studies Coursetaking

This document was submitted as a dissertation in October 2026 in partial fulfillment of the requirements of the Frederick S. Pardee Ph.D. in Policy Analysis at the RAND School of Public Policy. The faculty committee that supervised and approved the dissertation consisted of Julia Kaufman, Jon Schweig, and Laura Hamilton. The external reader was Kelly Siegel-Stechler.

Dissertation

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RGSD-A5506-1

Abstract

In contrast to other core academic subjects (especially math and science), little is known about students' high school social studies coursetaking. Prior work has left largely unexplored which students take which courses and why; to what extent state and local policy mechanisms shape enrollment patterns; and ultimately to what extent students' coursetaking matters for their college, career, and civic outcomes. In this three-paper dissertation, I begin to unpack the black box that is students' high school social studies coursetaking. To do so, I use transcript data collected from thousands of students as part of the High School Longitudinal Study of 2009.

In my first paper, I investigate differences in students' high school social studies coursetaking by state. I exploit variation in states' social studies-focused graduation requirements as they applied to the class of 2013 to investigate the association between state policy and social studies course enrollments. In descriptive analyses, I find that enrollment rates in some social studies courses (e.g., government, economics, geography) vary widely across states, while enrollment rates in world and U.S. history courses are consistently high. I find mixed evidence about to what extent states' graduation requirements are responsible for course enrollments. On the one hand, removal of discipline-specific graduation requirements is associated with declines in economics and geography (and to a lesser extent government) course enrollments and increases in course enrollments in "other" social studies disciplines like psychology. On the other hand, states' discipline-specific graduation requirements have little to no association with history course enrollments nor with enrollment in Advanced Placement (AP) courses in any discipline.

In my second paper, I investigate to what extent one prevalent local policy mechanism (tracking, or sorting, of students into certain math courses) predicts students' subsequent AP social studies coursetaking. My analyses reveal a complicated picture of how and to what extent math tracking may influence students' AP social studies coursetaking. I find math tracking is not associated with the *share* of students enrolled in more rigorous social studies courses. However, it may distort the *composition* of students in these courses. I also find evidence that high-achieving social studies students sorted into low math tracks under-enroll in AP social studies.

My third paper asks which aspects of students' social studies coursetaking—that is, whether the number or nature of the courses that students take—matter for their subsequent civic outcomes. I find a positive association between the total amount of social studies credits earned and students' likelihood of spending time volunteering, but I find no association with registration to vote. I find weak evidence that *how* students earn these credits might matter. For example, earning greater shares of credits in world history courses is positively associated with students' likelihood of having spent time volunteering while earning more credits in government courses is positively associated with students' likelihood of being registered to vote.

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Acknowledgments

I could not have completed this dissertation without the kindness and support of a great many people. I am particularly grateful to my dissertation committee (Julia Kaufman, Jon Schweig, and Laura Hamilton) for their support through this journey. Thank you for helping me talk through my ideas and for your guidance on my analyses. I very much appreciate your critical feedback that improved the quality of this product and your willingness to encourage me when I needed it. Thank you also to Kelly Stiegel-Stecher for serving as my external reader and for providing comments on drafts.

I would like to thank the numerous other colleagues who have mentored me over the last ten years. There are too many to list here, but I would particularly like to thank Rachel Dinkes, Sy Doan, Alice Huguet, Jana Kemp, Amy Rathbun, Heather Schwartz, Elizabeth Steiner, and Stephani Wrabel. Thank you for helping me to develop my identity as an education researcher and for training me in the skills needed to do this work.

To my PRGS cohort, thank you for your kindness, collaboration, and camaraderie. I am sure that completing a dissertation is difficult at any time but attending graduate school during a global pandemic presented unique challenges. Thank you especially to those PRGS students in my dissertation support group (Lawrence Baker, Annie Chen, Lynn Hu, and Pedro Nascimento de Lima) for holding me accountable and for offering me different perspectives. And thank you to Ashley Woo, my favorite collaborator over these last few years.

This dissertation was supported financially by the James Q. Wilson Dissertation Award and by the Susan Way-Smith Dissertation Award. Thank you for your generous contributions that made this work possible.

I would like to dedicate this dissertation to my high school AP U.S. history teacher. Your class was my favorite class that I took while in high school, and I am sure that it is at least partially responsible for my interest in this topic today.

And last, but certainly not least, thank you to both of my parents and numerous other family members who spent many years as dedicated public school teachers.

Abbreviations

AAAS	American Academy of Arts & Sciences
ANES	American National Election Studies
AP	Advanced Placement
APA	American Psychological Association
C3	College, Career, and Civic Life Framework
CIRCLE	Center for Information & Research on Civic Learning and Engagement
COVID-19	Coronavirus disease 2019
EAD	Educating for American Democracy
EC	Economics course
ECS	Education Commission of the States
ELA	English language arts
GE	Geography course
GPA	Grade point average
GV	Government/civics course
HSLS:2009	High School Longitudinal Study of 2009
IB	International Baccalaureate
ICCs	Interclass correlations
IPTW	Inverse probability of treatment weighting
K–12	Kindergarten through grade 12
NAEP	National Assessment of Educational Progress
NCES	National Center for Education Statistics
NCSS	National Council for the Social Studies
OT	Other social studies course
PRGS	Pardee RAND Graduate School
SCED	School Courses for the Exchange of Data
STEM	Science, technology, engineering, and math
US	U.S. history course
WH	World history course

Chapter 1. Motivation

I decided to focus my dissertation on social studies education on January 6, 2021. That morning, I was supposed to be (virtually) assisting teaching an economics course. Instead, I was glued to the television, watching in astonishment as insurrectionists entered the Capitol building in an attempt to halt the U.S. Congress from certifying the results of the 2020 presidential election. As I watched the events of the day unfold on television, I had many thoughts about how we as a nation arrived at this moment. But on that day and in the days to come, I mostly thought about schools. As an education researcher, I mostly reflected on the role of the public education system to prevent, address, and explain events such as those that took place on January 6.

The changing mission of public schools

There is no doubt K–12 public schools have an essential role to play in preparing students for postsecondary education and the labor force. However, the function of a public education system in a democratic society is likely even more foundational. In fact, universal public education in the United States initially proliferated under an assumption that successful self-governance is dependent upon having an enlightened and engaged citizenry (Winthrop, 2020). Thus, at least historically, a core function of public education has been to equip students with the civic knowledge, skills, and dispositions necessary to engage in civic life (Vinnakota, 2019).

Yet despite this obligation, schools' emphasis on civics has diminished in recent years. Over the last few decades, schools have increasingly pivoted to focus on developing students' academic skills in reading, math, and science, as well as supporting their career preparation (Hansen et al., 2018; Winthrop, 2020). This pivot is no doubt related to shifting federal and state education policies over the last few decades. In 1983, a National Commission on Excellence in Education published a report entitled *A Nation at Risk.* The report was a fairly scathing appraisal of the state of the U.S. education system and warned that student performance in the U.S. was falling behind other countries to a concerning degree (Gardner et al., 1983). The 1983 report made four main recommendations to address the state of public education: (1) strengthen high school graduation requirements to require content learning in multiple academic subjects; (2) adopt academic standards; (3) increase instructional time; and (4) improve teacher quality (ibid).

Although the accuracy of some claims in the report were later debated (e.g., Berliner & Biddle, 1995), the report did spurn a wave of education reforms in the following years that largely align with the report's recommendations. For example, most states raised their minimum graduation requirements between the early 1990s and the 2010s, including some that raised their requirements multiple times (Heller, 2023). States individually began adopting academic standards in core academic subject areas outlining the skills that students should learn in each

grade level (Schwartz, 2023c). Then, in 2010, more than forty states adopted a national set of standards in English language arts (ELA) and math referred to as the "Common Core" (Carmichael et al., 2010; Friedberg et al., 2018; NCES, 2015). Furthermore, the No Child Left Behind Act in 2001 and later the Every Student Succeeds Act in 2015 required states to regularly assess students against these academic standards. States were now required to administer annual summative assessments in math and reading and, to a lesser extent, in science. States also established accountability systems to monitor schools' progress in raising student achievement in these subjects. The Obama administration, through its Race to the Top Initiative, further encouraged states and schools to adopt data systems to monitor progress and to evaluate teacher effectiveness (Howell, 2015).

A common theme in these reform efforts is that social studies—the core academic subject area most closely and explicitly tied to shaping students' civic development—largely got left behind. For example, about a third of states require students to complete fewer credits in social studies than in math to graduate high school (ECS, 2023). States' academic standards in social studies remain scattered and are often not aligned to national frameworks (Stern et al., 2021). States are not required to regularly assess students in social studies, and most do not (ECS, 2018). Even fewer states consider students' social studies achievement in their accountability framework (ECS, 2021).[1] Schools spend less instructional time on social studies than on other core academic subjects, especially at the elementary level (e.g., Diliberti et al., 2023; Fitchett & Heafner, 2010; Fitchett et al., 2014; Heafner & Fitchett, 2012; Hoyer & Sparks, 2017; Tyner & Kabourek, 2020; U.S. Government Accountability Office, 2015). In summary, reform efforts to make schooling more rigorous over the last few decades to meet the perceived needs of a 21st century labor force have had the unfortunate side effect of schools de-prioritizing civics education.

Many researchers, civics experts (including six former secretaries of education), and civics-focused organizations have voiced concerns about schools' abdication of their civic mission and have advocated for a renewed focus on this topic after decades of perceived neglect (e.g., Alexander et al., 2021; Educating for American Democracy (EAD), 2021; Hansen et al., 2018; Levine & Kawashima-Ginsberg, 2017; Vinnakota, 2019; Winthrop, 2020). Support for a renewed focus on civics education comes at a time when the U.S. is grappling with many concerning trends such as a general weakening of American democracy (Levitsky & Ziblatt, 2018; Repucci, 2021); declining trust in both facts and institutions (Kavanagh & Rich, 2018; Saad, 2023); increasing political polarization (Boxell, Gentzkow, & Shapiro, 2020); and persistently low levels of civic knowledge among both students and adults (Annenberg Public Policy Center, 2023; NCES, undated-b; NCES, undated-c).

[1] Given its' learning objectives, it is debated whether high-stakes testing and accountability requirements are appropriate for the subject area. See, for example, Au (2009), Grant (2007), and O'Connor et al. (2007).

Perhaps because of these trends, evidence generally suggests there is broad support for a resurgence of civics education—at least in theory. Over the past several years, leaders and policymakers from across the political spectrum have called for schools to re-think or increase their focus on civics (e.g., Alfonseca, 2023; Coons, 2022; Goldstein, 2023). Public opinion polls show that parents rate civics as among the top three purposes of public schools (Saaveadra et al., 2024). Similarly, a 2022 survey found that most U.S. adults support increased funding for civics education and think teaching civics is more important now than it was five years ago (iCivics, undated). A 2021 survey of public and private school teachers found that most teachers, too, agree that there should be more emphasis on civics (Sailor et al., 2021).

Unfortunately, re-focusing attention on civics, or social studies education more broadly, in schools is proving difficult in practice. Setting aside the fact that schools are focused on helping students recover from several years of disruptions to schooling brought on by the COVID-19 pandemic (e.g., Kane & Reardon, 2023; Lewis & Kuhfeld, 2023; National Center for Education Statistics, undated-e), re-focusing attention on civics education, or social studies education more generally, has become more difficult because the subject has been increasingly politicized. There has always been some level of disagreement over how to approach civics education and what topics should be given most emphasis, but these disagreements have seemingly accelerated in recent years (e.g., Diliberti & Kaufman, 2022; Farkas & Duffett, 2010; Hamilton et al., 2020b; Hess & Rice, 2024; Polikoff et al., 2022; Rogers et al., 2022; Saaveadra et al., 2024).

How schools theoretically support students' civic development

Despite recent heightened partisan disagreements, there is some consensus over how schools should theoretically support students' civic development, particularly among civics education experts. Although it can be difficult to put a boundary around what aspects of K–12 education directly shape students' civic development, prior research has identified 10 practices important for such development (Gould et al., 2011; Guilfoile, Delander, & Kreck, 2016; Levine & Kawashima-Ginsberg, 2017). As shown in Table 1.1, these practices include a range of activities including student participation in extracurricular activities, news media literacy, simulations of democratic processes and procedures, and social emotional learning (Levine & Kawashima-Ginsberg, 2017). Taken together, these practices aim to build students' civic knowledge, civic skills, and civic dispositions (Vinnakota, 2019).

Table 1.1 Ten practices to support students' civic development

1	Classroom instruction on topics such as government, law, history, and democracy
2	Discussion of current events and controversial issues
3	Service-learning
4	Student participation in extracurricular activities
5	Student participation in school governance
6	Simulations of democratic processes and procedures
7	News media literacy
8	Action civics
9	Social and emotional learning
10	School climate

SOURCE: Reprinted from Levine & Kawashima-Ginsberg (2017).

The landscape of social studies coursetaking

High school social studies coursetaking is one critical pathway through which all or some of these activities are undertaken. Social studies instruction is typically relegated to subject-specific courses (e.g., history, economics, government), especially at the secondary level (Diliberti & Kaufman, 2022). Middle and high school students take multiple courses under the umbrella of social studies, each of which is focused on a specific discipline. By the end of their high school career, students will have taken courses in multiple different social studies disciplines, reflecting the multidisciplinary nature of the subject area. Students' coursetaking in specific social studies disciplines, then, is a rough proxy for their exposure to instruction in different topics that may be related to their civic development.

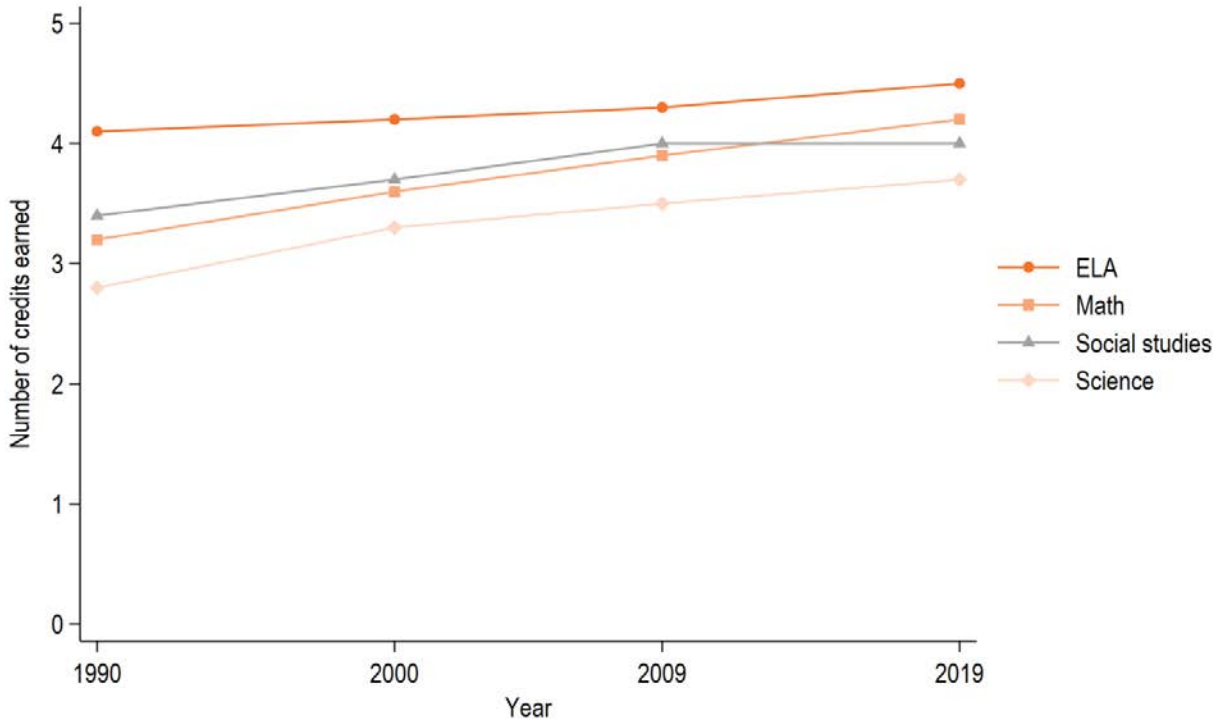
Periodic federal transcript studies have allowed federal statisticians and some researchers to document national patterns in students' high school social studies coursetaking. Federal studies have primarily focused on documenting enrollment trends in subject-specific social studies courses over time. A handful of researchers—motivated by concerns about the size and quality of their fields' pipelines—have conducted studies that dive deeper into high school coursetaking patterns in their respective disciplines. For example, Niemi & Smith (2001) and later Journell (2015), who were concerned about the pipeline of future political scientists, documented national patterns in students' enrollment in government and civics courses. Similarly, Walstad (2001) and Walstad & Rebeck (2012) documented national enrollment patterns in specific types of economics courses. Taken altogether, prior work using federal transcript studies has revealed a handful of insights about national patterns in students' social studies coursetaking.

In this section, I provide a broad overview of students' social studies coursetaking to lay the necessary foundation for subsequent analyses. I include in this section key findings from prior studies (mostly ones that used data from federal transcript studies) that have examined national patterns in students' social studies coursetaking. But since there are little prior data available specifically focused on social studies, I supplement pre-existing data with original results from

descriptive analyses I performed using the High School Longitudinal Study (HSLS:2009). These supplemental data, which I include in Appendix A, help to fill in gaps in our understanding of the national landscape of social studies coursetaking.

First, the average number of social studies credits earned among high school graduates increased from 3.4 credits in 1990 up to 4.0 credits in 2009 (AAAS, undated-b; NCES, 2021) (see also Figure 1.1). This means most students now take roughly one social studies course each year that they are in high school. But despite this growth, there is also an indication that students' coursetaking priorities may be changing. Back in 1990, students earned the greatest number of credits in English language arts (ELA), followed by social studies. By 2019, however, math had narrowly overtaken social studies as the core academic subject in which students earn the second greatest number of credits. High school graduates in 2019 earned 4.5 credits in ELA, 4.2 credits in math, and 4.0 credits in social studies. Nevertheless, students continue to earn more credits in social studies than they do in science.

Figure 1.1 Number of credits earned among high school graduates over time, by subject

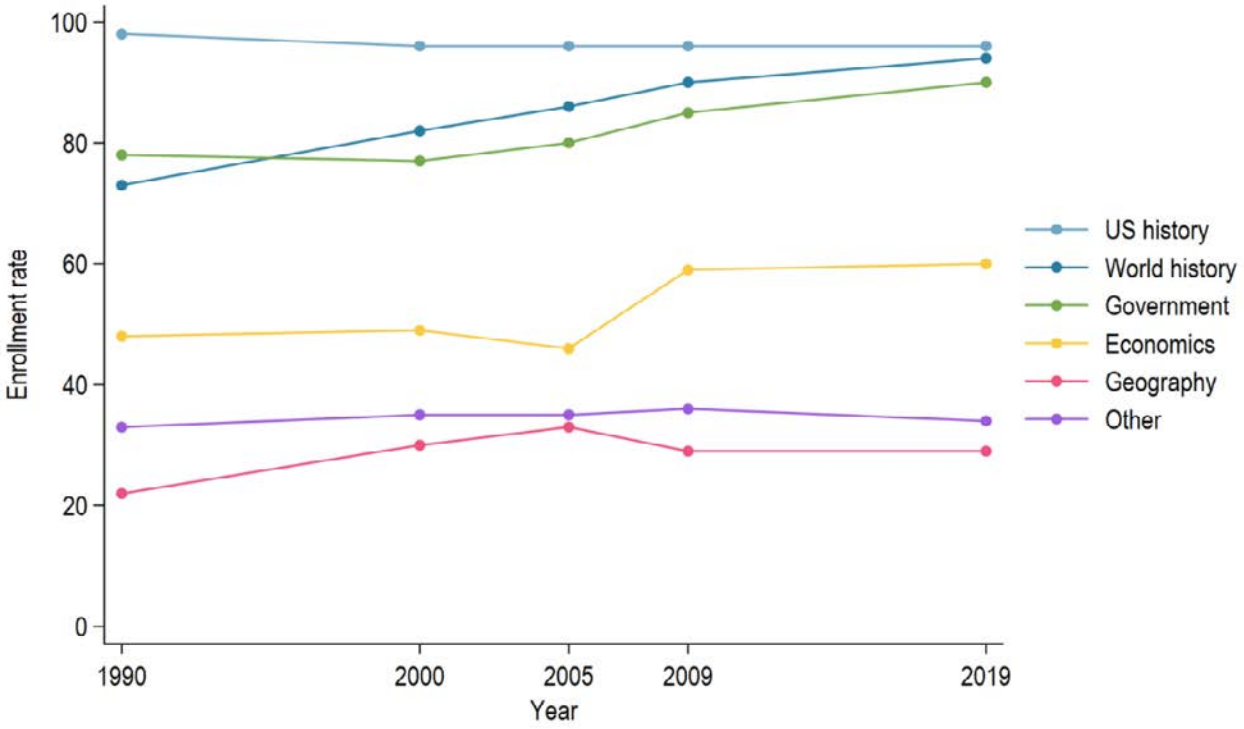


SOURCE: Data are from NCES (2022).

Second, periodic federal transcript studies have also provided some insights as to *how* students typically earn their social studies credits. More specifically, federal transcript data illuminate the specific disciplines in which students took courses to earn their credits. The most common disciplines in which students take courses while in high school are history, government (GV), economics (EC), geography (GE), psychology, and sociology. History courses are often

further categorized by their geographic focus such as state history (ST), U.S. history (US), or world history (WH) courses. Transcript studies have revealed that enrollment rates in courses across disciplines differ (NCES, undated-d). That is, enrollment rates in U.S. and world history courses are much closer to universal levels, while fewer students take economics, geography, and, to a lesser extent, government courses (AAAS, undated-b). As shown in Figure 1.2, 96 percent of high school graduates in 2019 took a U.S. history course, but only six in ten took an economics course and only three in ten took a geography course. Notably, about a third of students nationally take courses in "other" social studies disciplines like psychology or sociology. Data from periodic federal transcript studies have also revealed that enrollment rates in each social studies discipline have been remarkably stable over time. Despite modest growth in economics course enrollments between 2005 and 2009 and world history enrollments over the entire period, enrollment rates across social studies disciplines today are perhaps surprisingly similar to those back in 1990. Enrollment rates across disciplines are virtually unchanged over the last decade.

Figure 1.2 Enrollment rates in social studies courses over time, by discipline



SOURCE: Reprinted from American Academy of Arts & Sciences (AAAS, undated-b). "Other" includes psychology and sociology.

Data from federal transcript studies suggest that enrollment rates in most rigorous courses offered at the high school level such as Advanced Placement (AP) courses are higher for social studies than for the other core academic subject areas, notably math and science. Although

enrollment rates as well as the number of exams taken in AP math and science courses have grown over time (AAAS, undated-a; NCES, 2019), still participation in AP social studies outpaces participation in other subjects. In fact, over the last two decades, AP U.S. history and world history have consistently been the most common AP exams taken, with the sole exception of English language and literature (AAAS, undated-a). However, AP psychology saw the largest growth in terms of the number of exams taken over this period (AAAS, undated-a).

Third, transcript studies have also revealed disparities in social studies coursetaking by student subgroup (e.g., sex, race/ethnicity, family income), though perhaps not necessarily in the ways one might expect. Prior work has investigated disparities across student subgroups both in terms of the number of social studies credits earned and which courses were taken to earn these credits. For example, nationally, Asian students earn slightly more social studies credits on average than their counterparts belonging to other racial/ethnic subgroups: in 2013, Asian students earned 3.9 social studies credits on average, while White students earned 3.7 credits, Hispanic students earned 3.5 credits, and Black students earned 3.4 credits on average (de Brey et al., 2019). Meanwhile, prior work shows that AP enrollment gaps by sex are course specific (Johnson, 2018). As a general rule of thumb, however, limited data suggest there is a slight overrepresentation of women in AP social studies courses and that AP enrollments are becoming more female over time (Conger et al., 2009; Johnson, 2018).

Fourth, prior studies examining coursetaking patterns in specific social studies disciplines have identified school type and geographic location to be a driver of enrollment disparities. For example, Niemi & Smith (2001) found that enrollment rates in government courses among students in the West were some 15 percentage points higher than among students who attended high school in the Northeast. In their investigation into economics enrollments, Walstad & Rebeck (2012) identified similar patterns by region. Although not a primary focus of their analyses, these papers speculated that differences in state policy help to explain their results. For example, Walstad & Rebeck (2012) found that Hispanic students were particularly likely to have enrolled in economics courses—a pattern they hypothesized was because states like Texas and California (which have large Hispanic populations) required students to take this course.

Objectives for this research

The patterns revealed in these national descriptive analyses raise some obvious questions: Why are enrollment rates in some courses like world history and U.S. history so much higher than those in courses like geography and economics? To what extent do state and local policy choices shape these national enrollment patterns? Why are some students taking certain social studies courses while other students are taking different ones? Do students enroll in social studies courses arbitrarily or do they move through intentional course progressions? Where do the enrollment disparities across student subgroups originate? To what extent are students' college,

career, and civic outcomes shaped by their high school social studies coursetaking? Does it matter which students take which social studies courses?

This dissertation is a first attempt to answer some of these questions. In the following chapters, I present three essays intended to unpack the black box that is students' high school social studies coursetaking. As I describe in more detail below, I primarily rely on high school transcript data collected from thousands of students as part of the High School Longitudinal Study of 2009 (HSLS:2009). In Chapter 2, I investigate differences in students' high school social studies coursetaking by state, which helps answer the question of why enrollment rates in some courses like world history and U.S. history so much higher than those in courses like geography and economics. In Chapter 3, I investigate to what extent one prevalent policy mechanism (math tracking) influences students' social studies coursetaking. Together, Chapters 2 and 3 help to answer to what extent state and local policy choices explain national coursetaking patterns. Chapter 4 asks which aspects of students' high school social studies coursetaking matter for their subsequent civic outcomes. This analysis begins to address to what extent students' college, career, and civic outcomes are shaped by their high school social studies coursetaking. Chapter 5 concludes with some reflections on what these findings mean for policy and practice and offers some recommendations for future research on social studies coursetaking.

Chapter 2. Do states chart the course? The association between states' graduation requirements and social studies coursetaking

Abstract

Previous research—which has focused almost exclusively on math and science—has found mixed evidence about to what extent states' minimum graduation requirements in these subject areas have influenced students' coursetaking. It remains unclear to what extent social studies coursetaking varies by state and how much differences in state policy contribute to this variation. Using multilevel modeling with propensity score weighting and transcript data on over 13,000 students collected via the High School Longitudinal Study of 2009, I exploit variation in states' social studies-focused graduation requirements to examine the association between states' graduation requirements and students' social studies coursetaking. In descriptive analyses, I find that enrollment rates in some social studies courses vary widely across states; for example, enrollment rates in government and economics courses vary by some 20 and 80 percentage points, respectively. I find mixed evidence about to what extent states' graduation requirements are responsible for these differences in coursetaking across states. On the one hand, students across the United States take roughly the same number of social studies credits regardless of how many their state requires. Furthermore, students who attend high school in states where they are not required to take world or U.S. history courses are just as likely as students in states with these requirements to enroll in these courses. I also find no evidence that states' graduation requirements are associated with Advanced Placement (AP) course enrollments. On the other hand, removal of discipline-specific graduation requirements is associated with declines in economics and geography (and, to a lesser extent, government) course enrollments and increases in course enrollments in "other" social studies disciplines like psychology. The findings suggest that enrollment rates in government, economics, and geography courses will remain below universal levels in the absence of state mandates since, when given the freedom to choose, students tend to enroll in social studies courses in "other" disciplines instead. The findings raise questions about what social studies courses should be prioritized given the finite amount of time in the school day.

Introduction

In spring 2023, the U.S. Department of Education released results from the eighth grade National Assessment of Educational Progress (NAEP) U.S. history and civics assessments, the nation's premier assessments to monitor student achievement in these subject areas over time. Nationally, U.S. history assessment scores continued a previous pattern of decline and students'

scores on civics assessment declined for the first time ever (NCES, undated-b; NCES, undated-c). In a media interview, a federal official succinctly summarized one reason for the disappointing results: "Coursetaking matters" (Schwartz, 2023a). The official went on to state, "We're seeing that particularly for U.S. history…students who are taking these courses, wholly or in partial context…do better on these assessments" (ibid).

A vast body of literature generally supports the official's statement that high school coursetaking is associated with student outcomes. This body of work—which has mostly, but not exclusively, focused on math and science coursetaking—has shown that students who take both more and/or more rigorous courses while in high school are more likely to graduate high school, are better prepared for postsecondary education, and are more likely to enroll and persist (e.g., Attewell & Domina, 2008; Long et al., 2012; Morgan et al., 2018). Other studies have found that students' exposure to different types of courses while in high school is associated with their interest in pursuing different careers. This work has connected students' high school math and science (or STEM) coursetaking with an increased likelihood of selecting a college major in math and science and potentially a STEM occupation (e.g., Bohrnstedt et al., 2023; Federman, 2007; Gottfried & Bozick, 2016; Jewett & Chen, 2022; Miller et al., 2019; Trusty, 2002).

Although comparatively little attention has been dedicated to unpacking relationships between students' high school coursetaking in social studies and students' college, career, and civic outcomes, there have been a few isolated studies. In a similar vein to his STEM-focused counterparts, Ahlstrom (2021) found that students who took an AP Economics course in high school were more likely to major in economics in college. In an earlier work, Smith & Niemi (2001) found that taking a government course was positively associated with achievement in the subject area. Taking a civics course while in high school has also been shown to be positively associated with students' likelihood to vote, a rough proxy for civic engagement (Bachner, 2010; Siegel-Stechler, 2019).

Taken all together, these studies suggest that students' high school coursetaking—including in social studies—is correlated with both their achievement and their longer-term outcomes. The problem, however, is that students' time while in high school is finite. Although students can theoretically benefit from taking many courses, limited time during the school day means that students will be able to enroll in some courses but will not have an opportunity to take others. The obvious solution to this problem, then, is to identify which courses comprise the "optimal" set that students should take while in high school to maximize their college, career, and civic outcomes and then ensure that students take these courses.

States have effectively addressed this problem through state policy. That is, they have enacted a set of minimum course requirements that students must complete to graduate high school in that state. These requirements correspond to the courses that each state has deemed as "necessary" for students' long-term outcomes. Importantly, states have made very different decisions when it comes to "necessary" social studies courses. States' requirements differ in terms of the total number of social studies courses, or credits, that students are required to

complete and in which disciplines, if any, students are required to complete these credits (Education Commission of the States [ECS], 2023; Chattin & Hackmann, 2013).

Although states' minimum graduation requirements are intended to ensure that all students take "necessary" coursework—however the state has defined it—these requirements are not without tradeoffs. Because students' time in high school is finite, any coursetaking requirements dictated by states effectively constrain students' freedom to select their own courses, including in social studies. States recognize this inherent tension between mandating the coursework that they have deemed "necessary" for students' long-term success and allowing students the freedom to choose their own courses and have addressed it differently: some states offer students a high degree of choice in selecting their own courses, while others fully prescribe the specific courses that students must take to graduate.

Although it is clear that states have defined "necessary" social studies coursework differently and offer students varying degrees of choice to select their own coursework, it is not clear whether these policy differences actually matter for students' coursetaking. That is, it is unclear whether students' social studies coursetaking in the states without robust requirements looks any different than in the states in which this choice set is heavily or completely constrained. While one might hypothesize that social studies course enrollments are higher and disparities across student subgroups are smaller in the states that have more robust social studies graduation requirements, we do not actually know if this is actually the case. If social studies enrollment rates look similar across states regardless of the graduation requirements in place, this could be an indication that local policy—things like course offerings, course requirements at the school level, or district-set gatekeeping policies around specific courses—shapes students' coursetaking in this subject area to a greater degree than state policy. Or it could be an indication that students perceive the same courses to be fun, interesting, or "necessary" for their future outcomes and enroll in them even if they are not formally required to do so.

On the other hand, if states make different decisions about what social studies courses to require and if these requirements strongly predict students' course enrollments, this means that coursetaking patterns will look very different from state to state. Any disparities in social studies course enrollments across states raise concerns about whether students across the United States are receiving equitable opportunities to learn in this subject area. This concern is especially relevant if some student subgroups are disproportionately concentrated in states with relatively worse course enrollments and if students' social studies coursetaking is associated with their college, career, and civic outcomes.

Current study

This paper examines one possible explanation for the national patterns described in Chapter 1: states' minimum graduation requirements. In this exploratory study, I examine differences in students' high school social studies coursetaking by state. To do so, I rely on transcript data

collected in 2013 from roughly 13,450 students through the High School Longitudinal Study of 2009 (HSLS:2009). I first use these transcript data to descriptively investigate coursetaking across states, focusing on the ten states for which HSLS:2009 includes state oversamples. I then exploit variation in states' social studies graduation requirements as they applied to the class of 2013 to explore associations between state policy and students' social studies coursetaking. Beginning with the set of states that fully prescribe students' social studies coursetaking through robust graduation requirements, I remove these requirements one by one. I then compare social studies course enrollments in states with and without specific graduation requirements to determine the association between specific graduation requirements and students' coursetaking. I investigate multiple aspects of students' high school social studies coursetaking, including how many social studies credits students earn, in what specific disciplines, and how rigorous the courses taken are. I examine the following research questions:

(1) What share of high school students enrolled in various social studies courses by state?
(2) To what extent are states' social studies-focused graduation requirements associated with students' social studies coursetaking (including the number of credits earned, the share of credits earned, and the specific courses in which students enroll)?
(3) How do any course enrollment disparities across student subgroups (i.e., student race/ethnicity, family socioeconomic status) compare in states with and without specific graduation requirements?

To the author's knowledge, this is both the first analysis to document state-by-state patterns in social studies course enrollments and the first analysis to investigate what role state policy plays in shaping these enrollments. To preview my results, I find that enrollment rates in U.S. and world history courses are generally high across states, but enrollment rates vary widely for government courses, economics courses, geography courses, and courses taken in "other" social studies disciplines like psychology. I also find evidence that differences in states' social studies-focused graduation requirements help explain some of these enrollment disparities. Although students in the class of 2013 took similar numbers of social studies credits overall, the specific disciplines in which students earned these credits depended upon the state in which they attended high school. States that had a more robust set of graduation requirements (that is, states that had multiple discipline-specific requirements) consistently had higher course enrollments in government, economics, and geography courses. In contrast, states with fewer discipline-specific graduation requirements had lower enrollments in these disciplines, but higher enrollments in courses in "other" disciplines.

Focusing on the most rigorous AP/IB courses, I find preliminary evidence of larger enrollment disparities by student racial/ethnic subgroups in the states with more robust requirements. That is, those states that fully prescribed students' coursetaking patterns had wider enrollment disparities by student/ethnicity than states that placed no restrictions on students' social studies coursetaking. I conclude that while state-mandated graduation requirements seem to be an effective mechanism to boost social studies course enrollments in disciplines like

government, economics, and geography, there may be some unintended consequences in terms of widening disparities in AP course enrollments.

The revealed differences in coursetaking patterns across states for the class of 2013 raise questions about to what extent the shared (or rather unshared) experiences of young adults explain any differences in how they engage in civic and community life today. They also raise questions about what social studies courses should be prioritized given the finite amount of time in the school day.

Background

Why state might be a key driver of social studies course enrollments

There are potentially multiple state-level policy mechanisms shaping students' high school social studies coursetaking. For one, because each state sets its own academic standards for social studies, states vary significantly in terms of what social studies content gets covered and at what grade levels (e.g., American Institutes for Research, 2023; Godsay, 2012; Hansen et al., 2018; Stern et al., 2021; Zadrozny, 2020). Secondly, some states assess students in social studies at some point (or points) in middle or high school, while others do not. States' assessment policies differ across several dimensions including the types of assessment (e.g., summative, citizenship exam, end-of-course), content coverage, grades administered, and whether passage is required to graduate (e.g., ECS, 2018; Godsay, 2012; Railey & Brennan, 2016). These differences in states' academic standards and assessments may in turn shape which courses local school systems within these states offer and how they structure their social studies course sequences to align with these standards and assessments.

However, the state-level policy that perhaps has the strongest theoretical relationship to the courses that students take while in high school is states' minimum requirements for high school graduation. States' minimum graduation requirements specify the number of courses, if any, that students must successfully complete to graduate high school in that state. States can specify the academic subjects (e.g., math, science, social studies) in which students must complete these courses and, within each academic subject area, states can specify the specific disciplines (e.g., algebra, chemistry, world history) in which these courses must be completed. States' minimum graduation requirements are effectively constraints that states place on students' choice of courses in which to enroll. Thus, states' graduation requirement policies likely have a strong theoretical relationship to students' actual coursetaking while in high school.

Overview of states' social studies-focused graduation requirements

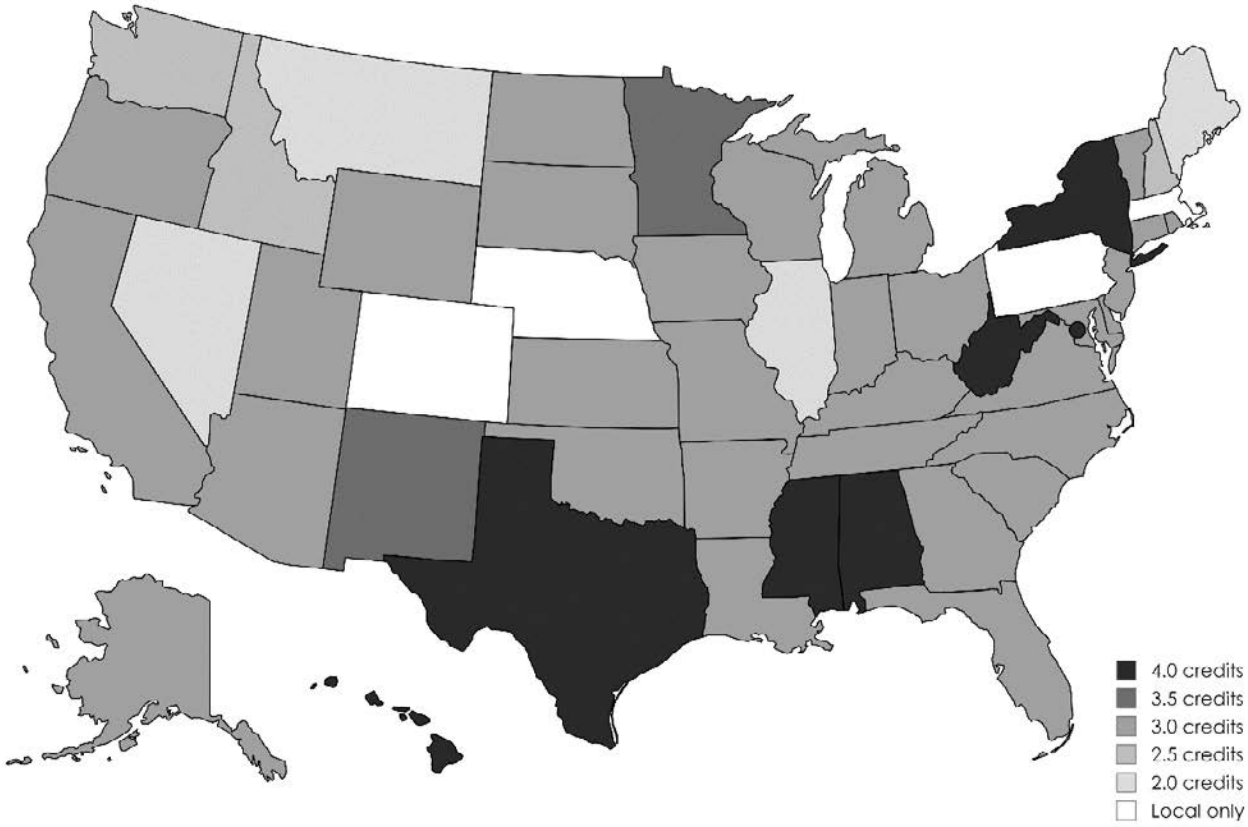
The 1983 *A Nation at Risk* report—which documented the need to increase the rigor of the U.S. education system to produce a highly-skilled workforce that could compete in an increasingly global economy (Gardner et al., 1983)—combined with poor student performance

on international assessments spurred a wave of reforms, including to states' graduation requirements. Most states raised their graduation requirements between the early 1990s and the 2010s, some multiple times (Heller, 2023). Although social studies requirements were not the focus of these reforms, requirements in this subject often got raised along with requirements in other core academic subjects (e.g., Chattin & Hackmann, 2013; Wilson et al., 2019). Importantly, states made different decisions about how many courses to require, in which academic and elective subjects, and in which disciplines. States' choices with respect to their graduation requirements likely reflect differing values, differing concerns about how increased requirements raises the potential for heightened dropouts, and differing labor force needs.

Multiple data sources have documented states' social studies-focused graduation requirements over the last two decades, including the total number of social studies credits required and in which disciplines, if any, these credits must be earned (i.e., Achieve, 2015a; Chattin & Hackmann, 2013; Godsay et al., 2012; Dounay, 2006; Education Commission of the States, 2007; McClure & Zadrozny, 2015; NCES, 2010, 2011, 2012, 2014, 2018; Zadrozny, 2017). Importantly, some states offer different types of high school diplomas (e.g., advanced diplomas, career/technical diplomas), and these diplomas sometimes have different course requirements than the standard high school diploma. Because the focus of this paper is on students who graduated high school in 2013, I focus this discussion on states' graduation requirements as they applied to this graduating class. To the authors' knowledge, there is no single data source that contains data on graduation requirements specifically for the class of 2013. Therefore, I used multiple data sources (i.e., Achieve, 2015a; Chattin & Hackmann, 2013; Godsay et al., 2012; Dounay, 2006; Education Commission of the States, 2007; McClure & Zadrozny, 2015; NCES, 2010, 2011, 2012, 2014, 2018; Zadrozny, 2017) and state department of education websites to triangulate and validate what graduation requirements were in place for class of 2013 graduates. From these sources, I obtained data on multiple dimensions of states' graduation requirements, focusing on the minimum requirements needed to earn a standard high school diploma in each state. A complete dataset of social studies-focused graduation requirements as they applied to the class of 2013 is available in Table B.1.

Below, however, I briefly summarize how states' social studies graduation requirements differed for the class of 2013 as this is necessary context to understand the analytic strategy employed in this paper. As shown in Figure 2.1, the number of required social studies credits ranged from 0 credits to 4 credits across the 50 states and the District of Columbia. Four states (Colorado, Massachusetts, Nebraska, and Pennsylvania) had no (or virtually no) state mandated graduation requirements, including in social studies; decisions about graduation requirements in these four states were entirely left to local school systems to decide. Meanwhile, Montana and Maine required students to earn only two social studies credits to graduate while states like Alabama, New York, and Texas required four. Most states, however, required students to earn three credits in social studies to graduate high school.

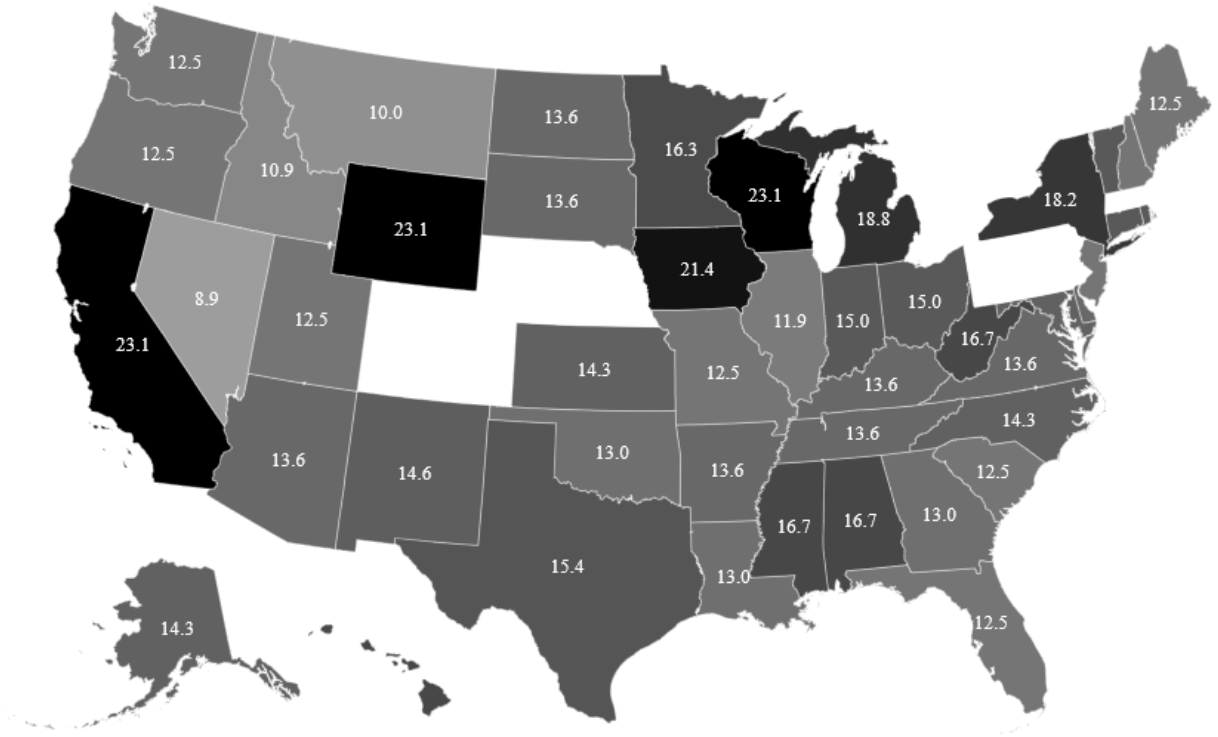
Figure 2.1 Number of social studies credits required by state for the class of 2013



SOURCES: Data on state requirements for the class of 2013 are from various sources (e.g., Achieve, 2015a; Chattin & Hackmann, 2013; Godsay et al., 2012; Dounay, 2006; Education Commission of the States, 2007; McClure & Zadrozny, 2015; NCES, 2010, 2011, 2012, 2014, 2018; Zadrozny, 2017) and state department of education websites.

Although states differed in terms of the total number of social studies credits they required students to complete for graduation, the number of required social studies credits was similarly scaled across states relative to the total number of required credits (see Figure 2.2). That is, states generally agreed that about one-sixth to one-quarter of students' total high school credits should be devoted to social studies. More specifically, the share of total credits that states mandated should be spent on social studies ranged from 9 percent in Nevada up to 23 percent in Wisconsin (see Figure 2.2). About three-fifths of states, however, mandated that students spend between 12 and 15 percent of their total credits on social studies.

Figure 2.2 Share of total credits focused on social studies for the class of 2013

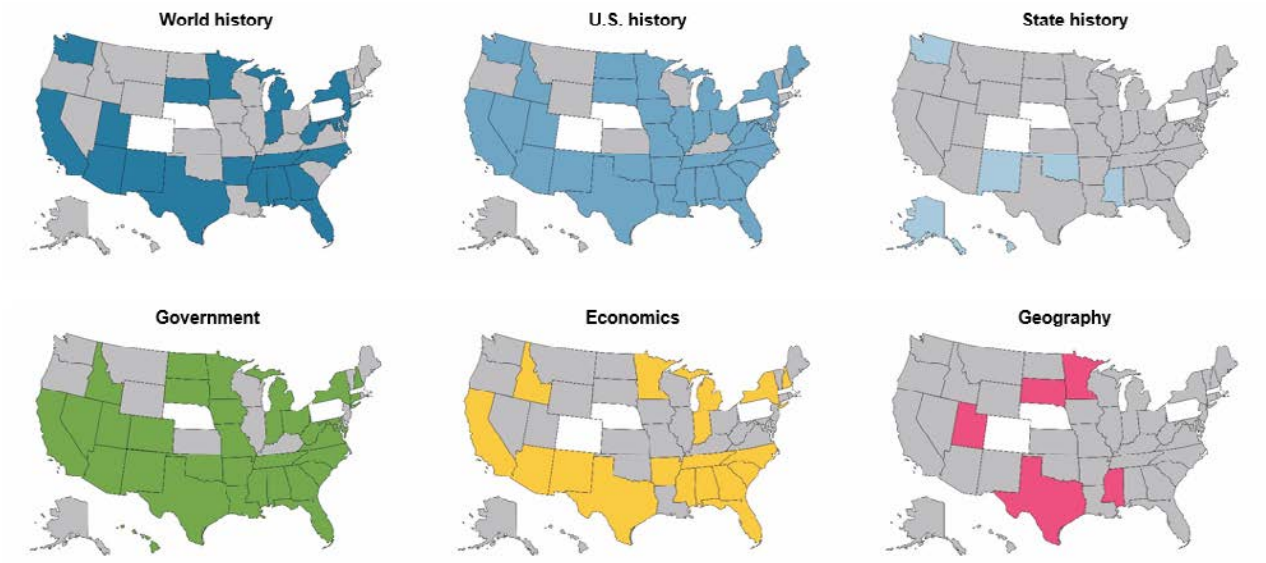


NOTE: Colorado, Massachusetts, Nebraska, and Pennsylvania (shown in white) had no (or virtually no) state mandated graduation requirements, including in social studies.
SOURCES: Data on state requirements for the class of 2013 are from various sources (e.g., Achieve, 2015a; Chattin & Hackmann, 2013; Godsay et al., 2012; Dounay, 2006; Education Commission of the States, 2007; McClure & Zadrozny, 2015; NCES, 2010, 2011, 2012, 2014, 2018; Zadrozny, 2017) and state department of education websites.

Beyond the total number of social studies credits required, states also differed in terms of their discipline-specific social studies course requirements (see Figure 2.3). For the class of 2013, 35 states required coursetaking in U.S. history, 34 states required coursetaking in government, 22 states required coursetaking in world history, 18 states required coursetaking in economics, 7 states required coursetaking in state history, and 5 states required coursetaking in geography.[2]

[2] Even though states may have had requirements in the same discipline, they did not always require the same number of Carnegie credits in this discipline. For example, the District of Columbia, New Mexico, and South Dakota all require students to take a course in world history to graduate, but this discipline requirement differed in Carnegie units (2 credits, 1 credit, and 0.5 credits, respectively) (see Table B.1).

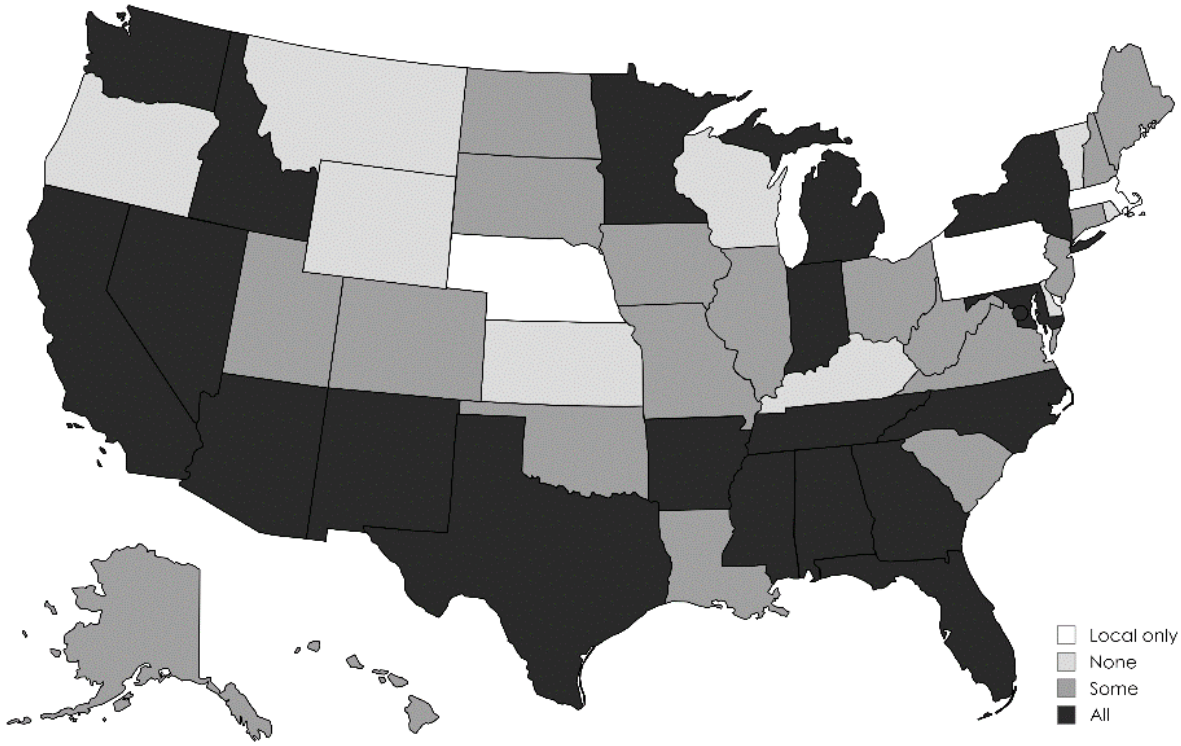
Figure 2.3 States' coursetaking requirements for the class of 2013, by social studies discipline



NOTE: Colored shading indicates that the state had a discipline-specific graduation requirement in place for the class of 2013. Colorado, Massachusetts, Nebraska, and Pennsylvania (shown in white) had no (or virtually no) state mandated graduation requirements, including in social studies.
SOURCES: Data on state requirements for the class of 2013 are from various sources (e.g., Achieve, 2015a; Chattin & Hackmann, 2013; Godsay et al., 2012; Dounay, 2006; Education Commission of the States, 2007; McClure & Zadrozny, 2015; NCES, 2010, 2011, 2012, 2014, 2018; Zadrozny, 2017) and state department of education websites.

Furthermore, states differed in terms of the share of social studies credits that they prescribed for their students in these disciplines (see Figure 2.4). At one end of the continuum are states like California, Florida, Georgia, and Texas, which not only required students to take courses in multiple social studies disciplines, but fully specified the disciplines in which students must earn their social studies credits. Somewhere in the middle are states like Connecticut, Illinois, and Maine, which placed some constraints on the disciplines in which social studies credits must be earned but did not fully prescribe students' coursetaking. Said another way, these states offered students some degree of choice in determining the disciplines in which they earn their social studies credits. Still other states like Delaware, Kansas, and Montana placed no restrictions on the disciplines in which students must earn their social studies credits.

Figure 2.4 Share of required social studies credits allocated across disciplines by state for the class of 2013



SOURCES: Data on state requirements for the class of 2013 are from various sources (e.g., Achieve, 2015a; Chattin & Hackmann, 2013; Godsay et al., 2012; Dounay, 2006; Education Commission of the States, 2007; McClure & Zadrozny, 2015; NCES, 2010, 2011, 2012, 2014, 2018; Zadrozny, 2017) and state department of education websites.

Graduation requirements and coursetaking: What we know from math and science

Previous research has investigated to what extent heightened graduation requirements are responsible for the rise in the average number of Carnegie units[3] earned by public high school graduates nationally between the 1980s and today (NCES, 2021). This body of work—which has almost exclusively mostly focused on math and to a lesser extent science coursetaking—provides mixed evidence about to what extent states' policies have shaped coursetaking. It is very clear the *number* of credits earned by high school graduates increased over this period (NCES, 2021). But it is less clear to what extent more rigorous graduation requirements have directly influenced this rise in coursetaking.

Some evidence suggests that graduation requirements positively influenced course enrollments and the number of credits earned. For example, Federman (2007) reviewed the math and science coursetaking patterns of high school graduates between 1982 and 1992 and found a positive association between these patterns and states' graduation requirements. Schiller &

[3] A Carnegie unit is a standardized of measurement of enrollment for secondary education that adjusts for variation in course length stemming from differences in the structure of schools' calendars. One Carnegie unit is equivalent to the completion of a course that meets one period per day for one school year, where a period is typically at least 40 minutes.

Muller (2003) observed enrollment patterns of students in the early 1990s and found that states' graduation requirements (especially when combined with accountability policies) in math were associated with small but statistically significant differences in math coursetaking, both in terms of the number and type of courses taken. They also found that although Black students in states with more stringent requirements entered their freshman year in lower-level math courses on average than their White counterparts, Black students overcame this initial disparity by the end of high school. Similarly, Goodman (2009) also tracked enrollment patterns of students in the late 1980s and early 1990s and concluded that graduation requirements increased math coursetaking among Black students (especially Black males) but had a weaker effect on the coursetaking of White students.

Other studies have been more skeptical about the extent to which graduation requirements have actually influenced students' coursetaking. For example, Buddin & Croft (2014) observed increases in math and science course enrollments between 2005 and 2013 regardless of to which graduation requirement students were subject. Graduation requirements could have little to no association with enrollments for different reasons. A null relationship between requirements and coursetaking could be because there are other factors at play that shaped enrollment increases both in states with and without more robust requirements. For example, though they observed increases, Clune & White (1992) found weak evidence to support graduation requirements as the sole *cause* of the observed increases. As they point out, the increases they observed sometimes predated states' policy changes, and there are other factors at play—things like district/school requirements and state university entrance requirements—that may have contributed to coursetaking increases. States also put other policies in place around the same time that they were increasing their graduation requirements (things like state Advanced Placement incentive programs, accountability policies) that could have shifted course enrollments and diluted the impact heightened graduation requirements by raising course enrollments across the board (Holstead et al., 2010). Local school systems can also add requirements above and beyond state minimums. Thus, in states with minimal state requirements, local school systems may be picking up the slack and adding requirements, potentially raising course enrollments to be more on par with those in states that do have requirements.

There are also other explanations for why graduation requirements may not influence coursetaking to the degree we might expect. For example, it could also be that few students have the potential to be influenced by graduation requirements because they are already exceeding the minimum amount of required coursework. In their analysis looking at enrollment patterns in 1990, Chaney et al. (1997) found that majorities of students were potentially in this position: 64 percent of students took more than the minimum amount of math required to graduate and 56 percent of students took more than the required science courses to graduate (ibid). There may also be implementation problems or weak enforcement in those states that have requirements in place. And there is some evidence to suspect that these may be problems to some degree. For example, both Carlson & Planty (2011) and Teitelbaum (2003) found that a notable share of

students (about one in ten) graduated high school without meeting all requirements set in policy, raising questions about states' commitment or ability to enforce their own policies.

Assuming graduation requirements do have some ability to influence students' high school coursetaking, this influence might not extend to all courses. For example, in their examination of a district-level policy change requiring students to complete three years of college-preparatory coursework in science, Montgomery et al., (2010) found that science coursetaking increased in the early 2000s among Chicago Public Schools graduates. And although there were some gains in completion of biology and chemistry courses, enrollment rates in the most advanced science courses were unchanged after the policy change while enrollments in earth/environment science courses—the science course associated with the lowest college-going rate—shot up dramatically (Montgomery et al., 2010). In fact, heightened graduation requirements might even have the unintended consequence of increasing enrollment disparities across student subgroups, especially in the most advanced or rigorous courses. Teitelbaum (2003) found that more stringent graduation requirements were linked to increases in the number of math and science credits earned among 1992 high school graduates, but that only some students took more advanced courses because of the policy change. Domina & Saldana (2012) confirm large increases in credits earned across academic subjects between 1982 and 2004; however, although they observed decreased disparities in lower-level math course enrollments like algebra I and geometry, they observed persistent disparities among higher-level math course enrollments like calculus.

Why social studies might be different from math and science

Social studies coursetaking differs from math and science in important ways, meaning it is plausible the relationship between states' minimum graduation requirements and coursetaking looks different too. Said another way, states' graduation requirements may affect students' social studies coursetaking differently than their coursetaking in other subjects like math, science, or English language arts (ELA). There are a few reasons to hypothesize that the relationship between state policy and coursetaking looks different for social studies than it does for other subjects, especially math: (1) differing degrees to which course pathways are structured; (2) greater variation across states in graduation requirements; and (3) students' differing proclivity to take nonrequired courses for whatever reason. I briefly discuss each of these reasons in turn.

First, there are differences in how coursetaking in each academic subject is structured. Like social studies, secondary math and science courses also tend to be organized by discipline (e.g., algebra, geometry, calculus, biology, chemistry). However, math coursetaking in particular tends to be ordinal in a way that social studies coursetaking is not. Although it is by no means the only course progression, students tend to pass linearly through a well-defined math sequence that begins with algebra I and culminates with algebra II, pre-calculus, or calculus (e.g., Brown et al., 2018; Han et al., 2023). Science coursetaking also tends to follow a handful of well-defined pathways (i.e., biology, chemistry, physics) (Brown et al., 2018)—perhaps to a lesser extent than

math, but almost certainly to a greater extent than social studies. In contrast, social studies course pathways are much less developed. Students do not necessarily move along pre-defined pathways from lower-level courses to higher-level ones, at least not nearly to the same extent that they do in other subject areas. Instead, students might have more freedom to enroll directly in higher-level social studies courses.

In math, one might expect adding a requirement to take algebra II might have the spillover effect of increasing enrollment (and completion) of algebra I and geometry if students must pass through these courses to enroll in algebra II. In social studies, by contrast, different disciplines may be competing for course enrollments since enrollments may not necessarily be order dependent; that is, requiring a student to take an economics course may prevent them from taking a geography course. Furthermore, graduation requirements may be differentially associated with AP course enrollments in social studies than in math because in social studies students do not have to work their way up to the highest-level courses by progressing through lower-level ones. Said another way, substituting a higher-level course for a lower-level course in the same discipline is likely much more feasible in social studies than in math. For example, adding a state requirement to take an economics course might directly influence AP economics course enrollments; students may think because they are required to take an economics course now, they might as well take one at a higher-level for whatever reason.

Second, the difference in degree of freedom that students have across states to choose courses might vary more for social studies than for other academic subjects. States certainly impose more constraints on students' social studies coursetaking than on their science coursetaking (Chattin & Hackmann, 2013). The degree of freedom in social studies relative to math is more difficult to unpack. In math, 17 states place no discipline-specific math requirements on their students (Achieve, 2015b; Chattin & Hackmann, 2013). Meanwhile, no state requires students to take beyond algebra II to graduate; states may require that students take a math course all four years of high school, but no states fully prescribe all four years of math coursetaking (Achieve, 2015b; Chattin & Hackmann, 2013). In contrast, only nine states place no discipline-specific constraints on students' social studies coursetaking and a third of states fully prescribe the disciplines in which these credits must be earned (see Table B.1). Because states' social studies course requirements potentially diverge to a greater degree than their math requirements, this means that there is potentially greater divergence in coursetaking across states for social studies than for math.

Third, students' propensity to take nonrequired courses in social studies may be different than their propensity to do in math or science. Students might be more or less interested in social studies than in math or they might perceive nonrequired social studies courses to be relatively more or less important, given their postsecondary, career, and or life plans. And there is some reason to suspect that students' propensity to take nonrequired courses is lower for social studies courses than for math courses. For example, surveys of 8th graders who took NAEP assessments in social studies topics in recent years revealed that minorities of students perceived learning

about topics like civics, U.S. history, geography to be important for their future (NCES, undated-g). Students may be especially reluctant to take nonrequired social studies courses if they are not interested in these courses and they do not perceive them to be critical for their life outside of high school.

Methodology

Data source

In this exploratory study, I examine the following three research questions: (1) What share of high school students enrolled in various social studies courses by state? (2) To what extent are states' social studies-focused graduation requirements associated with students' social studies coursetaking? and (3) How do any course enrollment disparities across student subgroups compare in states with and without specific graduation requirements? To answer these questions, I use restricted data from the High School Longitudinal Study of 2009 (HSLS:2009) conducted by the National Center for Education Statistics (NCES). In 2009 (the base year), NCES began tracking a single cohort of roughly 23,000 ninth graders or class of 2013 graduates. NCES followed this cohort of students through the rest of their high school career and into postsecondary education and the labor market. NCES used a two-stage, probability-based sampling design to identify students to participate in this longitudinal study. Federal statisticians first randomly sampled roughly 1,000 public and private high schools across the United States conditional on a set of school characteristics (e.g., control, locale) and geographic region. Using rosters of ninth grade students collected from those schools that agreed to participate, NCES subsequently sampled students (about 28 students per school on average). Furthermore, federal statisticians oversampled public schools and, subsequently, public school students in 10 states (California, Florida, Georgia, Michigan, North Carolina, Ohio, Pennsylvania, Tennessee, Texas, and Washington). With this sampling approach, HSLS:2009 can be used to produce estimates that are representative of the national population of high school students in 2013 as well as to produce state-level estimates in these 10 states. For more information about HSLS:2009's sampling scheme, see Ingels et al., 2011 and Ingels et al., 2015.

I primarily rely on students' high school transcripts, which were collected in the summer of 2013 after the vast majority of 2009 ninth graders had graduated. NCES attempted to collect transcript information both from students who remained in the base year school as well as from those students who moved schools at some point during their high school career. In total, NCES obtained complete transcript information for roughly 80 percent of the 23,000 ninth graders sampled in the base year. Thus, transcript data cover the entirety of students' high school careers, beginning with the 2009–2010 school year (when students were in grade 9) and ending with the 2012–2013 school year (when students who made standard grade progressions were in grade 12). Students' transcripts include information on course titles, course grades, course levels (e.g.,

regular, honors, AP) as well as the number of Carnegie credits attempted and earned for each course. For more information about how HSLS:2009 transcript data were collected and processed, see Ingels et al., 2015.

To address the problem of wide-ranging course titles, NCES relied on the School Courses for the Exchange of Data (SCED) classification system to identify comparable courses (National Forum on Education Statistics, undated). I focus on the subset of courses that SCED classifies as social studies. In total, SCED identifies 115 different types of social studies courses ranging from things like "Early U.S. History" to "Modern U.S. History" to "Ancient Civilizations," to "Civics" to "AP Microeconomics." To facilitate analyses, I sort these 115 types of social studies courses into seven bins: world history (WH), U.S. history (US), state history (ST), government (GV), economics (EC), geography (GE), and other (OT). For example, I group courses categorized by SCED as "Political Science," "Comparative Government," "AP Government," "Civics," or "Law" to be government courses. The first six bins correspond to the social studies disciplines in which states make graduation requirements. The "other" bin includes miscellaneous courses in social science or humanities disciplines like psychology, sociology, and anthropology.

In addition to students' transcripts, I also rely on several other pieces of information collected in HSLS:2009 through student, parent, and principal surveys administered at various points while students were in high school. Student demographic data (e.g., gender, race/ethnicity, family socioeconomic status) were collected via student and parent surveys in 2009, with preference given to data self-reported by students. Students were also surveyed in 2009 about their favorite and least favorite subjects, a rough proxy for students' interest in social studies courses. School demographic data (e.g., control, locale, enrollment size) were collected from principal surveys and were supplemented with data from federal administrative data systems. Data on schools' course offerings are from schools' course catalogs which were collected from participating schools during students' junior year.

I defined a set of inclusion criteria to determine which HSLS:2009 students to retain in an analytic sample. I restrict my sample to only include those students who made standard grade progressions and who graduated on time with a high school diploma (or equivalent) in 2013. I also exclude students for whom complete transcript information is unavailable. I make these two restrictions to ensure that I have data that consistently cover students' high school careers. I also exclude a small share of students who are missing complete demographic information. Furthermore, I only retain students who remain in their same base year school (and therefore also remain in the same state) for the entirety of their high school career. This restriction is to ensure that students are subject to the same set of graduation requirements throughout their high school career as I discuss in more detail below. After making these restrictions, I am left with data on 13,450 students distributed across the United States.

Analytic strategy

Research question 1

To answer my first research question ("What share of high school students enrolled in various social studies courses by state?"), I descriptively investigate enrollment patterns in various social studies courses by state. I focus on the 10 states for which HSLS:2009 has state oversamples (that is, California, Florida, Georgia, Michigan, North Carolina, Ohio, Pennsylvania, Tennessee, Texas, and Washington), although I include national averages as a reference point. I use these 10 states—which represent a diversity of policy environments—as illustrative examples of differences in social studies course enrollments across states. I focus on three measures of coursetaking in these cross-tabulations:

(1) *Total number of Carnegie credits earned in social studies*. This a continuous variable that ranges from 0 to 12. This variable captures the number of social studies courses that students enroll in while in high school scaled by the length of time they spend in these courses. I distinguish between the number of credits earned in any social studies courses and those credits earned in Advanced Placement/International Baccalaureate (AP/IB) courses.[4]

(2) *Ever enrollment.* These are dummy variables that equal 1 if a student ever enrolled in a specific social studies course while in high school, and 0 if not. I use dummy variables to capture enrollment in courses of a specific discipline (i.e., world history, U.S. history, state history, government, economics, geography, and "other"). I also distinguish between enrollment in a course of any level versus a course taken at the AP level.

(3) *Share of Carnegie credits earned.* These are continuous variables that range from 0 to 37.5 and are scaled by the total number of credits that students earn while in high school. I create separate variables to capture social studies coursetaking overall and by discipline.

In these descriptive analyses, I apply survey weights so that my results can be interpreted as representative of the national population of high school students in 2013. There are many HSLS:2009-provided survey weights to choose among. Because my descriptive results only rely on student transcript data, I use W3HSTRANS as my survey weight.

Research question 2

The goal of this research question is to investigate the association between states' social studies-focused graduation requirements (the independent variable of interest) and students' high school social studies coursetaking (the outcome). The high degree of variation in states' graduation requirements allows for the possibility that this variation can be exploited as sort of a natural experiment (see Figures 2.1 through 2.3). Said another way, because states have different graduation requirements, we can theoretically compare students' coursetaking patterns across

[4] I include enrollment in IB courses in these variables. However, the vast majority of students are enrolled in AP courses and not IB courses. Therefore, I refer to these as AP course enrollments for brevity throughout this document.

states with different requirements to determine the association between requirements and coursetaking.

To do so, I need to overcome three problems. The first problem is that states' social studies-focused graduation requirements have multiple dimensions such as the number of social studies credits required overall and in specific disciplines. Complicating the matter is the fact that these dimensions are somewhat interrelated (for example, a state might add a requirement to take a one-unit government course and increase the total number of required social studies credits from two to three accordingly). The multidimensionality of states' graduation requirements makes it difficult to theoretically isolate the effect of a single requirement on coursetaking.

The second problem is that students are not *randomly* sorted across states. That is, the student populations in the states that have enacted certain graduation requirements look different than the student populations in states that have enacted different requirements. Any systematic sorting of students across states (and therefore across exposure to various graduation requirements) limits my ability to observe the relationship between graduation requirements and their impact on students' social studies coursetaking. If there is systematic sorting of students across states, it will be difficult to determine whether any differences observed in students' coursetaking patterns are due to differing graduation requirements or simply due to differences in the populations of students in those states and their motivation to take certain social studies courses. For example, higher income students are probably more likely than their counterparts to enroll in both more and more rigorous social studies courses. If these students are disproportionately concentrated in certain states (such as states that require government courses), it will be difficult to tease out whether any observed differences in government courses across states is due to differences in graduation requirements or differences in students' preferences about coursetaking. In summary, the observational nature of the data collection raises clear concerns about selection bias.

The third—though somewhat related—problem is that students are not *evenly* distributed across states and that some graduation requirements are much more popular than others (see Figures 2.1 through 2.3). This means that students—both nationally and in my analytic sample—are not evenly distributed across state policy conditions. As shown in Table B.2, most students (about two-thirds) attended high school in a state where they were required to take 3 or 3.5 credits in social studies to graduate. Looking at discipline-specific graduation requirements, 79 percent of students attended high school in a state that required them to take U.S. history to graduate, 76 percent were in a state that required a government course, 61 percent were in a state that required a world history course, and 57 percent were in a state that required an economics course. Only a small minority of students were in a state that required them to take a geography course while in high school or a course on state history. The uneven distribution of students across policy conditions raises sample size considerations. Any considerations about the uneven distribution of students across policy conditions are compounded by two other factors specific to my dataset: (1) HSLS:2009 used a clustered sampling approach, meaning that students are nested within schools, and (2) use of state oversamples means that the distribution of students across

states (and therefore policy conditions) in my analytic sample is not directly related to the actual distribution of students across states in the population.

In the following sections, I outline my analytic strategy to answer research question two and discuss how my analytic choices overcome these problems.

Identification of state policy comparison groups

To examine associations between states' social studies-focused graduation requirements and course enrollments, I must define a series of comparison groups that sort states into mutually exclusive categories based on the similarity of their graduation requirements. One can think of these categories as analogous to defining various "treatments." It is not immediately obvious how to define a series of comparison groups that capture states' policy conditions due to the interrelated and multidimensional nature of states' social studies-focused graduation requirements (e.g., the total number of credits required, in which specific disciplines, if any, these credits must be earned). Furthermore, there are theoretically many different combinations of social studies-focused graduation requirements that states could have in place. It will be important to capture the extent of this diversity while defining a manageable number of comparison groups where our sample is sufficiently large to facilitate comparisons. A final consideration is that social studies coursetaking in the states that fully prescribe the number and disciplines in which these courses must be taken is likely very predictable. In contrast, students in states without robust requirements have a higher degree of choice over their coursetaking, heightening the potential for disparities. This means it is likely more interesting to examine enrollment patterns in the states without robust requirements.

To address these issues, I began by defining a baseline policy condition in which students' social studies coursetaking is fully dictated; students in this state policy condition are required to take a minimum of three social studies credits, and they must complete courses in U.S. history, world history, government, and economics. From there, I defined a series of possible alternate state policy conditions in which discipline-specific coursetaking requirements are successively added or removed. For example, a state could remove the requirement to take world history or add a requirement to take geography while holding the other discipline-specific requirements constant. As shown in Figure B.1, I hypothesized a variety of alternate state policy conditions and then investigated which states had graduation requirements for the class of 2013 that aligned with these conditions.

Upon review, I refined and reduced the list of state policy conditions down to the seven shown in Figure 2.5 below. I focus on these seven state policy conditions in my analysis for two main reasons. First, these state policy conditions reflect a linear removal of states' social studies-focused graduation requirements. That is, specific graduation requirements are removed (or added) one by one, holding the other requirements constant. A linear removal of graduation requirements across comparison groups is beneficial because it helps to isolate the association between the presence of a specific graduation requirement and course enrollments (and it has the

added benefit of ease of interpretation). In selecting which state policy comparison groups to use in my analysis, I use the requirement to take U.S. history to anchor the comparison groups because this is the course that states most commonly require (see Figure 2.3).

The second reason why I focus on these comparison groups is because they maximize my analytic sample size. I could have, for example, created comparison groups that remove the discipline-specific graduation requirements in a different, though still linear, order (e.g., remove the requirement to take economics first, then economics and government second). However, these policy scenarios are even rarer across states than those shown in Figure 2.5, raising sample size concerns.[5] Therefore, I focus on the 38 states assigned to the seven policy conditions listed in Figure 2.5. The baseline condition includes nine states (Arkansas, Arizona, California, Florida, Georgia, Indiana, Michigan, North Carolina, and Tennessee) and the number of states in the alternate policy conditions ranges from two up to nine.

Figure 2.5 Identification of state policy conditions and assignment of states

Policy Difference	Graduation Requirements						States
Add 1	TOT	US	GV	EC	WH	GE	MN, MS[1], TX
Baseline	TOT	US	GV	EC	WH		AR, AZ, CA, FL, GA, IN, MI, NC, TN
Remove 1	TOT	US	GV	EC			ID, NH, SC
Remove 2	TOT	US	GV				IA, LA, MO, ND, NV, OH, OK[1], VA
Remove 3	TOT	US					IL, ME
Remove 4	TOT						DE, KS, KY, MT, OR, RI, VT, WI, WY
Remove all							CO[2], MA, NE[3], PA

[1] MS and OK also have a state history requirement.
[2] Although graduation requirements in Colorado are generally locally determined, the state does require 0.5 units in government.
[3] Unlike other states, Nebraska does not define graduation requirements based on credits, but instead based on the number of hours of instruction.
SOURCES: Data on state requirements for the class of 2013 are from various sources (e.g., Achieve, 2015a; Chattin & Hackmann, 2013; Godsay et al., 2012; Dounay, 2006; Education Commission of the States, 2007; McClure & Zadrozny, 2015; NCES, 2010, 2011, 2012, 2014, 2018; Zadrozny, 2017) and state department of education websites.

It is important to remember, however, that some states serve more students than others and HSLS:2009 oversampled students in ten states. This means that the number of students in my analytic sample in each policy condition is not directly proportional to the number of states assigned to each condition. Unfortunately, half of the oversampled states (California, Florida,

[5] As a robustness check, I conducted my analysis using additional policy scenarios to those included in Figure 2.5 (i.e., removing only the requirement to take economics, removing the requirement to take both economics and government). I find similar results regardless of the order in which discipline-specific requirements are removed. Therefore, because the interpretation is the same, I do not include these results for ease of interpretation.

Georgia, Michigan, North Carolina, and Tennessee) are in the baseline policy condition comparison group. However, oversamples in other states like Ohio, Pennsylvania, and Texas add sufficient numbers of students to make comparisons with other state policy conditions viable. Nevertheless, the net result of this uneven distribution of students across states and states across comparison groups is that my sample is unevenly distributed across state policy comparison groups. The sample size in the comparison group with only the world history requirement removed is particularly small, which readers should keep in mind when interpreting the results.

Table 2.1 provides a summary of the seven state policy comparison groups, including the policy landscape, state assignments, and sample sizes. Although these comparison groups are not perfect, they capture the complexity of states' social studies-focused graduation requirements within the constraints of the HSLS:2009 sample.

Table 2.1 Summary of state policy comparison groups

		Alternate state policy conditions					
	Baseline	Remove 1	Remove 2	Remove 3	Remove 4	Remove all	Add 1
Policy conditions							
Avg. share of total credits	0.15	0.12	0.14	0.12	0.16	N/A	0.16
Number of SS credits required	3	<= 3	<= 3	2	<=3	0	> 3
Share of SS credits pre-determined	ALL	SOME	SOME	SOME	NONE	N/A	ALL
Discipline-specific requirements							
U.S. history (US)	Yes	Yes	Yes	Yes			Yes
Government (GV)	Yes	Yes	Yes				Yes
Economics (EC)	Yes	Yes					Yes
World history (WH)	Yes						Yes
Geography (GE)							Yes
States	AR, AZ, **CA**, **FL**, **GA**, IN, **MI**, **NC**, **TN**	ID[1], NH, SC	IA, LA, MO, ND, NV[2], **OH**, OK[3], VA	IL, ME	DE, KS, KY, MT, OR, RI, VT, WI, WY	CO[4], MA, NE[5], **PA**	MN, MS[6], **TX**
Analytic sample size	4,960	270	1,940	590	900	1,360	1,200

[1] Idaho requires 2.5 social studies credits and credits are fully pre-determined.
[2] Nevada requires 2 social studies credits and credits are fully pre-determined.
[3] Oklahoma requires students to take 0.5 credits of state history.
[4] Although graduation requirements in Colorado are essentially fully locally determined, the state does require a 0.5 unit of instruction in government.
[5] Unlike other states, Nebraska does not define graduation requirements based on credits, but instead based on the number of hours of instruction.
[6] Mississippi also adds a state history requirement.
NOTES: Bold font means that state was an HSLS:2009 oversampled state. Some states are excluded from these categories because their graduation requirements do not neatly align with those in other states making it difficult to isolate requirements (see Figure B.1).
SOURCES: Data on state requirements for the class of 2013 are from various sources (e.g., Achieve, 2015a; Chattin & Hackmann, 2013; Godsay et al., 2012; Dounay, 2006; Education Commission of the States, 2007; McClure & Zadrozny, 2015; NCES, 2010, 2011, 2012, 2014, 2018; Zadrozny, 2017) and state department of education websites. Analytic sample sizes are from the High School Longitudinal Study of 2009 (HSLS:2009).

Table 2.2 shows the demographic characteristics of the student populations in each of my state policy comparison groups (the national distribution is also included as a reference point). As shown in Table 2.2, the observable characteristics of the students in my analytic sample and the high schools that they attended differ across my state policy comparison groups. In other

words, there is empirical evidence of systematic sorting of students across my state policy comparison groups. I observe perhaps the clearest evidence of systematic sorting for Hispanic students. For example, Hispanic students comprise only 5 percent of the student population in the first alternate state policy comparison group but represent 16 percent of the student population in the baseline condition and 28 percent in the final alternate comparison group that adds a requirement to take a geography course. This is likely, at least in part, because Hispanic students tend to be concentrated in a handful of states (in particular, Arizona, Florida, California, which are in the baseline comparison group, as well as New Mexico and Texas, which are in the final comparison group). Hispanic students are severely under-represented (and White students over-represented) in the states that have fewer discipline-specific graduation requirements and those that remove all graduation requirements entirely. I mitigate this concern about systematic sorting of students across state policy comparison groups using inverse probability of treatment weighting as I discuss in the next section.

Table 2.2 Sample demographics for state policy comparison groups

		State policy comparison groups						
			Alternate					
Characteristic	All students	Baseline	Remove 1	Remove 2	Remove 3	Remove 4	Remove all	Add 1
Male	0.50	0.50	0.51	0.50	0.53	0.50	0.51	0.48
Female	0.50	0.50	0.49	0.50	0.47	0.50	0.49	0.52
White	0.59	0.57	0.76	0.62	0.50	0.74	0.64	0.44
Black	0.08	0.09	0.07	0.11	0.10	0.03	0.06	0.07
Hispanic	0.14	0.16	0.05	0.08	0.24	0.09	0.14	0.28
Asian	0.09	0.08	0.04	0.09	0.11	0.05	0.07	0.14
Other	0.09	0.10	0.08	0.09	0.06	0.09	0.08	0.07
Q1 SES (lowest)	0.13	0.15	0.11	0.11	0.15	0.11	0.12	0.15
Q2 SES	0.16	0.17	0.13	0.15	0.15	0.16	0.15	0.14
Q3 SES	0.19	0.19	0.18	0.16	0.19	0.18	0.18	0.20
Q4 SES	0.22	0.21	0.26	0.22	0.22	0.23	0.24	0.22
Q5 SES (highest)	0.30	0.28	0.33	0.36	0.29	0.32	0.32	0.29
Public	0.81	0.88	0.80	0.69	0.85	0.72	0.84	0.83
Private	0.19	0.12	0.20	0.31	0.15	0.28	0.16	0.17
City	0.27	0.27	0.32	0.27	0.30	0.35	0.19	0.35
Suburb	0.36	0.35	0.27	0.35	0.39	0.26	0.43	0.19
Town	0.12	0.10	0.20	0.10	0.12	0.25	0.12	0.15
Rural	0.25	0.28	0.20	0.28	0.19	0.14	0.25	0.31
Q1 FRPL	0.52	0.44	0.48	0.63	0.58	0.58	0.61	0.38
Q2 FRPL	0.29	0.31	0.29	0.26	0.22	0.28	0.21	0.33
Q3 FRPL	0.15	0.21	0.14	0.09	0.08	0.13	0.13	0.19
Q4 FRPL	0.04	0.04	0.08	0.02	0.12	0.01	0.05	0.10
0–499	0.21	0.13	0.20	0.35	0.25	0.29	0.26	0.30
500–599	0.23	0.24	0.11	0.21	0.13	0.30	0.27	0.22
1000–1499	0.21	0.22	0.39	0.21	0.11	0.14	0.24	0.10
1500+	0.35	0.41	0.30	0.23	0.51	0.28	0.23	0.38
N	13,450	4,960	270	1,940	590	900	1,360	1,200

NOTES: SES = socioeconomic status, FRPL = free or reduced-price lunch
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Inverse probability of treatment weighting

I adjust for the observed differences across assignment conditions by using inverse probability of treatment weighting (IPTW) (Austin & Stuart, 2015; Chesnaye et al., 2022; Greifer & Stuart, 2021). This is a common approach used in observational studies to mitigate concerns about selection bias across comparison groups. The basic idea behind IPTW is to create balance between comparison groups on observable characteristics; certain observations in the dataset are weighted upwards or downwards so that, in aggregate, the composition of each comparison group looks more similar on observable characteristics.

I create these weights in a three-step process. First, I use a logistic regression model to estimate the probability that a student was subject to a specific set of social studies-focused graduation requirements, conditional on a set of observed student and school characteristics. More specifically, I estimate the following logistic regression model:

$$policy_i = \beta_0 + \alpha student_i + \theta school_i + \varepsilon_i$$

where $policy$ equals 1 if student i attended high school in a state where he or she was subject to a specific set of graduation requirements in place for the class of 2013 and 0 if student i attended high school in a state assigned to the baseline policy condition. Meanwhile, $student_i$ represents a vector of student-level controls (i.e., sex, race/ethnicity, family socioeconomic status, achievement[6]) and $school_i$ represents a vector of school-level controls (i.e., school control, school locale, school poverty level, school enrollment size) known to be correlated with coursetaking patterns.[7] ε_i is a random error term. I separately estimate this regression model six times, once for each of my six alternate state policy comparison groups, always using the baseline states as my control condition.

In the second step, I use these models to predict the probability of being in an alternate state policy condition for each student in my sample. This is each student's propensity score (π_i). Again, I do this six times, once for each of my six alternate state policy comparison groups. In the third step, I convert my propensity scores to weights. Specifically, I assign student i in the baseline (control) comparison group a weight $= 1$ and student i in my alternate state policy condition a weight $= (1 - \pi_i)/\pi_i$. This adjusts the student populations in my alternate state policy condition comparison groups to more closely resemble the student population in the baseline states. This is effectively simulating what would have happened to students in baseline states had they not been in a baseline state (i.e., if they had not been required to take all the social studies courses that they were).[8]

As noted by Thoemmes and Kim (2011), there are two critical checks one should perform to confirm appropriate estimation of propensity score weights: (1) that propensity scores were estimated using a common support region, and (2) that balance has been achieved on observable

[6] As a proxy for students' social studies achievement—a measure that is not available in HSLS:2009—I use students' scores from a standardized math assessment administered to students in the base year as students were starting high school. Although an on-subject measure of achievement would be preferable, this is the only standardized measure of achievement universally available for HSLS:2009 students at the appropriate time point.

[7] There is agreement in the field that taking into account clustered data is preferable to reduce bias when estimating and applying propensity score methods. Several studies (e.g., Arpino & Mealli, 2011; Chang & Stuart, 2022; Fan et al., 2014; Langworthy et al., 2022) have proposed to account for clustering in the initial estimation of propensity scores by using fixed or random effects in regression models that predict the probability of treatment. Fan and colleagues (2013) show that accounting for clusters in at least one stage—either during estimation of the propensity score or during estimation of the outcome model—reduces bias, and that adjustments for clustering at the outcome stage has a larger impact than accounting for clusters at the propensity score estimations stage. Much of the recent work, however, has focused on how best to account for clustering when treatment assignment happens at the individual level (as opposed to the cluster level); little guidance has been offered about how to address clustering when treatment is assigned at the cluster level—as is the case in my study (Nickodem, 2020).

[8] Per Greifer & Stuart (2021), propensity scores can be converted to weights using different formulas. My choice of which comparison group(s) to weight does not substantively impact my results.

covariates. Figure B.2 illustrates that, for all alternate state policy conditions, propensity scores were estimated across an area of common support. With respect to the balancing property, there are large and statistically significant standardized mean differences across a range of student- and school-level covariates before weights are applied (see Table B.3). But as shown in Table 2.3, after weights are applied, the observed characteristics of the student populations in my baseline versus alternate comparison groups are much more similar. Although some differences remain across school characteristics, the most concerning student-level racial/ethnic differences are substantially reduced. Furthermore, the remaining standardized mean differences are typically below the Institute of Education Sciences' threshold for baseline equivalence after regression adjustment (What Works Clearinghouse, 2015).

Table 2.3 Sample demographics, by policy condition after weighting

	Remove 1		Remove 2		Remove 3		Remove 4		Remove all		Add 1	
Characteristic	SMD	Sig?	SMD	Sig?	SMD	Sig?	SMD	Sig?	SMD	Sig?	SMD	Sig?
Female	-0.06		0.00		0.00		0.03		-0.02		0.01	
White	-0.09		-0.01		-0.11	*	0.04		-0.04		-0.05	
Black	0.07		0.00		0.01		-0.01		0.01		0.04	
Hispanic	0.01		0.01		0.05		-0.04		0.01		-0.01	
Asian	-0.03		-0.03		0.05		-0.01		0.05		-0.01	
Other	0.10		0.02		0.05		0.00		-0.01		0.05	
Q1 SES	0.07		-0.02		-0.09		-0.01		0.01		-0.03	
Q2 SES	0.01		0.00		-0.02		0.00		0.01		-0.02	
Q3 SES	-0.03		0.03		-0.05		-0.03		0.00		-0.01	
Q4 SES	-0.05		-0.01		0.03		0.06		-0.01		0.03	
Q5 SES	0.01		0.00		0.10		-0.02		-0.01		0.02	
Achievement	-0.01		-0.02		0.11	*	-0.09	*	-0.01		0.04	
Private	-0.11	*	0.01		0.19	**	0.05		0.03		0.01	
City	0.04		0.09	**	0.23	***	0.00		0.05		0.04	
Suburb	0.09		-0.01		-0.03		0.01		0.01		0.06	
Town	-0.01		0.01		0.07		-0.03		-0.07	*	-0.03	
Rural	-0.14		-0.09	**	-0.27	***	0.02		-0.02		-0.08	*
Q1 FRPL	-0.13		0.02		0.16	**	0.10	*	0.09	*	0.09	*
Q2 FRPL	-0.06		-0.01		-0.14	**	-0.06		-0.18	***	-0.05	
Q3 FRPL	0.17		-0.03		-0.07		-0.04		0.05		-0.07	
Q4 FRPL	0.08		0.04		0.05		-0.05		0.07		0.01	
0–499	-0.14	**	0.00		0.09	*	0.14	**	0.06	*	0.04	
500–599	-0.32	***	0.00		-0.20	***	-0.06		0.01		-0.14	***
1000–1499	0.14		0.08	*	-0.04		-0.15	***	-0.04		0.05	
1500+	0.21	**	-0.07		0.13	*	0.06		-0.02		0.04	
N	5,230		6,900		5,540		5,860		6,320		6,140	

NOTES: SMD = standardized mean difference (difference in means between students in the policy condition and students in the baseline condition divided by the standard deviation). * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Significance testing is from a simple linear regression model regressing the covariate on a dummy indicator for the state policy condition. Includes only students with complete transcript and demographic data who graduated from high school on-time and remained in the same state and school for the entirety of their high school career.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Regression specification

I use a regression framework to investigate the association between various social studies-focused graduation requirements (as proxied by my state policy comparison groups) and students' high school social studies coursetaking. Specifically, I use a regression framework to compare social studies course enrollments among students who attended high school in my baseline states with those who attended high school in my alternate state policy conditions.

Because HSLS:2009 used a two-stage sampling method to identify students to participate in the study, multiple students in my analytic sample attended the same high school. It is likely that

coursetaking patterns—including in social studies—look more similar among students who attended the same high school. In other words, HSLS:2009's clustered-sampling strategy means that course enrollments among my students are likely to be correlated. This means that a simple linear regression model—which assumes residuals are normally distributed (often called the independence assumption)—is likely inappropriate for my data structure.

I empirically investigate whether there is reason to be concerned that social studies coursetaking patterns are correlated among students in the same school (and state) using an unconditional means model. Specifically, I estimate a series of multilevel linear models, iterating over various enrollment in various social studies courses as my dependent variable. I include random effects for state, then school, then school and state. The interclass correlations (ICCs) from these regression models suggest that course enrollments are correlated within schools and states and that a multilevel modeling approach is appropriate (see Table B.4).

To account for the mutually exclusive clustering of students in schools in states, I estimate multilevel regression models in which I nest students in schools in states. Specifically, I estimate a three-level random intercept model for student i in high school h in state s that takes the form:

$$course_{ihs} = \beta_0 + \beta_1 policy_{00s} + \beta_2 student_{ihs} + \beta_3 school_{0hs} + \beta_4 access_{0hs} + \beta_5 interest + u_{0hs} + u_{00s} + e_{ihs}$$

In these models, the dependent variable ($course_{00s}$) is a measure of coursetaking for student i in high school h in state s. I iterate over multiple coursetaking outcomes, including dummy indicators of ever enrollment in specific social studies courses and continuous variables capturing the number of Carnegie credits earned. Meanwhile, $policy_{ihs}$ is a dummy variable that $= 1$ if student i was high school h in state s where he or she was subject to an alternate state policy condition and 0 if the student attended high school in one of the states in my baseline comparison group. Note that this indicator is assigned at the state level and is constant among students and schools in the same state. Although I iterate over the six alternate state policy conditions, in all regression models, the coefficient on the $policy_{ihs}$ variable (β_1) is the coefficient of interest. β_1 captures the mean difference in coursetaking outcomes between students in the alternate state policy conditions and students in the baseline conditions. I interpret β_1 as capturing the direction and magnitude of the association between the presence of a specific set of social studies-focused graduation requirements and coursetaking outcomes.

In all models, I control for a variety of student- and school-level characteristics correlated with both the independent and dependent variables of interest. More specifically, $student_{ihs}$ represents a vector of student-level characteristics including sex, race/ethnicity, family socioeconomic status, and student achievement. $school_{0hs}$ represents a vector of school-level characteristics including school control, school locale, the school poverty level (proxied by the share of students eligible for free or reduced-price lunch), and school enrollment size. I also control for two other factors. $access_{0hs}$ represents a series of dummy variables capturing

schools' course offerings, which I interpret as a measure of course access or students' ability to take specific courses at their high school. Note that $school_{0hs}$ and $access_{0hs}$ do not vary at the student level. Second, I control for students' self-reported favorite subject ($interest_{ihs}$). I interpret this measure as students' interest in social studies, and, therefore, their proclivity to take social studies courses, especially those that are not required. u_{0hs} and u_{00s} are the random terms for schools and states, respectively. Note that there is no time subscript in these models. This is because I am treating the entirety of students' high school career as a single time point. Furthermore, because I have data on only a single cohort of students—and because states' graduation requirements are defined per graduating class—states' policy conditions remain constant throughout the study period.

Regardless of whether my coursetaking outcome is continuous or binary, I use linear regression models for ease of interpretability. For my binary measure of ever enrollment—that is, the measure for which a logit or probit model is arguably more appropriate—I performed a robustness check to ensure my results are not sensitive to this model choice. I weight all of my regression models using the propensity score weights I calculated in the previous section that adjust for observable differences in the student populations across state policy conditions. I use robust standard errors to adjust for the possibility of heteroskedasticity.

Research question 3

To answer my third research question ("How do any course enrollment disparities across student subgroups compare in states with and without specific graduation requirements?"), I retain the same basic regression framework employed for the previous research question. However, I add terms to my regression models that interact students' demographic characteristics with their state policy condition. These interaction terms capture whether the association between states' graduation requirements and coursetaking outcomes differs depending on a students' demographic characteristics. I focus on two demographic characteristics (race/ethnicity and family socioeconomic status) hypothesized to be correlated with course enrollments. Here, I focus on coursetaking between students in the states in which all state requirements have been removed and students in the baseline states. I chose this policy condition for this analysis for two reasons. First, it represents perhaps the most extreme divergence from the baseline states where students' coursetaking is fully prescribed. And second, relative to some of the other alternate state policy comparison groups, this comparison group has a larger sample size, especially for subgroup populations.

Results

Research question 1

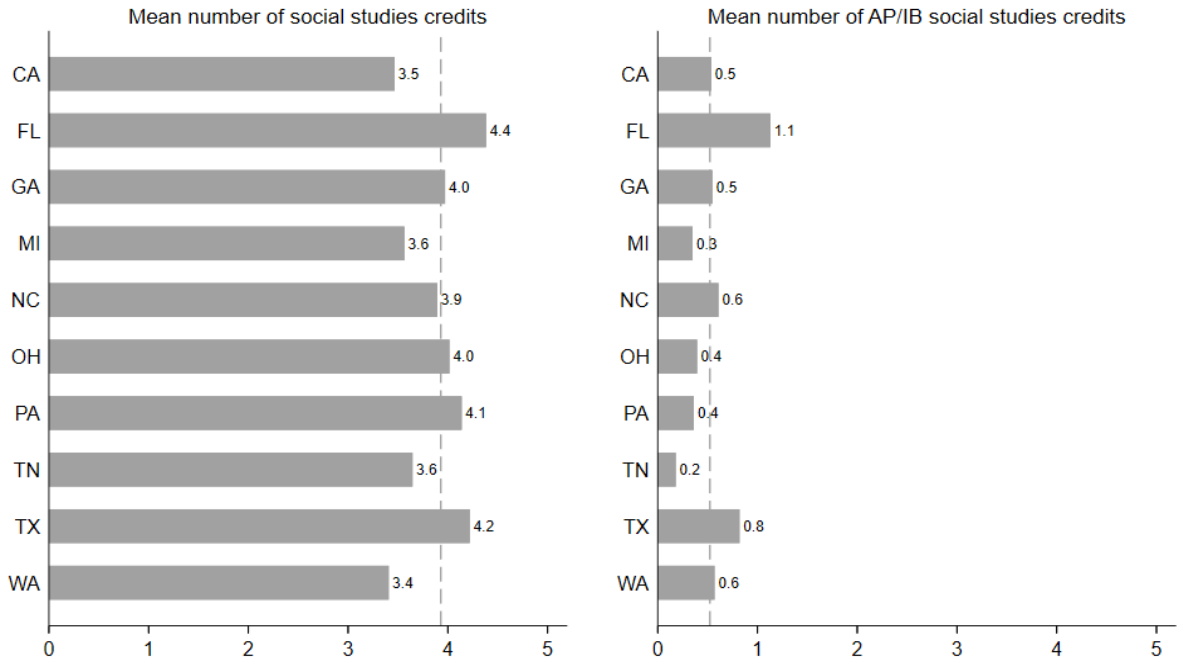
I first descriptively investigate coursetaking patterns in various social studies courses using the 10 oversampled states in HSLS:2009. Looking across states, I examine the total number of

credits earned in social studies; enrollment rates in various social studies courses by discipline, grade level, and rigor; as well as the share of credits earned in social studies. This analysis is included as an example of the degree of variation in social studies coursetaking across states.

Total number of credits earned in social studies

Nationally, students who graduated high school in 2013 earned just shy of 4 Carnegie credits in social studies on average (see Figure 2.6). I generally observe small differences in the mean number of Carnegie credits students earned in social studies across states. For example, Georgia, North Carolina, and Ohio were right on par with the national average. However, the mean number of social studies credits earned ranged from 3.4 credits in Washington up to 4.4 credits in Florida—roughly corresponding to an entire school year. Nationally, students earned 0.5 credits in AP/IB social studies courses, on average. However, the mean number of credits earned in AP/IB social studies courses ranged from 0.2 credits in Tennessee up to 1.1 credits in Florida.

Figure 2.6 Mean number of social studies credits earned, by HSLS:2009 oversampled state



NOTES: N = 13,450. Descriptive statistics are weighted using W3HSTRANS. Includes only students with complete transcript and demographic data who graduated on-time and who remained in the same state and school for the entirety of their high school career. Includes courses taken at any level and in any grade. Dashed line represents the national average.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

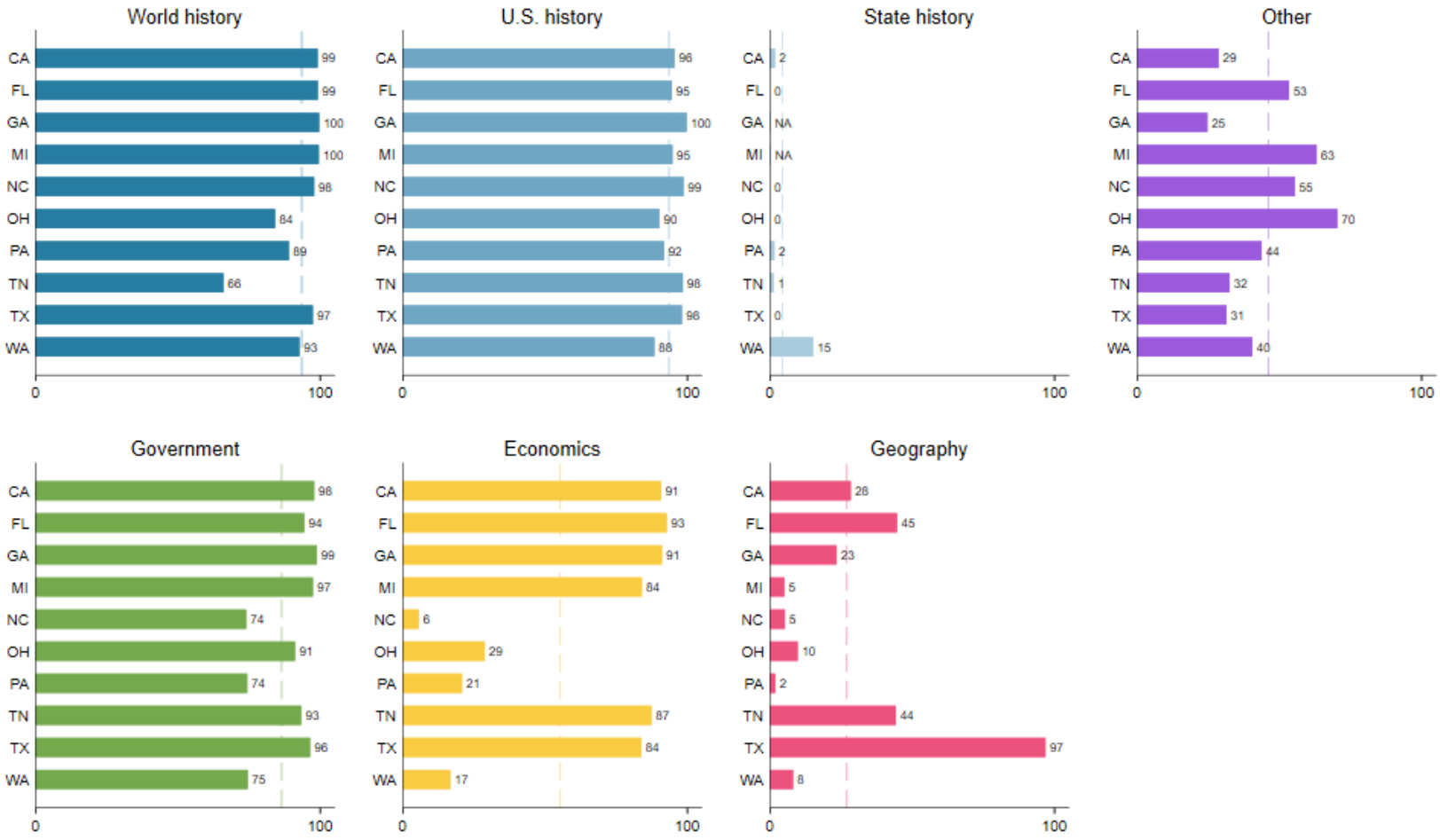
Ever enrollment in social studies courses by discipline

Turning to look at enrollment rates in specific social studies courses by discipline, I find that enrollment rates in U.S. history courses and world history courses were generally high across HSLS:2009 oversampled states (see Figure 2.7). For example, enrollment rates in U.S. history

courses were universally high, about 90 percent or above in all oversampled states. Enrollment rates in world history courses were generally high across states too, although there were exceptions. Enrollment in world history courses hovered around 66 percent in Tennessee. Conversely, enrollment in state history courses was universally low across states. Washington—which had an enrollment rate of 15 percent in state history courses—was a bit of an outlier here, but still the enrollment rate was quite low.

Enrollment rates among courses in the remaining social studies disciplines, however, varied widely across states. Although enrollment rates were generally high in government courses, several states (e.g., North Carolina, Pennsylvania, and Washington) had enrollment rates that were some 20 percentage points lower than their counterparts. Enrollment rates in economics and geography courses varied widely across states, reaching near universal levels in some states and while barely above zero in others. For example, enrollment rates in economics courses ranged from 6 percent in North Carolina up to 93 percent in Florida. Meanwhile, enrollment rates in "other" social studies courses (such as psychology and sociology) ranged from 25 percent in Georgia up to 70 percent in Ohio.

Figure 2.7 Enrollment rates in social studies courses, by discipline and HSLS:2009 oversampled state



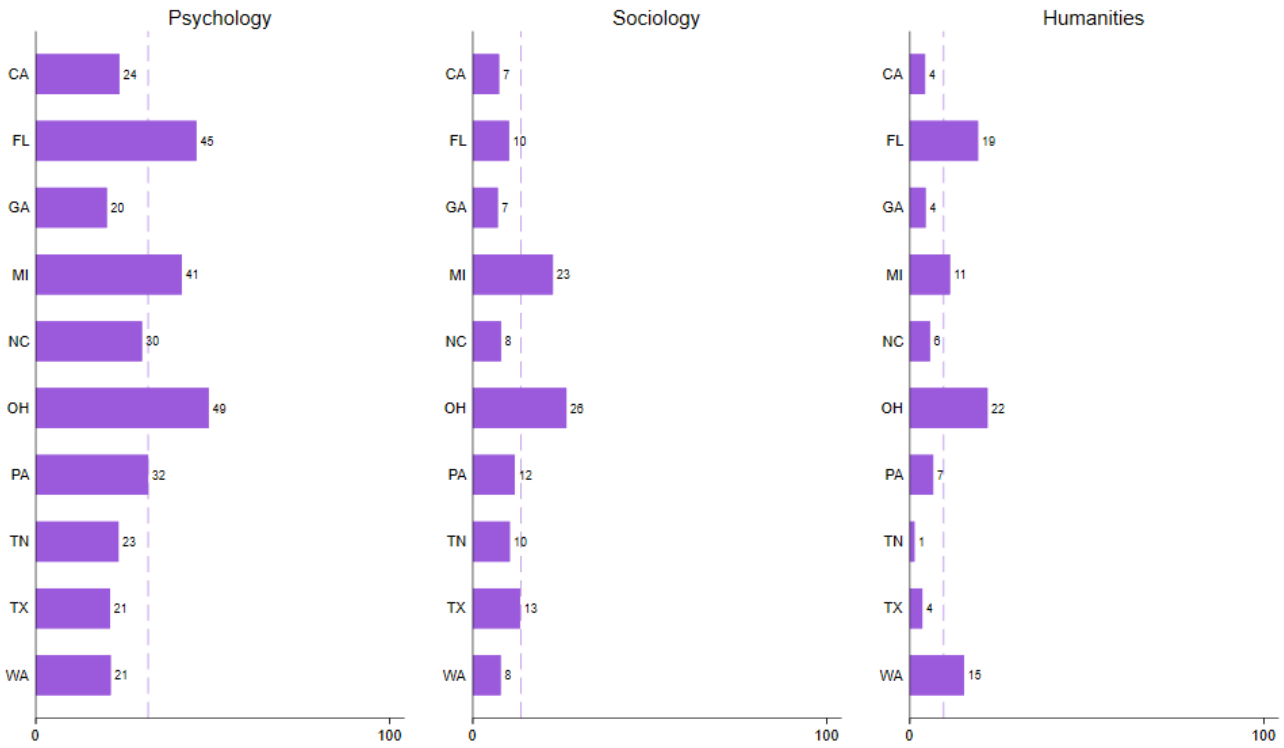
NA = Not available because there were too few students in the cell to meet reporting thresholds.

NOTES: N = 13,450. Descriptive statistics are weighted using W3HSTRANS. Includes only students with complete transcript and demographic data who graduated on-time and who remained in the same state and school for the entirety of their high school career. Includes courses taken at any level and in any grade. Dashed line represents the national average.

SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Figure 2.8 examines enrollment rates across states in "other" social studies courses in more detail, including courses in psychology, sociology, and the humanities. These are the social studies disciplines in which states have not enacted specific graduation requirements but are relatively common disciplines in which students take coursework. Of the "other" social studies disciplines, psychology is consistently the most common of these disciplines across states. Nevertheless, I observe large differences in enrollment rates across the 10 oversampled states. Enrollment rates in psychology courses range from 20 percent in Georgia to 49 percent in Ohio. Meanwhile, enrollment rates in sociology courses range from 7 percent in California and Georgia up to 26 percent in Ohio and enrollment rates in humanities courses range from 1 percent in Tennessee up to 22 percent in Ohio.

Figure 2.8 Enrollment rates in "other" social studies disciplines, by discipline and HSLS:2009 oversampled state



NOTES: N = 13,450. Descriptive statistics are weighted using W3HSTRANS. Includes only students with complete transcript and demographic data who graduated on-time and who remained in the same state and school for the entirety of their high school career. Includes courses taken in any grade. Dashed line represents the national average. SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

As shown in Figure B.3, states also differ in terms of the grade in which students typically take specific social studies courses. For example, in Texas, almost all students take a geography course in grade 9, a world history course in grade 10, a U.S. history course in grade 11, and then government and economics in grade 12. This suggests that students in Texas tend to progress

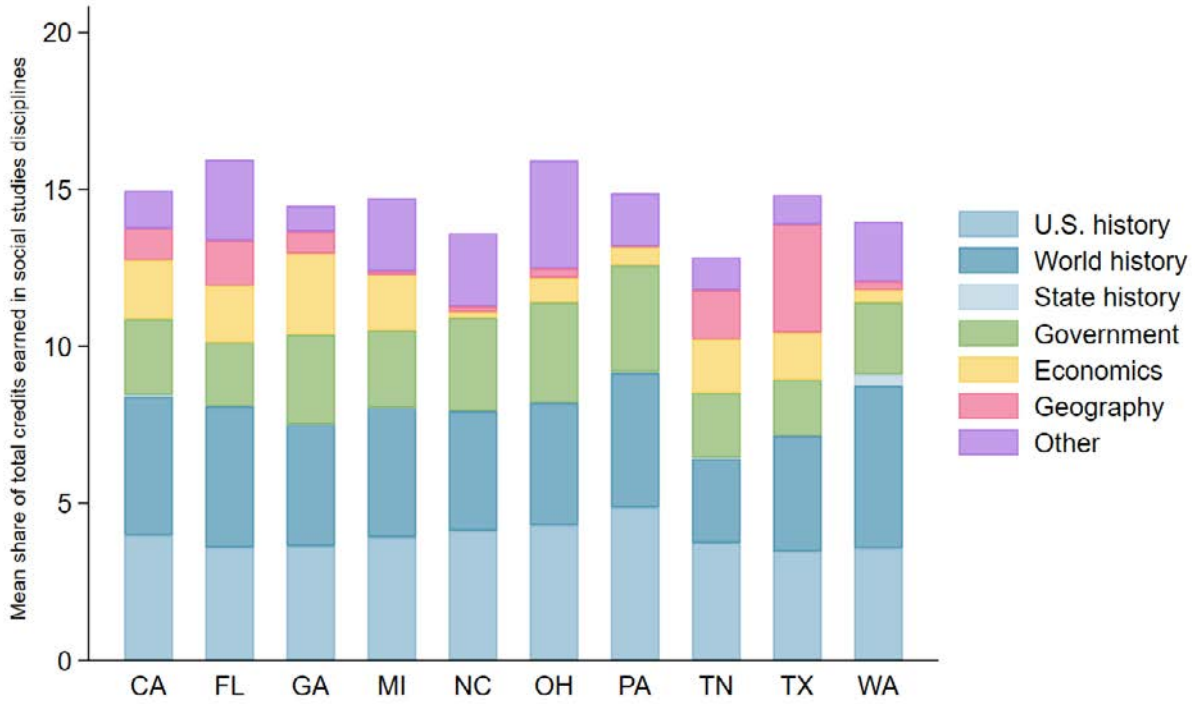
through a shared course pathway. In contrast, in Michigan, for example, enrollments in grade 9 are split between world and U.S. history courses and in grades 10 and 11, enrollments are split between history, government, and economics courses. This suggests that not all students in Michigan progress through the same social studies course pathway. Broadly speaking, though, geography enrollments tend to be more common across states in the lower high school grades, while government and economics courses tend to be taken near the end of high school. U.S. history tends to be taken in grade 11, though some states (such as Ohio) are exceptions. Enrollment in social studies courses in the "other" disciplines tends to be higher in the later high school years too.

Finally, Figure B.4 investigates the rigor of the social studies courses that students take across states. Unsurprisingly, across states, most students typically take non-honors social studies courses. Honors social studies courses are only popular in a handful of HSLS:2009 oversampled states, particularly Florida and North Carolina. In these states, somewhere between three and four in ten students take honors-level courses in world history, U.S. history, government, and economics. Honors courses appear to be especially rare in economics and geography. Meanwhile, enrollment rates in the most rigorous courses—that is, in AP/IB courses—do vary marginally across states. For example, enrollment rates in AP/IB world history courses range from 3 percent in Tennessee up to 26 percent in Texas. In fact, AP/IB course enrollments across social studies disciplines are consistently high in Texas.

Share of credits earned by discipline

As shown in Figure 2.9, the mean share of total credits earned in social studies only varied slightly across states. In all HSLS:2009 oversampled states, the share of total credits earned in social studies hovered around 15 percent. This corresponds to roughly one-sixth of the total number of credits that students earn while in high school. Figure 2.9 also displays how, on average, students earned this share of social studies credits. Overall, it appears that there are some notable differences in how students earn their social studies credits across states. Although students across states typically spend about the same share of total credits on history courses, the share of total credits spent in courses in government, economics, geography, and "other" social studies disciplines ranges across states (as shown by the relative heights of the bars). For example, students in Georgia seem to spend a greater share of their credits, on average, in economics than in "other" social studies courses. Conversely, students in Ohio seem to spend a greater share of their credits in "other" social studies courses than in economics courses. Yet despite these differences, Figure 2.9 also helps illustrate that any observed differences in social studies coursetaking across disciplines and across states represent a very small difference in terms of the total number of credits earned.

Figure 2.9 Mean share of total credits earned in social studies overall and in specific disciplines, by HSLS:2009 oversampled state



NOTES: N = 6,400. Descriptive statistics are weighted using W3HSTRANS. Includes only students with complete transcript and demographic data who graduated on-time and who remained in the same state and school for the entirety of their high school career. Includes courses taken in any grade.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Research question 2

In this research question, I shift to investigating the association between states' graduation requirements and students' social studies coursetaking. Using my state policy comparison groups, I examine the association between states' requirements and the number of social studies credits earned, enrollment in specific social studies courses both by discipline and level, and the share of social studies credits earned in specific disciplines.

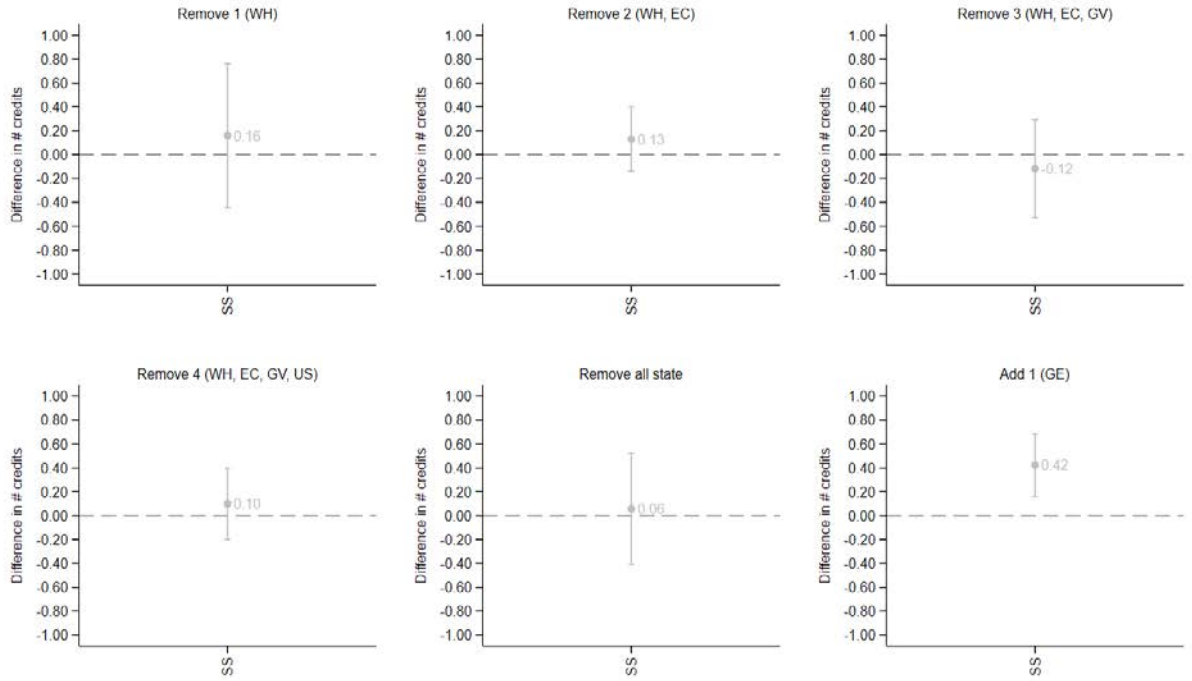
For ease of interpretation, I display my results in figures instead of tables. The figures in this section plot the coefficient and 95 percent confidence intervals from regression models. The point estimate is the difference in outcomes (e.g., number of social studies credits earned, ever enrollment in a specific course) between students in specific state policy conditions with requirements removed and students in the baseline condition. When the point estimate is below the zero line, it means the outcome on average was *lower* for students in the alternate state policy condition with requirements altered than students in the baseline condition. When the point estimate is above the zero line, it means the outcome on average was *higher* for students in the alternate state policy condition with requirements altered than students in the baseline condition.

When the confidence intervals straddle the zero line, it means differences between comparison groups are not statistically significant. A full set of regression results are available upon request.

Total number of credits earned in social studies courses

Figure 2.10 plots the difference in mean number of social studies credits earned in specific state policy conditions relative to students in the baseline policy condition, after controlling for other factors. As shown in Figure 2.10, I generally find no evidence of a relationship between states' graduation requirements and the total number of credits that students earn in social studies (see also Table B.5). That is, students earn roughly the same number of credits in social studies regardless of their state policy condition. There was one exception to this rule: students in the few states (Minnesota, Mississippi, and Texas) that had a geography requirement (i.e., a requirement above and beyond those in the baseline condition) earned a greater number of social studies credits, on average, than students in the baseline policy condition. The students in these states earned 0.42 more social studies credits on average than their peers in the baseline policy condition. This roughly corresponds to an extra half semesters' worth of social studies courses.

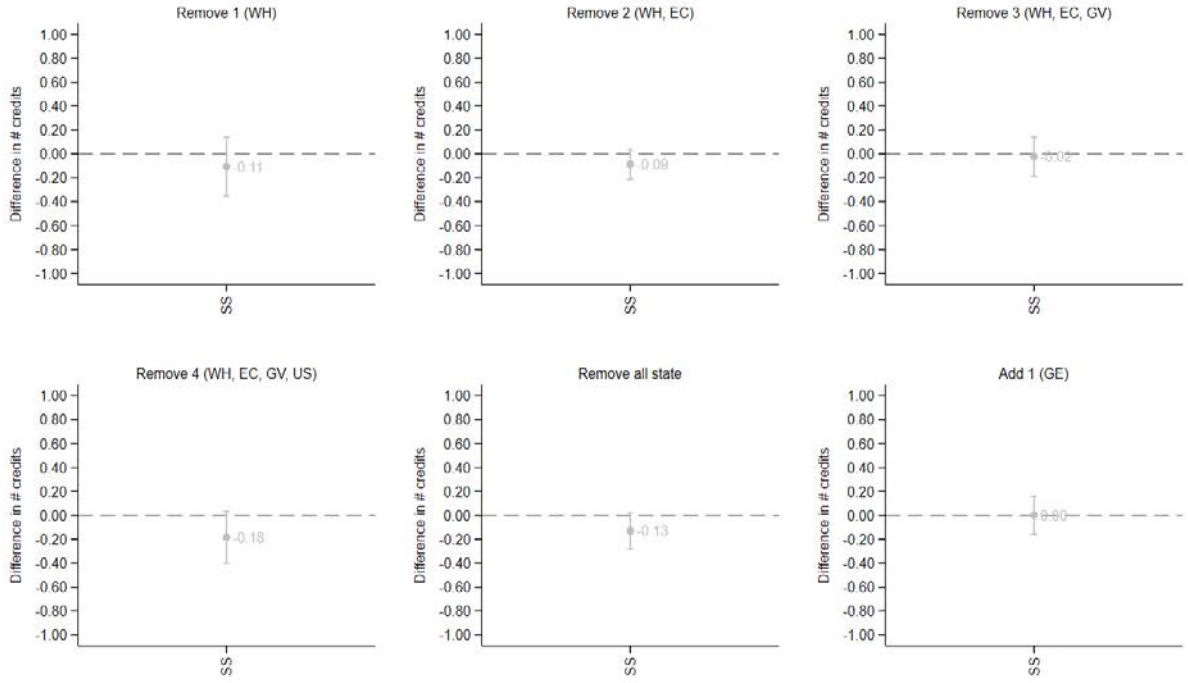
Figure 2.10 Coefficient plots for total number of credits earned in social studies (SS) courses



NOTES: N = 10,980. Figure presents the coefficient and 95 percent confidence interval on the state policy variable from multilevel linear regression models regressing the total number of social studies credits earned on the state policy condition and a variety of controls. Regression models include inverse probability weights. Includes courses taken at any level. Includes only students with complete transcript and demographic data who graduated on-time and who remained in the same state and school for the entirety of their high school career.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Figure 2.11 plots the difference in the mean number of AP/IB social studies credits earned in specific state policy conditions relative to students in the baseline policy condition, after controlling for other factors. As shown in Figure 2.11, I observe a similar story for AP/IB social studies credits as I do for the total number of social studies earned. That is, after controlling for other factors, students in all the alternate state policy conditions earned the same number of AP/IB social studies courses on average as those students in the baseline policy condition (see also Table B.5).

Figure 2.11 Coefficient plots for total number of AP/IB credits earned in social studies (SS) courses



NOTES: N = 10,980. Figure presents the coefficient and 95 percent confidence interval on the state policy variable from multilevel linear regression models regressing the total number of AP/IB credits earned on the state policy condition and a variety of controls. Regression models include inverse probability weights. Includes only students with complete transcript and demographic data who graduated on-time and who remained in the same state and school for the entirety of their high school career.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Ever enrollment in social studies courses by discipline

Moving to look at enrollment in discipline-specific social studies courses, I find some evidence that students' social studies coursetaking is shaped by their state's graduation requirements in specific disciplines (see also Table B.5). Looking first at the top left panel in Figure 2.12, removal of the requirement to take a world history course is not associated with any

change in course enrollments. That is, students in states that do not require students to take a world history course (holding other requirements constant) are no less likely than their peers in the baseline states to enroll in world history courses.

Furthermore, world history enrollments also remain unchanged when the requirements to take both a world history course and an economics course are removed (see the top center panel in Figure 2.12). Students in the states without world history and economics requirements are just as likely as their peers in the baseline states to enroll in world history courses. However, I observe a different story for economics course enrollments. In contrast to world history, removal of the economics course requirement is associated with a decline in course enrollments. The states that do not require students to take world history or economics have enrollment rates in economics courses that are 38 percentage points lower than the baseline states, even after controlling for other factors like student interest and course access.

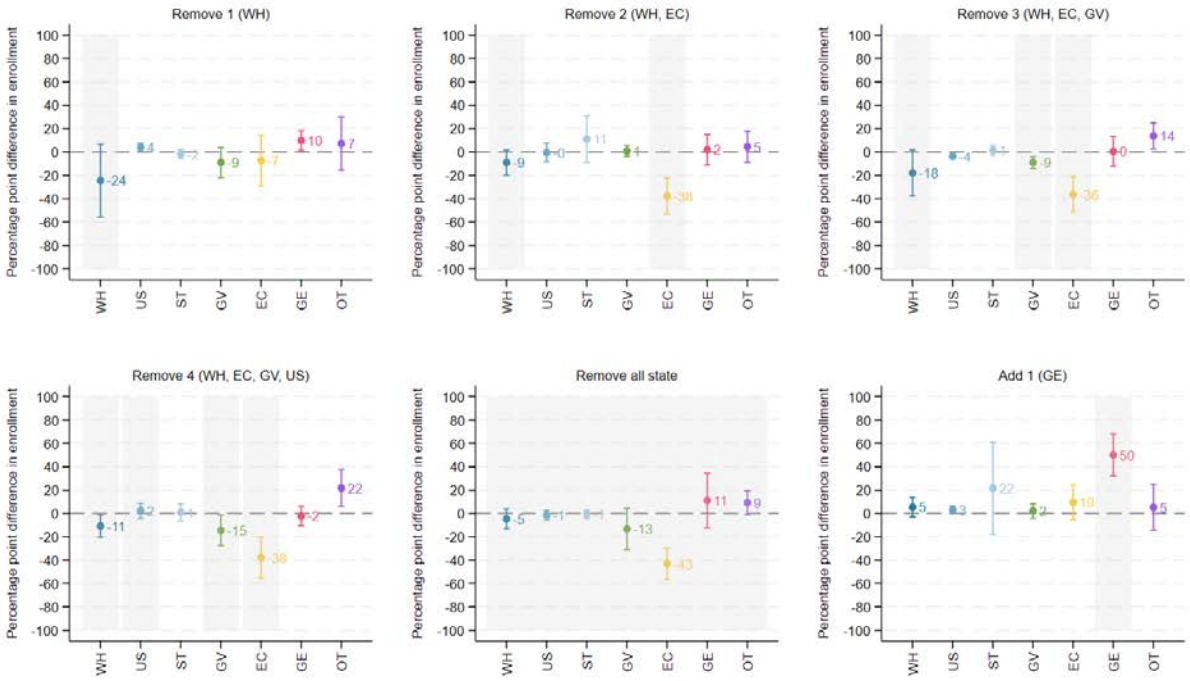
I observe a similar story when the requirement to take a government course is removed on top of the requirements to take world history and economics courses (see the top right panel in Figure 2.12). As before, students are no less likely to enroll in world history courses but are less likely to enroll in economics courses. Newly, however, students in these states are also less likely to enroll in government courses, even after controlling for other factors like student interest and course access. These states have enrollment rates in government courses that are 9 percentage points lower than the baseline states. Importantly, I also newly observe heightened enrollments in courses in the "other" social studies disciplines. That is, students in the states with 3 discipline-specific requirements removed (world history, economics, and government) are more likely to be enrolled in courses in the "other" social studies disciplines.

Removal of the fourth requirement to take a U.S. history course is not associated with any change in U.S. history course enrollments (see the bottom left panel in Figure 2.12). However, I observe the same general pattern described previously: declines in government and economics enrollments and increases in enrollments in the "other" social studies disciplines.

Importantly, this pattern largely disappears when I remove all state graduation requirements. Students in the four states (Colorado, Massachusetts, Nebraska, and Pennsylvania) that have no state-mandated graduation requirements (in social studies or in any other subject) have enrollment rates in social studies courses that generally look pretty comparable to those in the baseline states. The only exception to this rule is economics courses: students in states without state-mandated graduation requirements are significantly less likely to enroll in economics courses than their peers in the baseline states, after controlling for other factors.

Meanwhile, students' social studies coursetaking in the few states that require students to take geography in addition to the other discipline-specific requirements generally looks very similar to that of students in the baseline states (see the bottom right panel in Figure 2.12). There is one unsurprising exception: students in these states are more likely to enroll in a geography course than their peers in the baseline states. These states have enrollment rates in geography courses that are 50 percentage points higher than the baseline states.

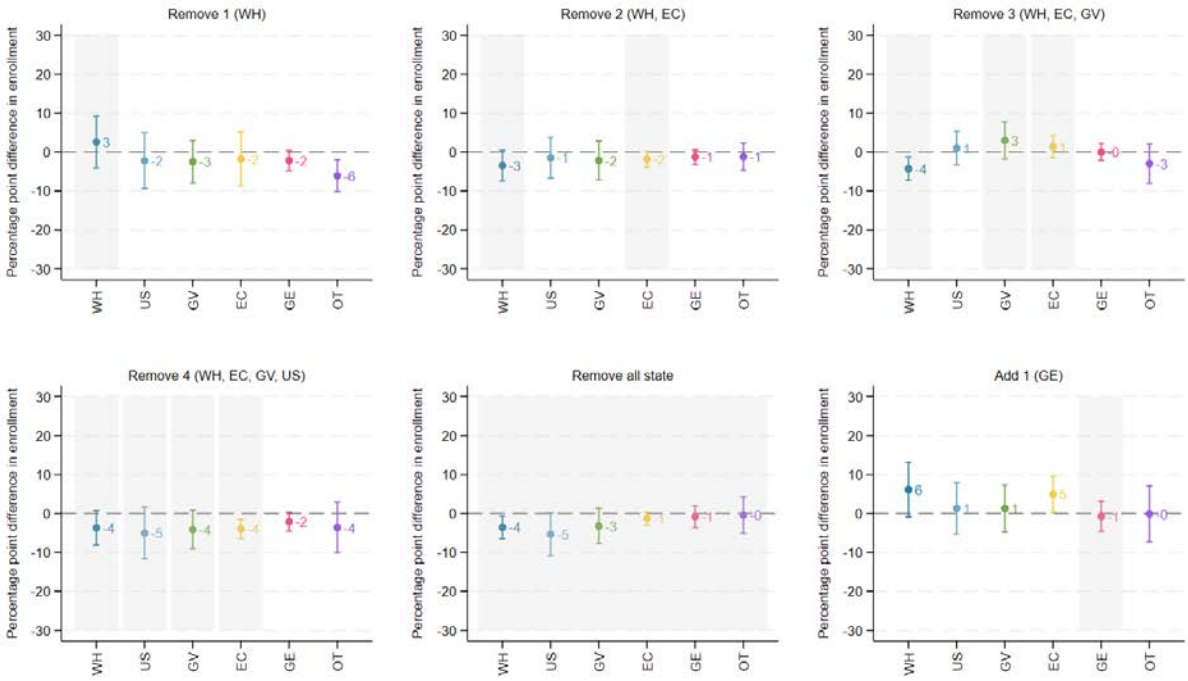
Figure 2.12 Coefficient plots for ever enrollment in specific social studies courses



NOTES: N = 10,980. Figure presents the coefficient and 95 percent confidence interval on the state policy variable from multilevel linear regression models regressing course enrollment on the state policy condition and a variety of controls. Regression models include inverse probability weights. Includes courses taken at any level. Includes only students with complete transcript and demographic data who graduated on-time and who remained in the same state and school for the entirety of their high school career. Grey shading indicates which requirements have been removed. World history = WH, U.S. history = US, State history = ST, Government = GV, Economics = EC, Geography = GE, Other = OT
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Focusing on enrollments in AP/IB courses, I observe a different story. Although I find some statistically significant associations between states' graduation requirements and students' coursetaking, overall, this relationship generally does not extend specifically to AP/IB courses. As shown in Figure 2.13, there is little to no association between states' policy conditions and AP/IB course enrollments. For example, although there is a strong association between removal of states' economics course requirements and student enrollment in economics courses, there is no association with enrollment in AP/IB economics courses (see the top center panel in Figure 2.13). Although I observe a handful of significant differences in AP/IB course enrollments in the alternate state policy conditions relative to the baseline states, these differences are substantively small and there is no clear pattern to the differences in AP/IB course enrollments (see also Table B.5).

Figure 2.13 Coefficient plots for ever enrollment in specific AP/IB social studies courses



NOTES: N = 10,980. Figure presents the coefficient and 95 percent confidence interval on the state policy variable from multilevel linear regression models regressing course enrollment on the state policy condition and a variety of controls. Regression models include inverse probability weights. Includes only students with complete transcript and demographic data who graduated on-time and who remained in the same state and school for the entirety of their high school career. Grey shading indicates which requirements have been removed. World history = WH, U.S. history = US, Government = GV, Economics = EC, Geography = GE, Other = OT
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

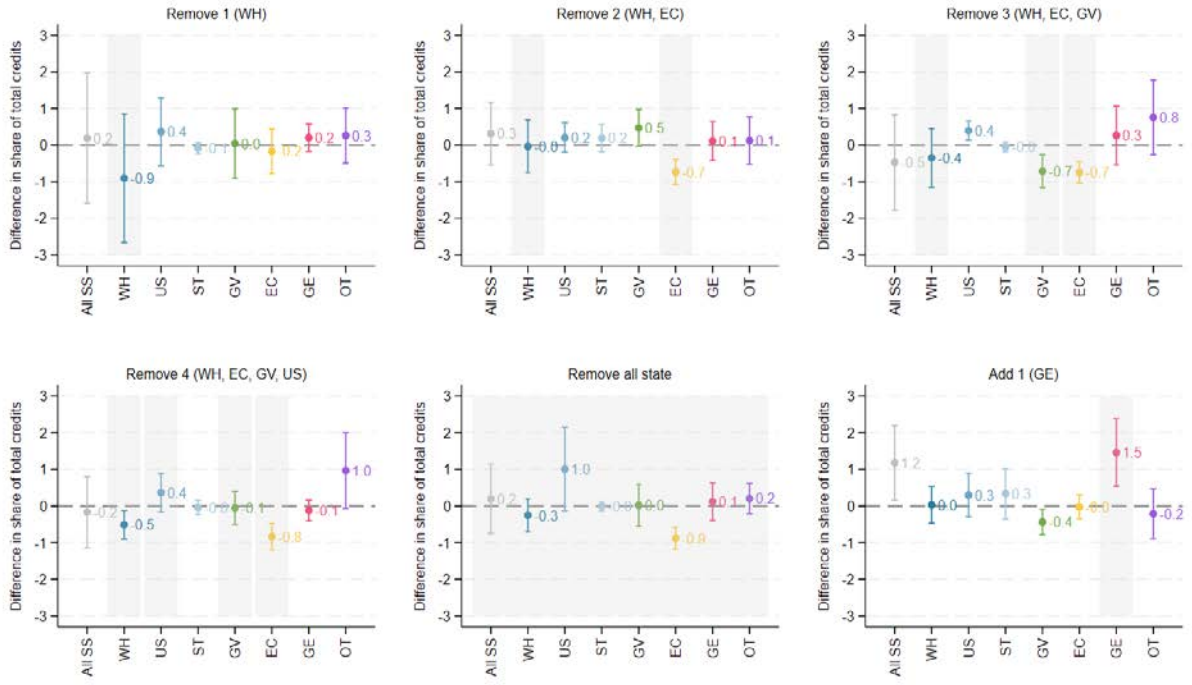
Share of credits earned by discipline

Finally, I examine how the share of total credits earned in social studies and in specific social studies disciplines differs across state policy conditions. I present the results of this analysis in Figure 2.14 (see also Table B.5). Looking first at the share of credits earned in social studies overall, I find that across state policy conditions, students spend roughly the same share of their total credits in social studies. For example, students in the states that remove all state-mandated graduation requirements spend about the same share of their total credits in social studies as students in the baseline policy condition. I observe only one exception to this rule: students in the states that require a geography course on top of other discipline-specific requirements spend a greater share of their total high school credits in social studies than students in the baseline states. In many ways, this finding is not surprising because states have generally scaled their social studies course requirements to comprise similar shares of the total number of credits required (see Figure 2.2).

Although differences are not always statistically significant, Figure 2.14 also suggests how some of these disciplines may be in tension with one another. That is, an increase in the share of

total credits earned in a specific discipline might come at the expense of credits earned in other social studies disciplines. For example, examine the top right panel in Figure 2.14. Relative to students in the baseline policy condition, students in the states with three course requirements removed (world history, economics, and government) earned *fewer* credits on average in government and economics courses. But these same students earned *more* credits in U.S. history courses. I observe evidence of this same pattern in the states that remove four credits and in the states that remove all state-mandated requirements, although differences are not statistically significant. Furthermore, although differences are not statistically significant, I also observe a pattern of declining shares of credits spent in economics courses offset by an increased share of credits earned in "other" social studies disciplines.

Figure 2.14 Coefficient plots for share of total credits earned in social studies courses



NOTES: N = 10,980. Figure presents the coefficient and 95 percent confidence interval on the state policy variable from multilevel linear regression models regressing the share of total credits earned on the state policy condition and a variety of controls. Regression models include inverse probability weights. Includes courses taken at any level. Includes only students with complete transcript and demographic data who graduated on-time and who remained in the same state and school for the entirety of their high school career. Grey shading indicates which requirements have been removed. All SS = Total social studies, World history = WH, U.S. history = US, State history = ST, Government = GV, Economics = EC, Geography = GE, Other = OT
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

The patterns observed in Figures 2.12 and Figure 2.14 generally suggest there may be a substitution effect occurring as discipline-specific course requirements are moved. That is, when students are not required to take discipline-specific courses in economics and, to a lesser extent,

in government, students tend to spend more time in U.S. history courses and/or in courses in the "other" social studies disciplines. Importantly, because the share of total credits spent in social studies does not change as requirements are removed, this suggests that students are *substituting between social studies courses as opposed to substituting social studies courses with courses in other academic subjects* (see also Figure B.5).

I performed a series of robustness checks to confirm these results. First, I confirmed that my findings are not sensitive to inclusion of propensity score weights. Social studies coursetaking patterns look similar across state policy groups regardless of whether propensity score weights are included. Second, while I chose to use linear multilevel regression models for ease of interpretability, I also confirmed that my results are not sensitive to this modeling choice by repeating my analyses using multilevel logistic regressions. Third, I estimated a version of my models in which I include all students and use a categorical variable capturing assignment of students to the policy condition, where the reference group is students in the baseline policy condition. The benefit of this model is that all students are included, increasing my sample sizes. The downside of this model is that adjustments cannot be made to account for differences in population compositions across my seven state policy conditions. Nevertheless, I generally observed similar estimates when I estimated the models in this fashion.

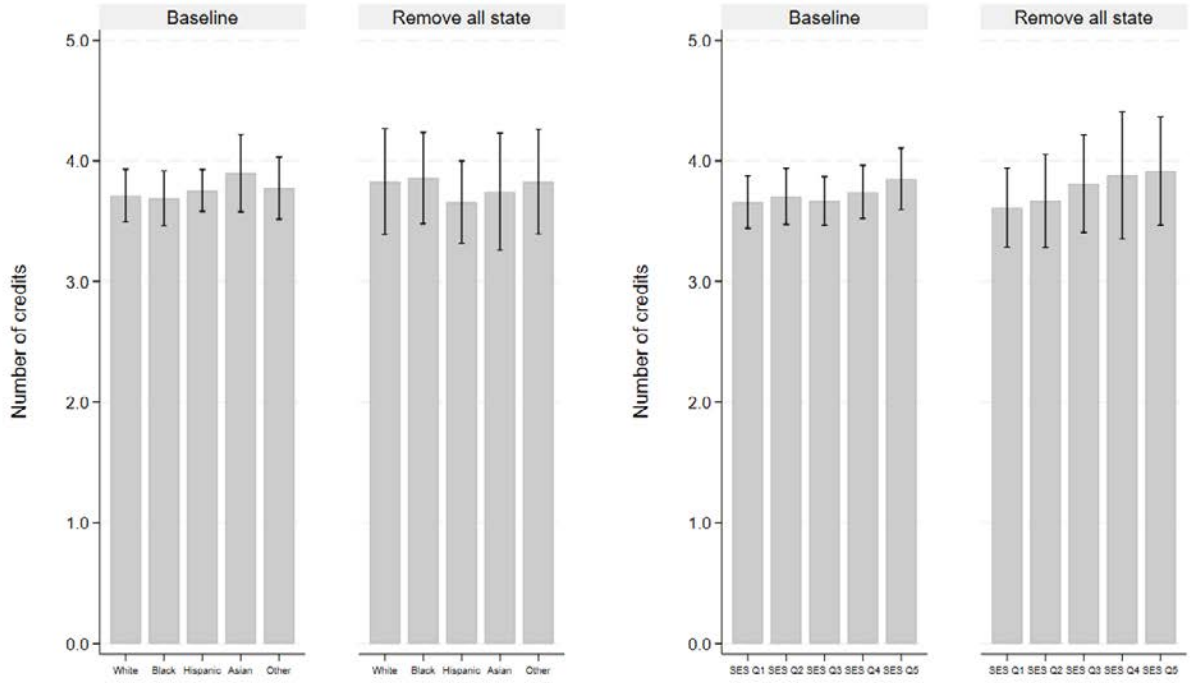
Research question 3

I now turn to my third research question, "How do any course enrollment disparities across student subgroups (i.e., student race/ethnicity, family socioeconomic status) compare in states with and without specific graduation requirements?" Said another way, I investigate to what extent there is parity in course enrollments across student subgroups. As mentioned above, I compare coursetaking for students in the states with all state requirements removed with those in the baseline states. I focus on these two policy conditions for these comparisons for two reasons: (1) they represent perhaps the most extreme divergence in the policy landscape and (2) I have sufficient sample sizes in these comparison groups to support subgroup analyses. Nevertheless, I caution readers that small sample sizes here lead to large confidence intervals.

Total number of credits earned in social studies

I begin by examining the total number of credits earned across student subgroups. Figure 2.15 shows the mean number of social studies credits earned by state policy condition and student subgroup. As shown in Figure 2.15, there was parity in the total number of social studies credits earned across student subgroups in both state policy conditions. That is, in both the baseline states and states with all state-mandated graduation requirements removed, students of all subgroups earned roughly the same number of social studies credits.

Figure 2.15 Mean number of social studies credits earned, by state policy condition and subgroup

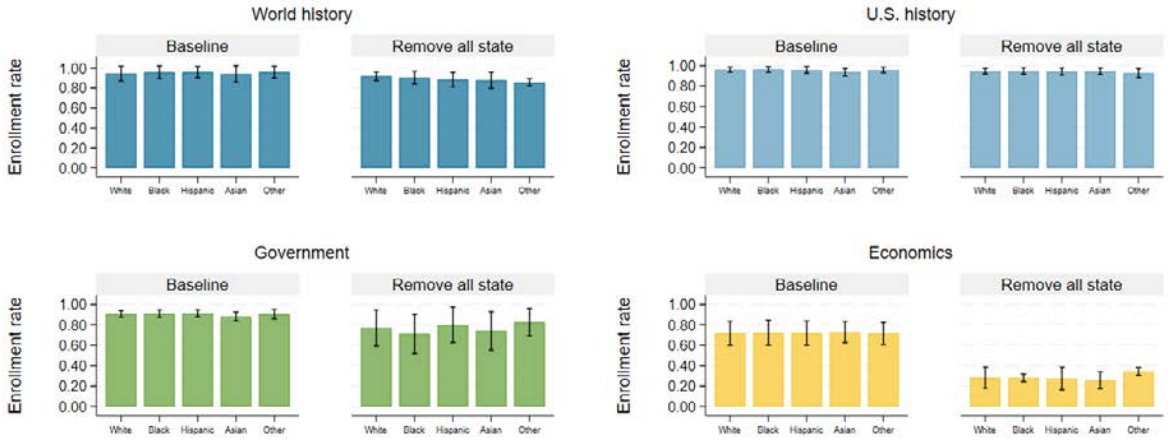


NOTES: N = 6,200. Results are margins from multilevel linear regression models regressing the number of credits earned in social studies on an indicator of the state policy condition interacted with categorical variables for student race/ethnicity and family socioeconomic status and a variety of controls. Regression models include inverse probability weights. Includes courses taken at any level. Includes only students with complete transcript and demographic data who graduated on-time and who remained in the same state and school for the entirety of their high school career.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Ever enrollment in social studies courses by discipline

I first examine ever enrollment in various social studies courses of any level by state policy condition and student racial/ethnic subgroup (see Figure 2.16). For ease of interpretation and to facilitate comparisons, I present my results as enrollment rates across student subgroups. Perhaps unsurprisingly given that there are no statistically significant differences in the total number of social studies credits earned across subgroups, I do not observe significant differences in course enrollments across student racial/ethnic subgroups within each of my state policy comparison groups. As shown in Figure 2.16, enrollment rates for students in the baseline states are consistently high for the disciplines in which these states have requirements (that is, world history, U.S. history, government, and economics). I find that although enrollment rates in economics courses are lower in the states with no state-mandated requirements, *they are not more unequal*. That is, the likelihood of enrolling in an economics course decreases for students of all racial/ethnic subgroups when this requirement is removed, not just for some students as I had hypothesized.

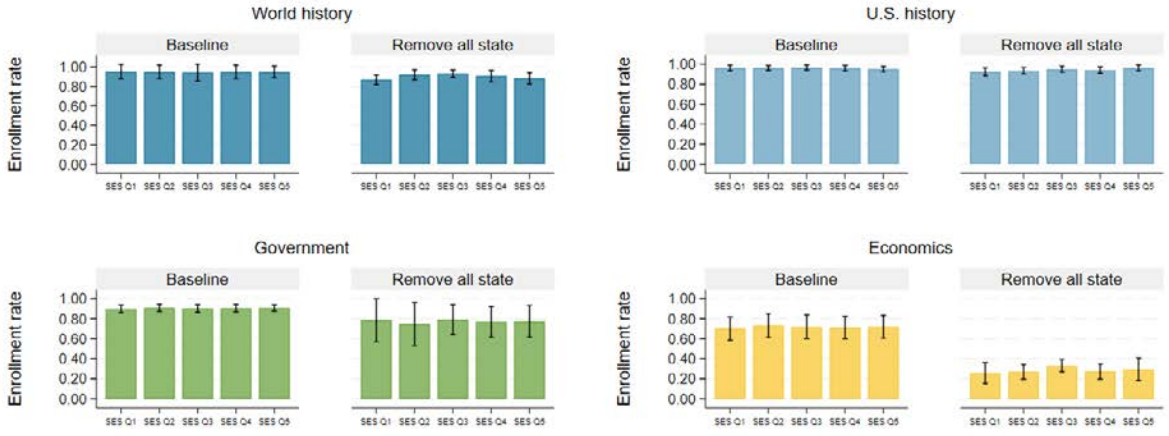
Figure 2.16 Enrollment rates in social studies courses, by discipline, state policy condition, and student racial/ethnic subgroup



NOTES: N = 6,200. Results are margins from multilevel linear regression models regressing course enrollment on an indicator of the state policy condition interacted with a categorical variable for student race/ethnicity and a variety of controls. Regression models include inverse probability weights. Includes courses taken at any level. Includes only students with complete transcript and demographic data who graduated on-time and who remained in the same state and school for the entirety of their high school career.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

As shown in Figure 2.17, I observe similar patterns by family socioeconomic status. That is, I find that economics course enrollments are lower in the states that do not mandate this course, but that they are not more unequal. Taken altogether, these findings suggest that removal of state-mandated course requirements does not necessarily lead to widening of enrollment gaps across student subgroups, at least when examining coursetaking at any level.

Figure 2.17 Enrollment rates in social studies courses, by discipline, state policy condition, and family socioeconomic status subgroup



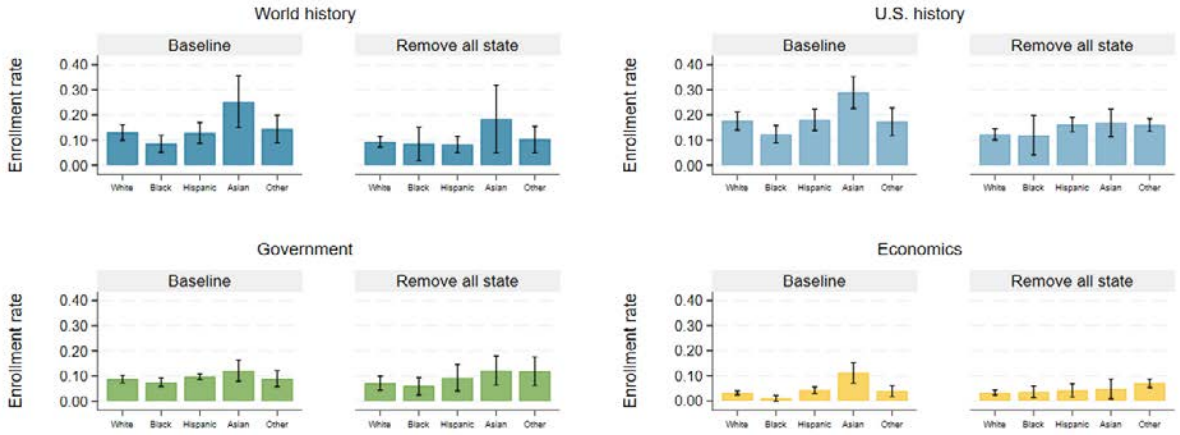
NOTES: N = 6,200. Results are margins from multilevel linear regression models regressing course enrollment on an indicator of the state policy condition interacted with a categorical variable for family socioeconomic status and a variety of controls. Regression models include inverse probability weights. Includes courses taken at any level.

Includes only students with complete transcript and demographic data who graduated on-time and who remained in the same state and school for the entirety of their high school career.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Next, I examine to what extent there is parity across student subgroups in AP/IB course enrollments. Here, I observe a slightly more nuanced story for AP/IB courses than I did for courses taken at any level. Figure 2.18 plots students' likelihood of enrolling in various AP/IB social studies courses by their race/ethnicity and their state policy context.

Looking at AP U.S. history courses as an example (shown in the top right panel in Figure 2.18), students across racial/ethnic subgroups in the alternate state policy condition with all state requirements removed were roughly equally likely to enroll in an AP/IB U.S. history course. That is, AP/IB U.S. history course enrollments for all racial/ethnic subgroups hovered around 15 percent. I observed a different pattern in the baseline states. That is, in the baseline states, nearly three in ten Asian students enrolled in an AP/IB U.S. history course. Meanwhile, only one in ten Black students did. In other words, I observed disparities in AP/IB U.S. history enrollments among students in the baseline states. Although confidence intervals are large—making it difficult to tease out precise relationships—I generally see evidence of this same pattern of widened disparities in world history and economics enrollments in the baseline states as well.

Figure 2.18 Enrollment rates in AP/IB social studies courses, by discipline, state policy condition, and student racial/ethnic subgroup



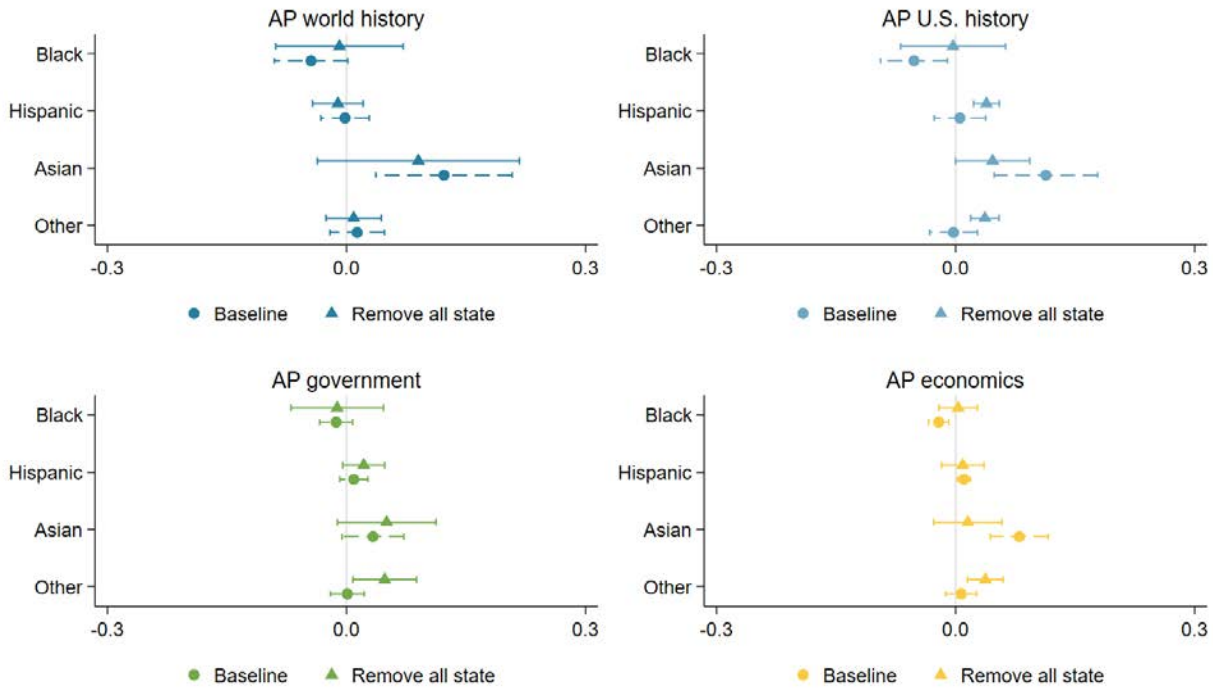
NOTES: N = 6,200. Results are margins from multilevel linear regression models regressing course enrollment on an indicator of the state policy condition interacted with a categorical variable for student race/ethnicity and a variety of controls. Regression models include inverse probability weights. Includes only students with complete transcript and demographic data who graduated on-time and who remained in the same state and school for the entirety of their high school career.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Figure 2.19 presents another way to conceive of these racial/ethnic differences. Figure 2.19 plots the difference in likelihood of enrollment in AP/IB social studies courses for students of various racial/ethnic subgroups relative to White students. A confidence interval that straddles

the zero line means that students of that racial/ethnic subgroup were no more likely to enroll in AP/IB social studies courses than their White peers. A positive value means that students of that racial/ethnic subgroup were more likely than their White peers to enroll in an AP/IB social studies course and vice versa.

Looking again at AP/IB U.S. history courses as an example, in both state policy conditions, Asian students were more likely than their White peers to enroll. But the Asian-White enrollment gap is larger in the baseline states than in the alternate state policy condition with all requirements removed. Furthermore, Black students in the alternate state policy condition with all requirements removed are no less likely than their White peers to be enrolled in AP/IB U.S. history courses. But in the baseline states, Black students are less likely to be enrolled in this course than their White peers. Although confidence intervals are large and there are some exceptions to the rule, I generally observe a similar pattern for AP/IB world history and economics course enrollments too. I do not observe the same patterns for government courses.

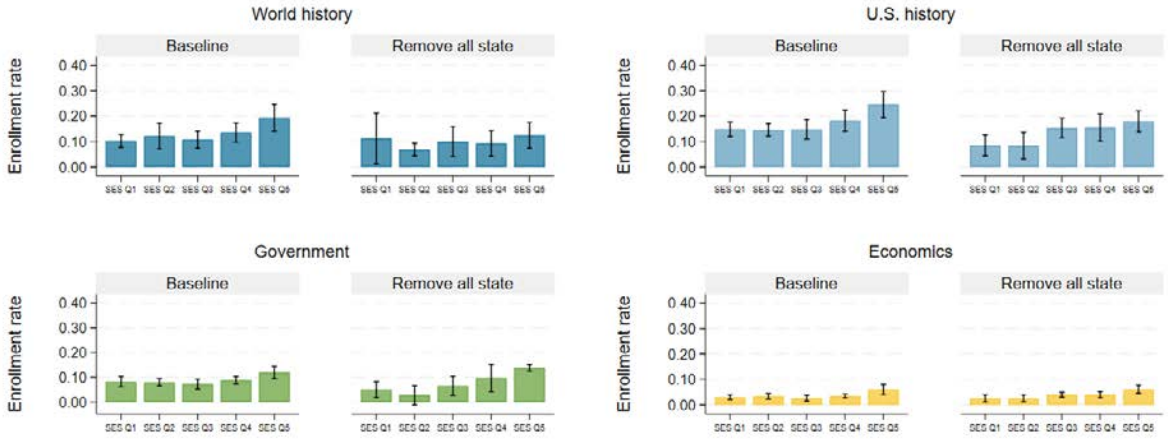
Figure 2.19 Racial/ethnic enrollment gaps (relative to White students) in AP/IB social studies courses, by state policy condition



NOTES: N = 6,200. Figure displays the difference in the likelihood of enrolling for each racial/ethnic subgroup relative to White students. Results are from multilevel linear regression models regressing course enrollment on an indicator of the state policy condition interacted with a categorical variable for student race/ethnicity and a variety of controls. Regression models include inverse probability weights. Includes only students with complete transcript and demographic data who graduated on-time and who remained in the same state and school for the entirety of their high school career.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

I also investigated differences in students' likelihood of enrolling in AP/IB social studies courses by state policy condition and family socioeconomic status. I found that enrollment gaps by family socioeconomic status are not as pronounced as those by student race/ethnicity. Although visually Figure 2.20 suggests that students' likelihood of enrolling in AP/IB social studies courses increases with family socioeconomic status in both state policy conditions, these differences are not statistically significant. In general, students across socioeconomic subgroups within the same state policy condition were roughly equally likely to be enrolled in AP/IB social studies courses after taking into account other factors, including student interest and course access.

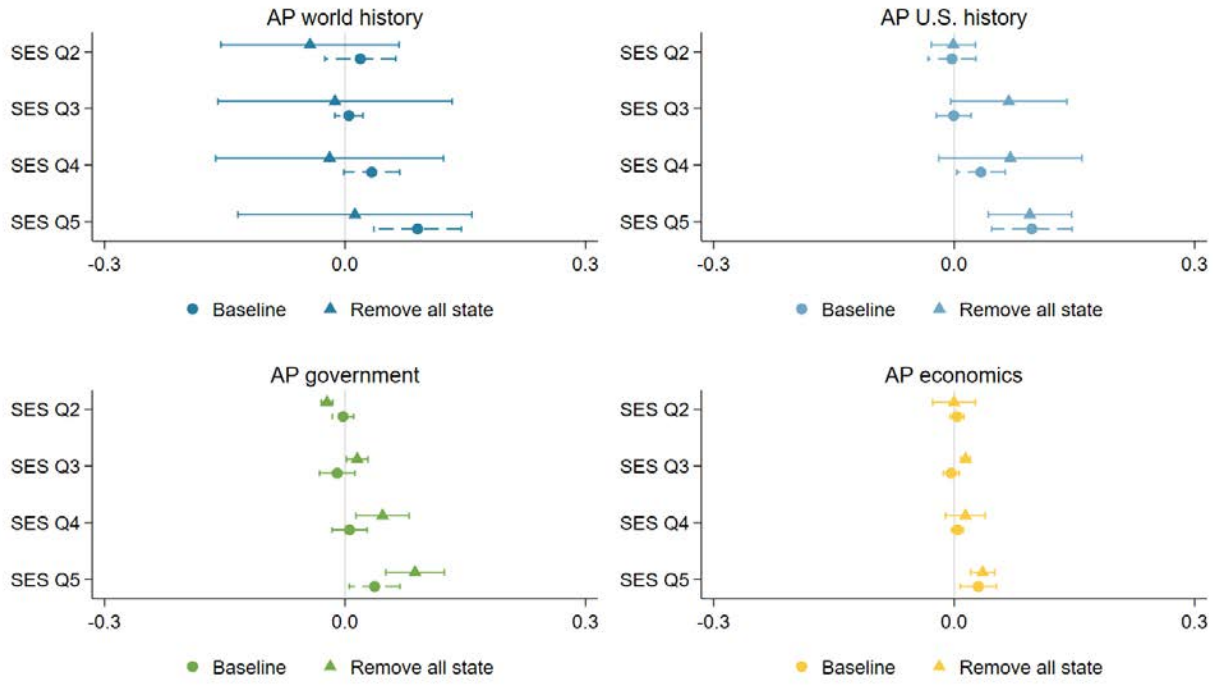
Figure 2.20 Enrollment rates in AP/IB social studies courses, by discipline, state policy condition, and family socioeconomic status



NOTES: N = 6,200. Results are margins from multilevel linear regression models regressing course enrollment on an indicator of the state policy condition interacted with a categorical variable for family socioeconomic status and a variety of controls. Regression models include inverse probability weights. Includes only students with complete transcript and demographic data who graduated on-time and who remained in the same state and school for the entirety of their high school career.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

The few exceptions to this rule can most clearly be seen in Figure 2.21. As shown in the bottom left panel in Figure 2.21, students in families in the highest socioeconomic quintile were more likely than their counterparts in the lowest socioeconomic quintile to enroll in AP/IB world history courses, but only in the baseline states. For the other AP/IB social studies courses—U.S. history, government, and economics—students in the highest socioeconomic quintile in the baseline states were more likely than their counterparts in the lowest socioeconomic quintile to be enrolled. But I observed this same pattern in the alternate state policy condition as well, and enrollment gaps were roughly of the same magnitude.

Figure 2.21 Enrollment gaps (relative to students in families in the lowest socioeconomic quintile) in AP/IB social studies courses, by state policy condition



NOTES: N = 6,200. Figure displays the difference in the likelihood of enrolling for each family socioeconomic quintile subgroup relative to students in the lowest family socioeconomic quintile. Results are from multilevel linear regression models regressing course enrollment on an indicator of the state policy condition interacted with a categorical variable for family socioeconomic status and a variety of controls. Regression models include inverse probability weights. Includes only students with complete transcript and demographic data who graduated on-time and who remained in the same state and school for the entirety of their high school career.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

In summary, though standard errors are large and patterns are not always consistent, results from this analysis generally suggest that racial/ethnic enrollment gaps in the most rigorous social studies courses are wider in the baseline states (i.e., those states that fully prescribe students' social studies coursetaking) than in the states that place no constraints on students' social studies coursetaking at all. In contrast, though I find some evidence that AP/IB course enrollments are higher among the students in the highest family socioeconomic quintiles than among students in the lowest quintiles, I do not find strong evidence that these socioeconomic enrollment gaps are related to states' policy context.

Limitations

Readers should keep in mind a few limitations when interpreting these results. First, the data analyzed in this paper were collected between 2009 and 2013 and reflect coursetaking patterns among students who graduated high school in 2013. It is possible that social studies coursetaking patterns have changed to some degree over the last decade, and there are some data points to

suggest that this might be the case. The number of students taking AP exams in humanities topics (including social studies) has continued to grow since 2013, suggesting that AP social studies course enrollments have grown too (American Academy of Arts & Sciences, undated-a). Furthermore, some schools and states have added new social studies course offerings since these data were collected. For example, the College Board is currently piloting a new AP African American Studies course, and, in 2021, California became the first state to require students to take an ethnic studies course to graduate high school (Kornfield, 2021). It is unclear how the introduction of these new course offerings may shift (or may have already begun to shift) social studies course enrollments. Given that there are a limited number of hours in the school day, it is possible these new courses will create a substitution effect, where students replace one or more of their more existing social studies courses with one or more of these new courses.

On the other hand, there are also some data points to suggest that social studies course enrollments may not have shifted over the last decade to the degree that we might have expected. Limited data from the National Assessment of Educational Progress (NAEP) transcript studies show that high school students were still taking the same number of social studies credits on average in 2019 that they were back in 2009 (NCES, undated-a). Furthermore, enrollment trends in all social studies courses remained flat between 2009 and 2019, following a notable growth period between 1990 and 2009 (American Academy of Arts & Sciences, undated-b). There was a slight growth in government course enrollments between 2009 and 2019, but enrollments remain below universal levels (ibid). Furthermore, states' graduation requirements—at least in social studies—have remained relatively stable over the past decade (ECS, 2023). For example, states like Arizona, California, Florida, Michigan, and Tennessee still fully prescribe the disciplines in which students' social studies credits must be earned. In Colorado, Massachusetts, and Pennsylvania, requirements are still set locally by school boards. States like Alaska, Kentucky, Montana, Rhode Island, Oregon, and Wisconsin still place no (or almost no) constraints on how students complete their social studies credits. However, there have been a few notable changes: Texas removed its requirement that students take a geography course and Nebraska enacted graduation requirements set at the state level. Nevertheless, to the degree to which states' graduation requirements influence students' coursetaking, the stability in states' social studies graduation requirements over the last decade suggest that coursetaking patterns today are likely similar to those observed for the class of 2013.

Second, this paper explores only one aspect of state policy (states' minimum graduation requirements) and its relationship with students' high school coursetaking. However, it is possible that other state policies could influence students' high school social studies coursetaking as well. States' academic standards in social studies vary widely (e.g., American Institutes for Research, 2023; Stern et al., 2021; Zadrozny, 2020) and differing expectations across states in what content students should be exposed to in high school could influence students' coursetaking to some degree. In some states, the minimum postsecondary entry requirements exceed those necessary to graduate high school in that state; these requirements might be set directly by the

state or by the state's primary public postsecondary institution (Dounay, 2006; Jimenez & Sargrad, 2018). This discrepancy appears to be a greater problem for math requirements than for social studies, but there is some misalignment between postsecondary entry requirements and minimum graduation requirements for social studies too (Jimenez & Sargrad, 2018). For example, four states (Delaware, Montana, New Hampshire, and Wisconsin) have minimum high school graduation requirements in social studies that are less than those required to attend the public university system in that state (ibid). Thus, students' social studies coursetaking in these states may be influenced by students' desire to complete the courses necessary for postsecondary entry and less so those needed only to graduate high school.

Some states also impose additional graduation requirements beyond coursetaking that could influence the courses that students take. For example, some states require students to pass end-of-course assessments, exit exams, or citizenship exams to graduate (e.g., Education Commission of the States, 2018; Godsay, 2012; Railey & Brennan, 2016). In fact, Schiller & Muller (2003) found that states' coursetaking requirements in math had greater teeth when paired with assessment requirements. Relative to other subject areas like math, few states have high stakes assessments for social studies. However, as shown in Table B.6, a handful of states do. These assessments differed in terms of their type, whether they were required for graduation, and what specific social studies topics they covered. It is possible that states' assessment policies influence students' high school coursetaking to some degree.[9] Furthermore, recent reviews of states' middle school social studies guidelines suggest that discipline-specific social studies coursetaking does vary at the middle school level across states (Zadrozny, 2017, 2020). Variation in high school social studies course enrollments may be explained to some extent by variation in middle school course enrollments; for example, students in one state may typically take geography in grade 8 while students in another state may typically take this course in grade 9. Because HSLS:2009 began tracking students in ninth grade, I am not able to investigate how middle school coursetaking—and how differences in how states structure their middle school courses—shape students' high school social studies coursetaking. In summary, states' minimum graduation requirements are likely not the only state policies that influence coursetaking, and it is possible that any state differences I observe in this paper are driven by differences in state policy other than (or in addition to) graduation requirements.

The final set of limitations relate to the data and methods used in these analyses. Although survey sampling was done intentionally to allow for production of state-level estimates in 10

[9] It is possible that states' social studies assessments—and not course requirements—influence student social studies coursetaking to some degree. However, evidence from my HSLS:2009 sample suggest this is not the case. Using a regression framework, I compared enrollment rates in states with a course and an assessment requirement with enrollment rates in states with only a course enrollment. Of course, states only administer statewide social studies assessments in the social studies disciplines in which they have course mandates (see Table B.1 and Table B.6). Therefore, I had sufficient sample to investigate whether states' social studies course requirements have more teeth when paired with a world history, U.S. history, or government assessment. Notably, these are the disciplines that have the highest enrollment rates—both nationally and across states. The intertwined nature of course and assessment requirements and the fact that enrollment rates in the types of courses that have assessment requirements are so high regardless of the state policy context limit my ability to fully investigate the influence of assessments on coursetaking. With these caveats in mind, I found no evidence to suggest that course requirements in any of these disciplines have more teeth when paired with assessments. Enrollment rates in states that require students to both complete a course and pass an assessment are no higher than in those states that only require completion of a course. I observed this same pattern for U.S. history, world history, and government courses.

states, sample sizes for each state are small especially because students are nested within schools. Nevertheless, NCES has used HSLS:2009 in a similar fashion to produce state-level estimates of course enrollments, increasing confidence that estimates are reliably stable for reporting purposes (NCES, undated-f). However, small sample sizes limit my ability to tease out significant differences in course enrollments across states since some estimates can be quite imprecise. Furthermore, the research design employed in this paper cannot be used to estimate the causal effect of states' graduation requirements on students' social studies coursetaking. While propensity score weighting likely helps to mitigate concerns about selection bias to some extent, differences in outcomes between students in the baseline states and in the alternate policy scenarios may be due not only to differences in the policy context but due to differences in the composition of students across states. Future research on students' high school social studies coursetaking should move toward more rigorous research designs that would allow for production of causal estimates.

Summary

In this paper, I used high school transcript data on some 13,000 students collected via the High School Longitudinal Study of 2009 to investigate students' social studies coursetaking by state. I also exploited differences in states' graduation requirements to investigate the association between state policy and students' social studies coursetaking. In this section, I first briefly summarize the key findings from these analyses. I then discuss their implications for policy and practice.

Review of key findings

First, high school students across the United States earn roughly the same number of credits in social studies on average, although how they earn these credits varies widely. That is, I observed parity in the average number of social studies credits earned across student subgroups and across states, regardless of the specific graduation requirements in place (see Figures 2.10 and 2.15). I suspect that I observe this parity, at least in part, because states have similarly scaled their number of required social studies credits to comprise about one-sixth of the total required (see Figure 2.2) and because in states where requirements are low, students' social studies coursetaking often exceeds state minimums (see Figure 2.6). What is different across the United States is not how much of high school coursetaking is dedicated to social studies but how states, and therefore students, distribute their social studies time across disciplines (see Figure 2.9). Descriptive analyses suggest that enrollment rates in some social studies disciplines (government, economics, geography, and "other") vary widely across states. For example, enrollment rates in economics and geography courses are near universal levels in some states but are barely above zero in others (see Figure 2.7). Furthermore, my analyses reveal a tension between enrollment in government, economics, and geography courses on the one hand and

courses in "other" social studies disciplines on the other. As shown in Figures 2.12 and 2.14, when states remove discipline-specific requirements in government, economics, and geography, coursetaking in these disciplines falls while coursetaking in "other" social studies disciplines—such as psychology, sociology, and the humanities—rises.

Second—and relatedly—a nontrivial number of students nationally (including large numbers of students in states without many discipline-specific requirements) enroll in courses in the "other" social studies disciplines. Nationally, about a third of students enroll in courses in the "other" social studies disciplines (see Figure 1.2). In some states, as many as half of students do (see Figure 2.7). Enrollment in these "other" courses is especially high in states where students have more freedom to select their own courses (see Figure 2.12). This suggests that there is at least some tension between the courses that states want students to take and the courses that at least some students want to take and will choose to take if left to their own devices.

Third, I find limited evidence that states' graduation requirements are associated with coursetaking in the most rigorous AP/IB social studies courses. As shown in Figure 2.13, AP/IB social studies course enrollments—at least when looking at totals—looked similar in the states with discipline-specific requirements removed to those in the baseline states. This suggests that implementing discipline-specific graduation requirements does not necessarily lead to more students enrolling in the most rigorous courses in these disciplines. This finding generally aligns with those from prior studies that have examined relationships between states' graduation requirements and students' math and science coursetaking; these studies observed the greatest coursetaking increases in the lowest-level courses as opposed to the most rigorous ones (e.g., Domina & Saldana, 2012; Montgomery et al., 2010).

Fourth, although social studies course enrollments are lower in the states without discipline-specific requirements, they are not necessarily more unequal across student subgroups. I had expected to observe larger disparities in course enrollments across student subgroups in the states without robust graduation requirements, thinking that increased school or student autonomy would result in greater enrollment differences. To my surprise, this was not the case. Instead, I observed relative parity in course enrollments in the states without robust requirements (see Figures 2.16 and 2.17). In fact, I found at least some evidence to support the opposite conclusion. That is, I found limited evidence that disparities in AP/IB social studies course enrollments are larger in the states that have more stringent graduation requirements. In the baseline states—that is, in the states that require students to take economics, government, world history, and U.S. history—I observed gaps in AP/IB courses by student race/ethnicity.

Implications

First, fewer students will continue to enroll in government, economics, and geography courses (though not history courses) in the absence of state mandates. Adding graduation requirements in these disciplines will lead to heightened—though not necessarily

universal—course enrollments. As shown in Figure 2.12, enrollment rates in non-history social studies courses drop, often substantially, when state requirements to take these courses are removed. This drop off suggests that students will *not* elect to enroll in these courses on their own if they are not required to do so. Therefore, if state policymakers believe these courses to be fundamental for students' college, career, and civic outcomes—which is still an open question—they should mandate that students take these courses in the form of discipline-specific graduation requirements. This is likely to lead to increased course enrollments for students of all subgroups.

However, my results also suggest that even with additional discipline-specific requirements in place, coursetaking in some of these disciplines like economics may still lag below universal levels (see Figure 2.16). Numerous factors explored in prior research help explain why we might expect this to be the case. First, some states offer different high school degree programs (such as a career and technical education track), which may have slightly different course requirements (Achieve, 2015a). Second, states may be reluctant to enforce their graduation requirements if it means withholding diplomas from students. There is some evidence from the math literature to suggest this is a realistic concern. Both Carlson & Planty (2011) and Teitelbaum (2003) found that a notable share of students (about one in ten) graduated high school without meeting all requirements set in policy.

Second, high enrollment rates in the "other" social studies courses means that more attention should be paid to these courses.[10] Psychology courses comprise the largest share of these "other" courses (see Figure 2.8), suggesting that this is the "other" social studies course most deserving of additional attention. Setting aside the American Psychological Association (APA)'s assertion that psychology has wrongly been classified as a social studies course (Alston et al., 2019), states currently provide limited guidance about what these courses should look like. For example, only five states include the behavioral sciences in their academic standards (American Institutes for Research, 2023). States' lack of guidance for these "other" courses raise concerns about the consistency and quality of instruction delivered in these courses, at least relative to core four social studies disciplines (government, economics, geography, and history) where states—at least the best ones—not only provide academic standards, but also provide guidance on how content across social studies disciplines is supposed to work together to support students' civic development (e.g., California Department of Education, 2016; Stern et al., 2021). States and schools might look to existing national frameworks to develop instructional guidance. For example, the appendix to the C3 framework provides recommended learning objectives for high school psychology, sociology, and anthropology courses. The APA also just released

[10] Another related question is why, when they have the freedom to do so, more students choose to enroll in these "other" social studies courses than courses in disciplines like government, economics, and geography. For one, students may not perceive these government, economics, and geography courses to be as critical for their future college, career, and civic outcomes. There is some limited evidence to suggest that students hold largely negative attitudes about the utility of social studies (Schug et al., 1982). Furthermore, students may not need to take some or all of these courses to be competitive on their college applications (Dounay, 2006; ECS, 2022). Some students—perhaps especially STEM-focused students—might perceive a psychology course to be more aligned with their future college and career objectives. Ultimately, more research is needed to fully understand which social studies courses actually matter for students' college, career, and civic outcomes and how students make decisions about which social studies courses to enroll in.

suggested revised national standards for high school psychology courses (APA, 2022) and the College Board offers many resources to support AP coursetaking. Of course, concerns about the quality or consistency of instruction across classes and schools apply not only to courses in these "other" social studies disciplines like psychology and sociology, but to economics, geography, history, and government as well. However, a quick review of states' websites suggest that much more guidance is already provided for these disciplines than for the "other" disciplines.

Third, implementation of discipline-specific graduation requirements is unlikely to substantially increase course enrollments in the most rigorous AP/IB level courses. In fact, it may even have the unfortunate side effect of increasing enrollment disparities. Broadly, however, the lack of association between states' graduation requirements and students' AP/IB social studies coursetaking suggests that other mechanisms might have a stronger influence on students' AP/IB coursetaking. For example, students' AP/IB coursetaking might be better explained by school-level mechanisms, such as schools' course offerings and/or schools' policies that restrict who can enroll in higher-level courses. Or it could be that other state-level mechanisms beyond graduation requirements explain variation in students' AP/IB social studies coursetaking. States are continuing to push schools to expand their AP/IB course enrollments and have created different incentives to do so, such as subsidizing AP exam fees (College Board, undated; Kim-Christian & McDermott, 2022). More research is needed to understand the landscape of AP/IB social studies enrollments and how state and local policy mechanisms shape these course enrollments.

Finally, states are charting the courses that students take, at least to some degree, and they are charting different ones—raising concerns about whether students across the United States are receiving equitable exposure to a diversity of social studies disciplines while in high school. In aggregate, my analyses suggest that students' social studies coursetaking looks different across states and that differences in states' graduation requirements are at least partially responsible for these coursetaking patterns. Importantly, many states' social studies-focused graduation requirements look similar today to what they were for the class of 2013 (ECS, 2023). For example, Colorado, Massachusetts, and Pennsylvania still allow local school boards to determine graduation requirements (ECS, 2023). Thus, to the extent to which students' coursetaking is a function of their states' graduation requirements, the patterns I observed among class of 2013 graduates likely still generalize to present day.

Furthermore, graduation requirements are not the only place where we have seen states enact different policies in recent years when it comes to social studies. Perhaps increasingly over the last decade or so, states have adopted different academic standards for social studies and different assessments. Some states are moving to include emerging topics like media literacy in their academic standards while others are restricting the content teachers can discuss in their classrooms (e.g., Diliberti et al., 2023; Hansen et al., 2018; Stern et al., 2021; ECS, 2018). This perhaps increasing divergence in how states are approaching social studies education for

coursetaking and beyond raises obvious equity concerns, especially because the composition of students looks very different across states (e.g., NCES, 2022a).

In a democracy such as ours, it is probably ideal for all future voters to have roughly equivalent baseline knowledge to participate in the democratic process. For example, we would probably like all voters in our democracy to have a shared understanding about how the economy functions, the geographic differences in our nation, and how prior events in U.S. history have shaped current events. If students in different states are taking different social studies courses—for example, if students in Ohio are taking psychology courses while students in Texas are taking economics courses (see Figure 2.7)—this potentially raises concerns about which states are better preparing their students to engage in our democratic processes and to what extent differential knowledge obtained from taking different courses shapes students' perspectives.

Chapter 3. When math sorts, does social studies distort? How math tracking influences students' social studies coursetaking

Abstract

Math tracking—or the sorting students into separate math courses by math ability level—is a widely used, though controversial, practice in U.S. middle and high schools. Due to a confluence of factors, tracking secondary students in math may inadvertently sort them in other academic subjects too, including in social studies. This is potentially problematic because students may be differentially skilled in math than in social studies and because persistent disparities in students' math course placements by race/ethnicity and family socioeconomic status may be carried over into social studies. Using multilevel modeling with propensity score weighting and transcript data on over 11,000 students collected via the High School Longitudinal Study of 2009, this paper investigates to what extent students' math course placements at the start of high school in grade 9 predict their likelihood of enrolling in AP social studies courses in subsequent school years. My analyses reveal a complicated picture of how and to what extent math tracking is associated with students' AP social studies coursetaking. On average, students in high schools that use math tracking are no more or less likely to be enrolled in AP social studies courses in grades 10–12 than their counterparts in schools that do not use math tracking. However, use of math tracking may distort the composition of students enrolled in these courses: for example, the Black-Asian enrollment gap is wider in AP government courses in the schools that use math tracking compared with the schools that do not. In the subset of high schools that do track in math, overall, I find a strong positive association between students' ninth grade math course placement and their likelihood of enrolling in AP social studies courses, even after controlling for a variety of other factors. I find that the association between students' grade 9 math course placement and students' subsequent AP coursetaking is especially strong in schools with larger enrollment sizes. Furthermore, high-achieving social studies students on lower math tracks may be particularly disadvantaged: a student with an A grade point average in social studies on a low math track is less likely to enroll in an AP U.S. history course than a student with a B average on a high math track. Overall, the findings suggest that future research and policy discussions about schools' math tracking practices should not be isolated to potential impacts on students' math coursetaking but should include a focus on other academic subjects too.

Introduction

In 2021, six former U.S. education secretaries penned an opinion piece for *The Wall Street Journal* urging states and schools to reinvest in civics education. As they wrote, "Regrettably,

civics, which teaches skills of participation and the knowledge that sustains it, and history, which provides a frame of reference for the present, have been sorely neglected over the past half-century in U.S. schools…The early republic emphasized history, reading and math. In the mid-20th century, the launch of the Soviet satellite Sputnik and the dawn of an era of global economic competition drove a turn toward investment in STEM education" (Alexander et al., 2021). There is much evidence to support the secretaries' claim that civics, or social studies, education has become marginalized in the K–12 public education system in favor of STEM (science, technology, engineering, and math) education. For example, the federal government allegedly spends $50 per student on STEM education but only 5 cents per student on civics education (Ronco, 2024). Local school systems provide fewer dedicated supports for social studies than they do for other core academic subjects like math including less teacher evaluation, fewer professional learning activities, and less guidance around curriculum and instructional materials (Diliberti, 2023). Furthermore, although it is difficult to make comparisons across subjects, it appears there is more variation in the quality of states' academic standards in social studies than in math and more states have social studies standards ranked "mediocre" or "inadequate" (Friedberg et al., 2018; Stern et al., 2021).

The No Child Left Behind Act in 2001 (later amended by the Every Student Succeeds Act in 2015) required states to begin regularly assessing students in math and reading and, to a lesser extent, in science. The Act also established formal accountability systems to monitor schools' progress in increasing student achievement in these subjects. Social studies education was notably excluded from these reforms. Even today, few states administer assessments to monitor student achievement in social studies (ECS, 2018), and even fewer include indicators of social studies achievement in their school accountability system (ECS, 2021). In the rare cases when states do consider social studies achievement for accountability purposes, it is weighted far lower than achievement in reading, science, and math (ECS, 2021). In 2010, seven in ten social studies teachers agreed that "social studies classes have become a lower priority because of pressure to show progress on state tests in math and language arts" (Farkas & Duffett, 2010), a finding similarly echoed a 2022 survey of teachers (Hamilton et al., 2024). Likely related to increased accountability pressures in other academic subjects, schools are spending less instructional time in social studies, especially at the elementary level (e.g., Diliberti et al., 2023; Fitchett & Heafner, 2010; Fitchett et al., 2014; Heafner & Fitchett, 2012; Hoyer & Sparks, 2017; Tyner & Kabourek, 2020; U.S. Government Accountability Office, 2015). In sum, prior evidence on a variety of indicators—spending, instructional supports, academic standards, assessment, accountability policies, instructional time—consistently support the conclusion that K–12 schools prioritize STEM education over civics.

This paper hypothesizes there is yet another aspect of K–12 schools that prioritizes students' STEM education over their social studies education: math tracking. Tracking is the practice of sorting students in the same school into different courses by academic ability level. Higher-achieving students are sorted, or tracked, into more advanced courses, while lower-achieving

students are assigned to less advanced courses. Although some elementary schools do group their students by ability, tracking of students into specific courses by ability level typically begins in middle school and carries through high school (Kaufman et al., 2024; Loveless, 2013). And although U.S. schools can theoretically track students in all academic subjects, math is the core academic subject for which the practice of tracking is by far most prevalent.

This paper posits that tracking of students into math courses by their ability level may also inadvertently sort students in other academic subjects, like social studies. This systematic sorting of students across academic subjects has previously been referred to as *de facto* tracking—or an association in students' coursetaking across academic subjects that cannot be explained by formal institutional mechanisms (Lucas & Berends, 2002). Prior research hypothesizes that *de facto* tracking can arise from a complicated web of demographic and organizational aspects of schools—including school schedules, enrollment size, the degree of curricular differentiation, and the composition of the student population—as well as implicit or explicit beliefs about what types of students belong in more advanced courses (Lucas & Berends, 2002). Because math is the most tracked subject and because math tracking typically begins before students enter high school, students' math course placements might be highly predictive of their likelihood of enrolling in more advanced coursework in other academic subjects like social studies in subsequent school years. This means that students may end up sorted into courses in other academic subjects like social studies *not necessarily based on their ability level in that subject but instead based on their math ability*.

Current study

In this chapter, I investigate the association between math tracking and students' high school social studies coursetaking. The primary objective of this paper is to empirically illustrate the theoretical interconnectedness of students' high school coursetaking across academic subjects. With transcript data on some 11,300 students collected in the High School Longitudinal Study of 2009 (HSLS:2009), I first use multilevel modeling with propensity score weighting to compare social studies course enrollments in the schools that use math tracking with those that do not. I hypothesize that enrollments in more advanced social studies courses—which I proxy with Advanced Placement (AP) social studies courses—will be both higher and more inequitable in the schools that use math tracking. I focus on AP social studies course two reasons: (1) these courses are typically the most advanced or rigorous courses offered at the high school level and (2) few students nationally enroll in other advanced social studies courses not at the AP level (see Figure B.4). These initial analyses are intended to illustrate that AP social studies course enrollments look different in schools that track than in schools that do not track, and, therefore, it is worth investigating the tracking schools further.

I then restrict my analytic sample to focus solely on the subset of schools that track students in math. I again use multilevel modeling with propensity score weighting to investigate the

association between students' math course placements and their AP social studies coursetaking. I hypothesize there is a strong positive association between students' ninth grade math course placement and their likelihood of taking more advanced (AP) social studies courses, even after controlling for other factors associated with coursetaking like demographic characteristics, prior achievement, and course access. I also suspect this association is stronger in schools that experience greater constraints in constructing their master schedule, which I proxy by capturing various dimensions of schools' structure as well as the organization of their course schedules (e.g., number of periods in the school day, use of block scheduling). I investigate the following research questions:

(1) How do AP social studies course enrollments (overall and across student subgroups) compare in high schools that use math tracking versus those that do not?
(2) Is there an association between students' ninth grade math course placement and their likelihood of enrolling in AP social studies courses during their later high school years, after controlling for other factors associated with students' coursetaking?
(3) Is this association moderated by the structure of the high school that a student attends, including its enrollment size or the organization of its course schedule?
(4) Are high- versus low-achieving social studies students differentially influenced by their math track placement?
(5) Are students across subgroups similarly disadvantaged from being sorted onto a lower math track?

To the author's knowledge, this is the first study to explicitly focus on the relationship between students' math course placements and their subsequent AP social studies enrollments. To preview my results, I uncover a complicated picture of how and to what extent math tracking is associated with students' AP social studies coursetaking. Specifically, I find that, at least on average, students in high schools that use math tracking are no more or less likely to be enrolled in AP social studies courses in grades 10–12 than their counterparts in schools that do not use math tracking. However, use of math tracking may distort the composition of students enrolled in these courses: for example, the Black-Asian enrollment gap is wider in AP government courses in the schools that use math tracking compared with the schools that do not. Meanwhile, in the subset of schools that do track in math, I find a strong positive association between students' math track placement in grade 9 and their likelihood of enrolling in AP social studies courses, even after controlling for a variety of other factors associated with coursetaking. Black students are the exception to this rule: Black students on high math tracks are no more likely than their counterparts on low math tracks to enroll in AP social studies courses. I also find that the association between students' grade 9 math course and their subsequent AP social studies coursetaking is especially strong in schools with larger enrollment sizes. High-achieving social studies students on lower math tracks may be particularly disadvantaged: a student with an "A" grade point average in social studies on a low math track is less likely to enroll in an AP U.S. history course than a student with a "B" average in social studies on a high math track. Overall,

the findings suggest that future research and policy discussions about schools' math tracking practices should not be isolated to potential impacts on students' math coursetaking but should include a focus on other academic subjects too.

Background

Overview of tracking

Tracking is the practice of sorting students into specific courses by ability level. Middle and high schools sort, or track, higher-achieving students into more advanced courses, while assigning lower-achieving students to less advanced courses. Schools often use multiple measures to determine which students should be placed into which courses (Beaver & Weinbaum, 2013; Gao & Adan, 2016; Means et al., 2010). For example, schools may consider students' performance on previous standardized assessments (e.g., summative assessments, interim assessments, diagnostic assessments), their prior course grades, and/or teachers' recommendations. They may also take into consideration parents' or students' preferences. The list of measures that schools might take into consideration when making course placement decisions notably includes more objective measures like students' performance on previous standardized assessments and more subjective measures such as teachers' recommendations.

But regardless of the specific measures used to make such determinations, in the U.S. education system, tracking of students into specific courses occurs within schools and is intended to be decided independently by subject. This is in contrast to education systems in other countries that instead sort students across schools or across entire instructional programs (e.g., general education, vocational education) (OECD, 2020; OECD, 2024). A key reason why course placement decisions have historically been decided independently subject-by-subject is because students are not necessarily equally skilled across all academic subjects. That is, a student might have a relatively higher ability in one subject than in another, as I discuss in more detail below.

Prevalence of math tracking

Although U.S. schools can theoretically track students in all academic subjects, math is the core academic subject for which the practice of tracking is by far most prevalent (Loveless, 2013). Math tracking is widely used in secondary (middle and high) schools throughout the United States. Data suggest that roughly three-quarters of secondary schools track their students into math courses (Kaufman et al., 2024; Loveless, 2016; Steiner et al., 2024). And although there have been efforts to expand or constrain schools' use of the practice over time (e.g., Schwartz, 2023b), math tracking has been around for decades. Data show that as early as 1990, the vast majority of eighth graders were attending middle schools that had tracked them in math (Loveless, 2016). In comparison, tracking is not nearly as prevalent for the other academic subjects—least of all social studies (Hallinan, 1994; Loveless, 2013; Oakes, 1987).

Yet despite its continued popularity, math tracking is not a universal practice. Some states engage in math tracking to a much greater degree than others (Kaufman et al., 2024; Loveless, 2016; Steiner et al., 2024). Furthermore, there is somewhat mixed evidence about to what extent certain types of schools are more likely to engage in math tracking. One 2024 survey found that low-poverty schools and large schools were more likely to group students into math classes by ability than their high-poverty, urban, and small counterparts (Steiner et al., 2024). Other evidence suggests that school characteristics may not necessarily be a strong predictor of such grouping (Antonovics et al., 2023; Standing & Lewis, 2021).

How math tracking typically works

Perhaps one reason why tracking is so common in math relative to other academic subjects is that students typically progress through a clearly defined hierarchical math course sequence. The most common math sequence nationally is algebra I, then geometry, and then algebra II (Brown et al., 2018; Han, 2023; Koon & Davis, 2019). After algebra II, some students continue on to take even more advanced math courses like trigonometry or pre-calculus followed by Advanced Placement (AP) calculus (Brown et al., 2018). Starting this math sequence by grade 8 at the latest allows those students on the high math track to reach AP calculus before the end of high school. When Algebra I is offered in middle school, higher-achieving students tend to take algebra I in grade 8 (or even earlier in some cases), while lower-achieving students take a general math course and begin the same sequence a year later with algebra I in grade 9.

The benefits and drawbacks of math tracking

Despite its prevalence, math tracking remains a controversial practice. This is because the practice has produced mixed results in schools (Gamoran, 1992). On the one hand, research has shown that students who take more advanced math courses, especially earlier in their career, consistently have better outcomes (e.g., Long et al., 2012; Stein et al., 2011). Enrolling in an early algebra I course has been positively linked with an increased likelihood of enrolling in subsequent advanced math courses, if not higher math achievement (McEachin et al., 2020). Advocates of tracking policies claim that because it is more difficult for teachers to teach a group of students with diverse ability levels, instruction can be more effectively targeted when students are grouped by ability. In short, high performers benefit from being on the advanced track, and proponents claim it is unfair to hold these high performers back.

Others oppose the practice of tracking because they see the practice as broadly helping high-performing students at the expense of low-performing students (Coe, 2020). And there is evidence to support these claims. For example, low-achieving students are more likely to be in classes taught by novice teachers, perhaps in part because teachers prefer to teach more advanced courses (Kalogrides et al., 2012; Kalogrides & Loeb, 2013). Critics also argue that tracking segregates students, sorting them along racial and socioeconomic lines. Black students, Hispanic students, and low-income students have historically been underrepresented in grade 8 algebra I

enrollments and these differences persist through more advanced coursework (Loveless, 2021). This is likely in part because students' math course placements are influenced by often subjective measures of achievement that may be biased toward particular types of students. For example, screening processes that rely too heavily on subjective measures like teachers' or parents' recommendations may bias which students are identified for more advanced instruction (Card & Giuliano, 2016; Grissom & Redding, 2016). For example, well-educated parents are likely to have a better knowledge of tracking practices and are probably more likely to intervene to ensure their children are sorted into higher math courses (Useem, 1992). In short, opponents of math tracking claim the practice reproduces historic inequities in students' learning opportunities.

States and schools have made differing decisions about how to address these tensions, and some have even flipped back and forth in their approaches over time (Domina et al., 2016). Some, for example, have responded to these criticisms with an "algebra-for-all" approach where all students take algebra I in eighth grade. Research on these "algebra-for-all" policies that have been enacted at scale have revealed especially heterogeneous effects (e.g., increased enrollments, but heightened failure rates), since not all students are ready for algebra I in grade 8 (Dougherty, 2017; Stein et al., 2011). Other districts, most recently San Francisco Unified, have responded by "de-tracking" math, or requiring all students to wait until grade 9 to begin algebra I (Huffaker et al., 2023; Rubin, 2006).

This paper does not take a position on whether math tracking is a good practice for schools to employ. Instead, this paper is focused on the potential implications of math tracking for coursetaking in other subjects. Of particular interest are implications for equity—e.g., whether students in tracked versus nontracked math settings have equitable opportunities for higher level social studies courses, whether particular types of students sorted onto lower math tracks are especially disadvantaged in terms of their future opportunities to take more rigorous courses in other subjects.

The possibility of "de facto" tracking

What we have been discussing so far is *de jure* tracking—an intentional sorting of students across differentiated math courses by their math ability level—often done using a defined set of known, if not objective, criteria (Lucas & Berends, 2002). But, as mentioned above, there is a possibility that sorting students into separate math courses may inadvertently sort students in other academic subjects, like social studies, too. That is, students who are tracked into more advanced math courses may end up being tracked into advanced courses in other subjects as well while students sorted onto lower math tracks get boxed out from more advanced opportunities in other subject areas. This systematic sorting of students across academic subjects has previously been referred to as *de facto* tracking—or an association in students' coursetaking across academic subjects that cannot be explained by formal institutional mechanisms (Lucas & Berends, 2002).

A high degree of correlation between which students are in advanced courses across academic subjects is not necessarily inherently concerning. For example, students interested in attending selective postsecondary institutions may choose to take high-level courses across multiple academic subjects. Thus, a high degree of association in which students are in high-level courses across academic subjects may simply arise from the fact that motivated students are likely to be motivated across subjects.

On the other hand, the correlation of students' course placements across academic subjects may also *not* be indicative of choice. *De facto* tracking may also arise, in part, from the demographic composition of schools (Lucas & Berends, 2002). Prior research has shown that schools tend to view students' ability as fixed by the time they arrive at high school (Oakes & Guiton, 1995). These conceptions of students' ability are socially constructed and highly influenced by a student's race/ethnicity and social class (Oakes & Guiton, 1995; Oakes et al., 1997). Schools, then, make courses that accommodate these perceived differences in students' ability (Oakes & Guiton, 1995). Said another way, schools might conceive of a certain type of student as an all-around "high achieving" student and place students into courses across academic subjects accordingly. And because these conceptions are highly socially constructed, schools become stratified along race and class lines.

De facto tracking can also arise or be shaped by schools' various organizational and environmental elements. These factors might include enrollment size, the degree of curricular differentiation, the restrictiveness of gatekeeping practices (and what these practices are), scheduling practices, among others (e.g., Domina et al., 2019; Kilgore, 1991; Lucas & Berends, 2002). I expand on just a few of these key elements below. For one, there is just the simple way that math tracking works. That is, most students in the same school typically progress through a shared math course sequence; they just begin the same sequence at different times. This means that students tend to progress through the math course sequence as a cohort rather than as individuals. Schools, then, might think of students as a cohort, or a block, rather than as individuals when deciding which students to assign to which courses.

Furthermore, there is the fact that the initial sort of students by math ability level typically happens in grade 8. Although some ability grouping may happen as early as elementary school (Kaufman et al., 2024), eighth grade is typically when schools make decisions about which students, if any, to place in algebra I. Most students in the U.S. complete grade 8 in a middle school (or in a combined elementary/middle school) before transitioning to high school at grade 9 or later. Taken together, this means that students' math course placements in their first year of high school have largely already been decided in advance of their arrival. That is, students that completed algebra I in middle school arrive at high school in grade 9 ready to enroll in geometry, while others arrive needing to take algebra I in grade 9. High schools must then accommodate this sorting of ninth grade students into math courses as they develop their master schedules.

Schools' development of their master schedules is a complicated institutional process involving balancing many different factors like time, teachers, physical space, and student and

staff preferences and needs (e.g., Delany, 1991; Khazzaka, 1997; Oakes & Guiton, 1995; Pittman, 2022; Riehl et al., 1999). Surveys of principals about how they develop their master schedule have revealed that students on high academic tracks have among the highest stakeholder influence in scheduling decisions (Pittman, 2022). Schools catering to the needs and preferences of historically high-achieving students in their scheduling decisions may inadvertently disadvantage those students on lower tracks.

Consider an over-simplified example to establish the intuition about why course schedules might box out students on low math tracks from opportunities to take higher level social studies courses. Figure 3.1 shows a theoretical master schedule for tenth and eleventh grade students. Say, the school employs eight teachers and distributes students so that there are 30 students in each class at one time. A quarter of the tenth graders (30 students) are on the high-level math track and took a geometry course in ninth grade. The remaining tenth graders are on the low-level math track and took an algebra I course in ninth grade. Therefore, the school must schedule 30 tenth graders in algebra II and the remaining 90 students in geometry. But the school must schedule these students in other subjects too. In doing so, the school knows that many, if not most, of the tenth graders in the advanced math course (algebra II) will also want to be in the advanced courses in the other subjects too. Therefore, the school avoids scheduling the advanced courses in all subjects during the same period.

The school comes up with the theoretical master schedule shown in Figure 3.1. All the tenth graders in the advanced math course (algebra II) are theoretically able to be enrolled in the advanced social studies course (AP world history) because the course is scheduled during a different period. But this is not true for all the tenth graders who are in the lower-level math course (geometry). A third of these students will be in their geometry course at the same time as the higher-level social studies course. Furthermore, for students in the lower-level math course, the advanced courses in the other academic subjects are somewhat in competition with each other since there is no way a student can take all of them.

Figure 3.1 Illustrative master schedule for a theoretical high school

	Teacher 1 Math	Teacher 2 Math	Teacher 3 Science	Teacher 4 Science	Teacher 5 ELA	Teacher 6 ELA	Teacher 7 Social studies	Teacher 8 Social studies
Period 1	Geometry (Gr10)	Algebra II (Gr11)	Chemistry (Gr10)	Physics (Gr11)	Honors ELA II (Gr10)	AP Language (Gr11)	World history (Gr10)	U.S. history (Gr11)
Period 2	Geometry (Gr 10)	Algebra II (Gr11)	AP Chemistry (Gr11)	Earth science (Gr10)	ELA II (Gr10)	ELA III (Gr11)	AP world history (Gr10)	U.S. history (Gr11)
Period 3	Geometry (Gr 10)	Algebra II (Gr11)	Honors chemistry (Gr10)	Physics (Gr11)	ELA II (Gr10)	ELA III (Gr11)	World history (Gr10)	AP U.S. history (Gr11)
Period 4	Pre-Calculus (Gr11)	Algebra II (Gr10)	Chemistry (Gr10)	Physics (Gr11)	ELA II (Gr10)	ELA III (Gr11)	World history (Gr10)	U.S. history (Gr11)

SOURCE: Author's creation.

The degree to which schools' master schedules may influence the association between students' math course placements and their subsequent social studies coursetaking may depend on exactly how the school schedule is structured. For example, students in schools that operate schedules with more class periods (e.g., schools that operate an 8-period school day as opposed to a 6-period school day) might be able to enroll in more courses overall. Students in schools that operate with more periods in the school day likely also have more flexibility in their schedule to find time for the courses that they want to take. In these schools, students' coursetaking in other academic subjects like social studies may not be as beholden to their math track placements because there might be greater degree of flexibility in scheduling.

And there may be other organizational factors beyond scheduling that influence the degree of *de facto* tracking. One critical factor is likely schools' enrollment sizes. On the one hand, schools that enroll fewer numbers of students tend to employ fewer teachers. These smaller schools may not have the student or staff numbers needed to justify offering multiple sections of the same advanced course (if they offer it at all) or might struggle to find more qualified teachers who are capable of and interested in teaching more advanced courses (Ingersoll et al., 2004; U.S. Government Accountability Office, 2018). Perceived demand for advanced courses has been shown to be a key determinant of schools' willingness to offer these courses (Iatarola et al., 2011). Beyond course offerings, the scheduling constraints documented above may be particularly strong in small schools. That is, when small schools can scrape up the necessary minimum numbers of students and staff needed to justify offering an advanced course, they can probably only justify operating a single section or two.

Large schools, on the other hand, likely find it easier to offer a diverse array of course offerings, especially those at the AP level (see Figure A.3). Not only can larger schools offer a wider selection of courses, but they also can probably offer multiple sections of the same course. In short, students in large schools likely have many more choices than students in small schools (Lee et al., 2000). But a wider selection of offerings also means that students have to choose between these courses—or that schools have to help students choose between these courses—potentially creating the possibility for greater curricular differentiation in large schools. As summarized by Lee et al. (2000), small schools offer fewer courses targeted at the middle of the distribution. Large schools, on the other hand, have more and differentiated courses that tend to serve a different population of students. And, in some ways, we might think of curricular differentiation as a good thing because it might help make large schools feel smaller (this is sometimes referred to as the "school-within-a-school" model). And a vast body of research has shown that smaller schools, on average, produce better outcomes than their larger counterparts (e.g., Leithwood & Jantzi, 2009; Ready et al., 2004).

Why "de facto" tracking is cause for concern

There are two key problems with *de facto* tracking students across academic subjects. The first is that because math tracking happens first and is the most prevalent, students are likely

sorted into other academic subjects not necessarily based on their achievement in that subject but instead based on their achievement in math. The problem is, of course, that students may be differentially skilled in math than they are in social studies. There is a small, but likely nonzero, population of students that are low-achieving in math but potentially high-achieving in social studies. Since sorting of students into particular social studies courses—such as those at the Advanced Placement level—should ideally reflect differences in students' social studies achievement and not their math achievement, these are the students likely to be most disadvantaged by a sorting system that prioritizes their math achievement.

And there is some evidence to suggest that students might be slightly differently skilled across academic subjects. Prior work has illustrated that although student achievement is highly correlated across academic subjects, it is not perfectly correlated (Roof & Chimuma, 2022; Singer & Strasser, 2017; Unal et al., 2023). Notably, previous studies have focused on understanding the correlation between student achievement in math and science or student achievement in math and English language arts (ELA). Social studies has largely been absent from this literature—an unsurprising finding given the dearth of social studies assessments that would be needed to support these analyses (Education Commission of the States, 2018). Preliminary analyses conducted with the HSLS:2009 support the conclusion that students' math achievement is not perfectly correlated with their social studies achievement (see Appendix D).

Second, prior research has shown that there are large disparities by race/ethnicity and family income in students' initial algebra I course placements and that these gaps persist through the rest of the math sequence up to AP calculus (e.g., de Brey, 2019; Morton & Riegle-Crumb, 2019; Oakes, 1990; Riegle-Crumb & Grodsky, 2010; Stein, 2011; U.S. Department of Education, 2023). If math tracking does spill over into social studies, this means that any systemic inequities in students' math course placements are likely also reflected in social studies course enrollments. Said another way, the disparities we observe in students' math course placements might unintentionally be carried over into social studies.

Methodology

Data sources

To investigate my research questions, I use restricted data from the High School Longitudinal Study of 2009 (HSLS:2009) published by the National Center for Education Statistics (NCES). In 2009 (the base year), NCES began tracking a cohort of over 20,000 ninth graders (or class of 2013 graduates) distributed across roughly 1,000 public and private high schools. NCES tracked this cohort of 2009 ninth graders throughout the entirety of their high school careers, spanning the 2009–2010 through 2012–2013 school years, and eventually into postsecondary education and the labor market.

Importantly for this paper, NCES used a two-stage, probability-based sampling design to identify students to participate in the HSLS:2009 data collection. NCES first randomly sampled roughly 1,000 high schools conditional on a set of school characteristics including geographic location. Once schools had agreed to participate, NCES subsequently sampled ninth grade students in these schools (about 28 students on average in public schools and 26 students in private schools). NCES requested that participating schools provide rosters (enrollment lists) of ninth grade students, and these rosters were used to randomly sample students within participating schools. This means that the students in the HSLS:2009 data collection represent a random draw of students within each school. For more detailed information about the HSLS:2009 sampling scheme, see Ingels et al., 2011.

Over the course of the study period, NCES collected a variety of data on students from many sources including student, parent, teacher, administrator, and counselor surveys; transcripts; and course catalogs. For the analyses I present in this paper, I use data from several HSLS:2009 data sources. Below, I briefly describe each of these data sources in turn, focusing on the aspects of each data source that are most relevant for this paper.

High School Longitudinal Study of 2009 (HSLS:2009)

Student transcripts

The analyses in this paper rely on students' high school transcripts, which were collected in the summer of 2013 by which time the vast majority of 2009 ninth graders had graduated. In total, NCES obtained complete transcript information for roughly 80 percent of the 20,000 ninth graders sampled in the base year. In processing students' high school transcripts, NCES documented information about each course that students took, including the course title, grade, school year taken, semester taken, level (e.g., regular, honors, Advanced Placement), grade earned, and number of Carnegie credits attempted and earned. To address the problem of wide-ranging course titles, NCES relied on the School Courses for the Exchange of Data (SCED) to identify comparable courses, like Algebra I (National Forum on Education Statistics, undated). For more detailed information about how students' transcript data were collected and processed, see Ingels et al., 2015.

Course catalogs

In addition to students' transcripts, NCES collected course catalogs from participating high schools. A course catalog is essentially a complete list of the courses that a school offers. This data collection began in 2011–2012 during students' junior year of high school, but mostly coincided with collection of students' high school transcripts. NCES requested that schools provide course catalog data covering up to two school years (2012–2013 and/or 2013–2014). Like with students' transcripts, NCES relied on a coding scheme to process schools' course catalogs, documenting information such as course titles, target grade, course level (e.g., regular, honors, Advanced Placement), and terms offered. Because course catalogs were collected only

once during the study period, analyses using these data necessarily assume that schools' course offerings are time invariant. With this caveat, however, schools' course catalog data can be combined with student-level data to measure whether students had access to specific courses offerings at their high school.

Student and parent surveys

In the base year, participating students and their parents were surveyed about a wide variety of topics including their demographics, family situation, and the student's high school experience (e.g., their favorite subjects, what activities they participated in). I rely on multiple student and parent survey items in my analyses. For example, I use survey variables capturing the student's demographic characteristics, including their sex and race/ethnicity. Family socioeconomic status is composite index constructed from multiple student and parent survey variables capturing parental education and occupation, family income, and school urbanicity. For more information about the design and administration of these surveys and what specific topics were included, see Ingels et al., 2011.

Administrator survey

In the base year (and again during students' junior year), principals of sampled schools were surveyed and asked to provide a wealth of information about their high school's environment. Principals were asked basic questions about the composition of the student body and what grades the school served. They were also asked questions about programming, course offerings, policies and practices, and the school climate. I make use of several survey items administered to school principals. The first is a survey item asking about the school's total enrollment. The second is a set of survey items asking about the structure of the school's course schedule, specifically whether the high school uses traditional or block scheduling for various types of instruction (i.e., academic, vocational, other).

Mathematics assessment

In fall 2009 (when students were just starting ninth grade), they completed a computer-adaptive mathematics assessment. With the exception of a follow-up mathematics assessment administered two years later in 2011–2012, this is the only standardized measure of achievement available in the HSLS:2009 data collection. The assessment focused on algebraic reasoning and included domains on topics like "systems of equations," "sequences and recursive relationships," and "linear equations, inequalities, and functions." The assessment was administered over a 40-minute period and included two parts. The first part of the assessment was the same for all students and included 15 questions. Students were routed into the second stage of the assessment (containing 25 questions) based on their performance in the first stage. Students were routed into one of three options: low, moderate, or high.

Students' scores on the assessment were calculated using an item response theory model. For my analyses, I rely on the standardized scores derived from this model. This is a norm-

referenced measure of achievement, meaning it is an estimate of each student's achievement relative to the entire participating student population. The standardized scores were scaled to have a mean of 50 and a standard deviation of 10 to easily allow for comparisons in standard deviation units. For more information about the design, administration, and scoring of the mathematics assessment, see Ingels et al., 2011.

States' graduation requirements

Many reports have documented states' social studies-focused graduation requirements over time (i.e., Achieve, 2015a; Chattin & Hackmann, 2013; Godsay et al., 2012; Dounay, 2006; Education Commission of the States, 2007; McClure & Zadrozny, 2015; NCES, 2010, 2011, 2012, 2014, 2018; Zadrozny, 2017). However, to the author's knowledge, there is no one single data source that contains data on states' social studies-focused graduation requirements specifically as they applied to the class of 2013 which is the relevant set of graduation requirements for the students participating in HSLS:2009. Therefore, I used the data sources listed above and state department of education websites to triangulate and validate what social studies graduation requirements were in place for class of 2013 graduates. A complete dataset of social studies-focused graduation requirements as they applied to the class of 2013 is available in Table B.1.

Analytic sample

Using the data sources above, I define a set of inclusion criteria to create an analytic sample. I retain only those students for whom complete transcript data are available. I also restrict my sample to include only those students who graduated high school on time in spring 2013. I also require students to remain in the same school for the duration of their high school career. Furthermore, to ensure there is a sufficiently large number of students in a school that I can determine whether the school is using math tracking (as I explain in more detail below), I exclude schools that have fewer than five students who meet the conditions above. I also remove students and schools that do not have complete demographic information available. After implementing these exclusion criteria, my analytic sample contains just over 11,300 students distributed across 730 high schools. The average high school in my analytic sample contains about 20 students, although there are a handful of high schools with fewer than 10 students.

Even with these restrictions, my analytic sample remains large and generally representative of the national population of high school students and schools during the 2012–2013 school year, at least on observable characteristics. However, there are a few exceptions as shown in Table 3.1. For example, my analytic sample has an underrepresentation of Hispanic students, an underrepresentation of students attending public schools, and an underrepresentation of students in schools located in towns and rural areas.

Table 3.1 Demographic characteristics for my analytic sample of students compared with the national population

	Analytic sample	National population
Student characteristics		
Race/ethnicity		
White	59.8	54.8
Black	8.5	14.6
Hispanic	13.4	21.0
Asian	9.2	5.1
Other	9.1	4.5
School characteristics		
Control		
Public	81.6	88.1
Private	18.4	11.9
Locale		
City	26.8	30.5
Suburb	35.4	40.2
Town	12.6	10.9
Rural	25.2	18.4
Percent FRPL eligible		
0–25% FRPL	52.5	34.6
25–50% FRPL	27.8	50.1
50–75% FRPL	15.0	8.6
75–100% FRPL	4.7	6.7
Enrollment size		
0–499 students	21.1	18.9
500–999 students	25.0	20.2
1,000–1,499 students	21.4	19.7
1,500+ students	32.6	41.2
N	11,320	16,000,000

SOURCE: Data for analytic sample come from the High School Longitudinal Study of 2009. Data for the national student population come from the 2013–2014 Common Core of Data and the Private School Universe Survey and include all students in high schools.

Analytic strategy

Research question 1

Regression specification

My first research question asks, "How do AP social studies course enrollments (overall and across student subgroups) compare in high schools that use math tracking versus those that do not?" To answer this question, I use a regression framework to compare differences in AP social studies coursetaking in schools that do use math tracking versus schools that do not. Because

students' course enrollments (in both math and social studies) are likely highly correlated within schools and because HSLS:2009's sampling method ensures I have multiple students in the same school, I estimate multilevel linear regression models. (This modeling choice is confirmed by unconditional means models, as shown in Table B.4). Specifically, I estimate two-level random intercept models with robust standard errors that takes the form:

$$APcourse_{is} = \beta_0 + \beta_1 track_{0s} + \beta_2 X_{is} + u_{0s} + e_{is}$$

In these models, the dependent variable ($APcourse_{is}$) is a dummy indicator capturing whether student i in high school s enrolled in a specific AP social studies course while in high school. This variable equals 1 if a student ever enrolled in specific AP social studies course and 0 if not. I use dummy variables to capture enrollment in four types of AP social studies courses: AP world history (including European history), AP U.S. history, AP government (U.S. or comparative government), and AP economics (microeconomics or macroeconomics). I focus on students' AP social studies coursetaking in grades 10 through 12 since less than 3 percent of students in my analytic sample took an AP social studies course in grade 9. Although my outcome of interest is binary, I use linear probability models for ease of interpretation.

Meanwhile, $track_{0s}$ is a dummy variable that $= 1$ if student i was high school s that used math tracking and 0 if not (see the next section for more details about how I define this indicator). Note that this variable is assigned at the school level and is constant among all students in the same school. The coefficient on the $track_{0s}$ variable (β_1) is the coefficient of interest. β_1 captures the mean difference in students' likelihood of taking various AP social studies courses in schools that do versus do not track in math. X_{is} represents a vector of controls, including student demographics (i.e., sex, race/ethnicity, family socioeconomic status), school demographics (i.e., control, locale, enrollment size, student racial/ethnic composition, and share of students eligible for free or reduced-price lunch), student interest, student achievement in both math and social studies, course access, and state graduation requirements (see more details on these control variables below).

In a sub-analysis to examine differences in AP social studies course enrollments across student subgroups and school contexts, I interact my binary indicator of math tracking with categorical variables capturing student demographics (e.g., $track\ x\ race_{0s}$). These interaction terms allow me to investigate whether being in a tracking school has differential associations with AP social studies coursetaking across student subgroups. In these analyses, I choose Asian students and students in the highest socioeconomic quintile as my reference groups because these are the student populations that have historically been disproportionately represented in AP course enrollments (see also Figure A.10). Finally, u_{0s} is a school random effect and e_{is} is a random error term.

Independent variable of interest: Schools' use of math tracking

The independent variable of interest for this research question is schools' use of math tracking. To construct a measure of math tracking, I exploit the fact that HSLS:2009 used a two-stage sampling design, first randomly sampling schools and then randomly sampling ninth grade students within each sampled school. The key is that students within each school were randomly sampled from rosters of schools' entire ninth grade student population, as opposed to sampling specific classrooms of students within a school. This sampling structure means that I can observe and compare coursetaking patterns among students within the same school and that these observations will be based on a random draw of students within each school.

I use students' transcripts to identify the math course that each student took in grade 9. But because some students take multiple math courses in a single school year, I rely on an HSLS:2009-provided categorical variable that captures each students' highest math course taken in grade 9. As expected per Brown et al. (2018), the vast majority of students in my analytic sample (about 80 percent) were enrolled in either an algebra I course or a geometry course in ninth grade (see Table 3.2).[11] Also as expected, the students in my nontracked students tended to be enrolled in Algebra I while students in my tracked schools were more evenly split between Algebra I and Geometry.[12]

Table 3.2 Distribution of students' highest math course taken in grade 9

	Percentage		
Highest ninth grade math course	All schools	Nontracked	Tracked
Basic math	1.6	---	1.8
Other math	1.7	0.8	1.8
Pre-algebra	4.3	2.7	4.5
Algebra I	50.4	57.7	49.3
Geometry	28.3	14.5	30.4
Algebra II	7.0	1.9	7.8
Other advanced math	6.7	22.2	4.4

NOTES: N = 11,070 students. --- indicates that samples were too small to meet reporting thresholds.
SOURCE: High School Longitudinal Study of 2009.

For each of the 730 schools in my analytic sample, I go school by school to examine students' math coursetaking patterns in grade 9. I construct a binary variable capturing whether

[11] It is important to keep in mind that this is a rough categorization of students' ninth grade math coursetaking. Even within these categories, courses can look very different. For example, algebra I courses might include college prep algebra, honors algebra, or integrated algebra. Schools may group students by ability across courses even if all students take an algebra I course in grade 9. In summary, this categorization of the data is an oversimplification of the complexity of students' math coursetaking patterns and schools' math course offerings. But it is still useful as a rough proxy for differences in students' math pathways.

[12] Some of these nontracked schools seem to have "tracked up" (i.e., had all their students take algebra I in grade 8 such that they were placed in geometry in grade 9) while others have "tracked down" (i.e., have all students in algebra I in grade 9). Those students in an "other advanced math course" were typically in an integrated math course.

each school used math tracking. If *at least 90 percent of* students within the school took the same math course in grade 9—regardless of what this course was—I consider the school to be a nontracking school. If students within the same school took different math courses in grade 9, I consider the school to be a tracking school. I choose this threshold to account for the fact that there are likely to be some anomalies in students' math coursetaking patterns such that math course placements may not be completely identical for all students in the school. I identify 15 percent of my 730 schools as nontracking schools and 85 percent as tracking schools.

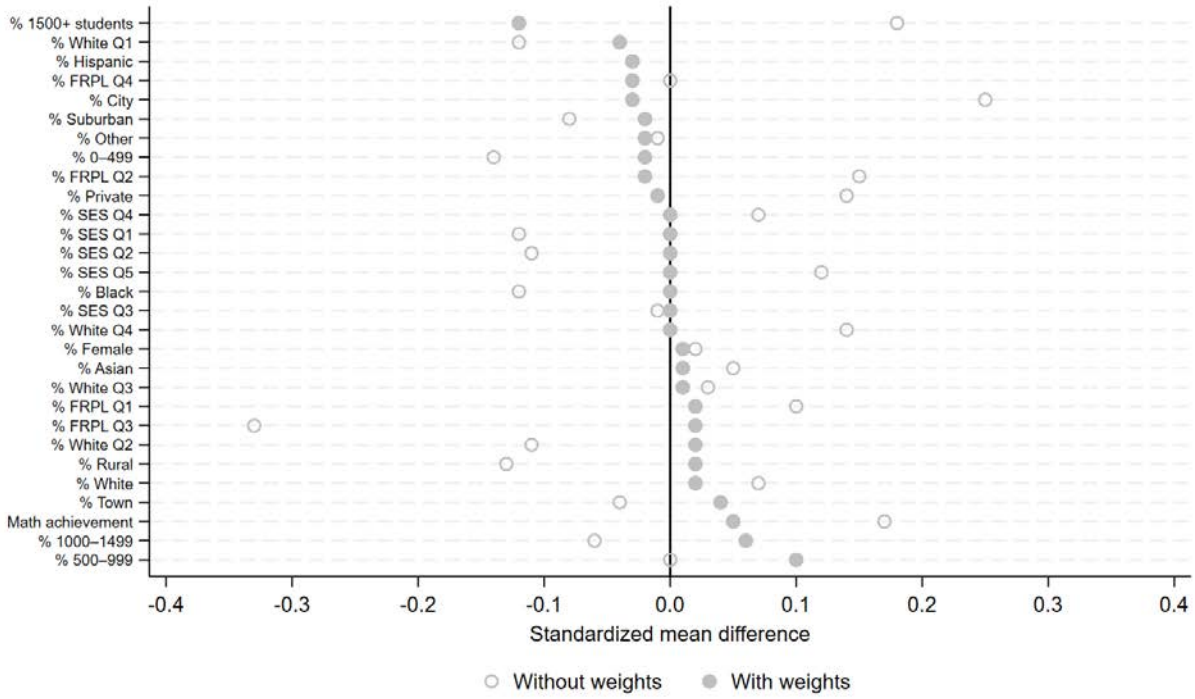
Inverse probability of treatment weighting

My next concern is that the 85 percent of the schools in my analytic sample (and the students in them) that use math tracking are systematically different from the schools that do not. Any differences between these two comparison groups limits my ability to attribute any observed differences in outcomes to the policy difference (math tracking). That is, I am unable to separate out whether any observed differences in social studies coursetaking are due to the policy difference or simply due to differences in what types of schools tend to employ these policies.

I mitigate observed differences across these two comparison groups by using inverse probability of treatment weighting (Austin & Stuart, 2015; Chesnaye et al., 2022; Greifer & Stuart, 2021). This analytic strategy is commonly used in observational studies such as this and has been employed in other studies that have used HSLS:2009 to examine coursetaking patterns (e.g., Bohrnstedt, 2023). I create these weights in a three-step process. First, I use a logistic regression model to estimate the probability that a student was in a school that used math tracking, conditional on a set of observed student (i.e., sex, race/ethnicity, family socioeconomic status, math achievement) and school characteristics (i.e., control, locale, enrollment size, student racial/ethnic composition, and share of students eligible for free or reduced-price lunch). In the second step, I use these models to predict student i's probability, or propensity, of being in a tracked school (π_i). In the third step, I convert my propensity scores to weights. Specifically, I assign students in the tracked schools a weight $= 1/\pi_i$ and the students in my nontracked schools a weight $= 1/(1-\pi_i)$. This adjusts both comparison groups to better resemble the entire student population at least on observable characteristics. I include these weights in all regression models.

Figure C.1 illustrates that propensity scores were estimated across an area of common support. As shown in Figure 3.2, before propensity score weights were applied, there were large standardized mean differences between the two comparison groups across a range of student- and school-level covariates. But after weights are applied, the observed characteristics of the student populations in nontracked and tracked schools are much more similar. Although some differences do remain, the standardized mean differences tend to be small and generally below the Institute of Education Sciences' threshold for baseline equivalence after regression adjustment (What Works Clearinghouse, 2015).

Figure 3.2 Standardized mean differences before and after application of propensity score weights



N = 11,220. Standard mean difference calculated as the mean in the tracked schools – the mean in the nontracked schools divided by the pooled standard deviation.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Control variables

I also construct a series of control variables that are likely to be correlated with schools' use of math tracking (and, if so, which students are placed on which tracks) as well as students' social studies coursetaking. Below, I briefly describe each of the control variables used in my regression models. I discuss the theoretical and any empirical justifications for each variable's inclusion and describe how each measure was constructed.

Students' demographic characteristics (including their sex, race/ethnicity, and family socioeconomic status) are highly correlated with their coursetaking patterns both in math and social studies, especially in AP courses (see, for example, Figures A.9 and A.10). *Sex* is measured as a dummy variable, where 1 = female. Student *race/ethnicity* is a categorical variable with 5 categories: White, Black, Hispanic, Asian, and Other. Students' sex and race/ethnicity were self-reported by students in the base year, although missing data were filled in from other sources. *Family socioeconomic status* is an index measure that captures parental education, parental occupation, and family income that has been adjusted for urbanicity. It was constructed using information provided by students' parents in the base year. I use a categorical version of this index that is collapsed into quintiles, where the bottom quintile (Q1) represents the poorest families, and the top quintile (Q5) represents the wealthiest families.

Beyond demographics, students' coursetaking, both in math and in social studies, likely reflect student interest to some degree. That is, students who have an interest in say, history or math, are probably more likely to take courses in these areas. Furthermore, students who are very interested in taking courses in a specific area are probably especially likely to overcome real or perceived barriers to get into these classes. As a proxy for student interest in taking particular courses, I use a survey question administered to students in the base year. Students were asked, "Not including lunch or study periods, what is your favorite school subject?" Students were provided a list of 13 academic and nonacademic subjects as response options, two of which were "Social Studies, History, Government, or Civics" and "Mathematics." I create a 3-category variable (social studies is favorite subject, math is favorite subject, or other favorite subject) using students' responses to this survey item.

Student achievement, broadly defined, is clearly associated with students' coursetaking. I use two measures of student achievement in my regression analyses. First, I use students' scores on a mathematics assessment which they took in the fall of ninth grade. Students' assessment scores were standardized to have a mean of 50 and a standard deviation of 10. Unfortunately, no such assessment was administered in social studies, leaving few options for how to account for students' social studies achievement and the fact that this might be different than their achievement in math. However, not accounting for students' social studies achievement at all would likely bias my results. Therefore, I use students' social studies grade point average for the courses they took in grade 9. Students' grades for the social studies courses that they took in grade 9 are likely very predictive of their likelihood to enroll in future social studies courses, especially courses at the AP level. I caution readers that neither of these measures are ideal measures of achievement, though they are the best available in the dataset (for more details see the Limitations section below).

Meanwhile, many school characteristics—like control, enrollment size, and resource level—likely shape students' coursetaking patterns in both math and social studies. Larger and better-resourced schools, for example, are likely to be able to offer a greater diversity of courses, perhaps because they can hire more teachers or have enough students that it makes economic sense to run a course (U.S. Government Accountability Office, 2018) (see also Figures A.2 and A.3). Other research has provided some evidence that certain types of schools are also more likely to group students into math courses (e.g., Steiner et al., 2024). Therefore, I use several categorical variables capturing various school characteristics as controls. *Control* is a dummy variable capturing whether the high school is public or private. *Locale* is a four-category variable (urban, suburban, town, rural) capturing the urbanicity of the area in which the school is located. *Percent white students* is a four-category variable capturing the schools racial/ethnic composition in quartiles. Similarly, *percent of students eligible for free or reduced-price lunch* is a rough proxy for the school resource level, measured in quartiles. Finally, *size* is a four-category variable (0–499 students, 500–999 students, 1,000–1,499 students, and 1,500+ students) capturing the number of students enrolled in the high school.

Finally, I control for two other policy mechanisms that are likely associated with students' coursetaking. First, I control for students' access to specific AP social studies courses at their school. Students' ability to access AP courses at their school—which is highly associated with the type of school they attend (see Figure A.3)—likely directly influences their likelihood of enrolling in these courses. I use dummy variables capturing whether students had access to specific AP social studies courses at their school, which I obtain from schools' course catalogs. Second, I control for whether students are required to take a course in that specific discipline based on their state's graduation requirements. Although prior analyses have suggested that states' graduation requirements have little to no association with students' AP coursetaking (see Figure 2.13), such requirements may be associated with schools' propensity to offer these courses and/or for some students to enroll. Again, I use dummy indicators to capture whether or not students attended high school in a state where certain discipline-specific requirements were in place (see Figure 2.3).

Research question 2

Research question two asks whether there is any association between students' math course placement in grade 9 and their likelihood of enrolling in AP social studies courses in subsequent school years. To answer this research question, I retain the same general regression framework that I employ in the first research question, including the same outcome variable and the same set of controls. I simply adjust my independent variable of interest to focus on students' math tracking assignments rather than on schools' use of math tracking. Among the subset of roughly 620 schools that track in math, I construct a second measure of math tracking corresponding to whether students were placed on the low or high math track in their school. I estimate the following model:

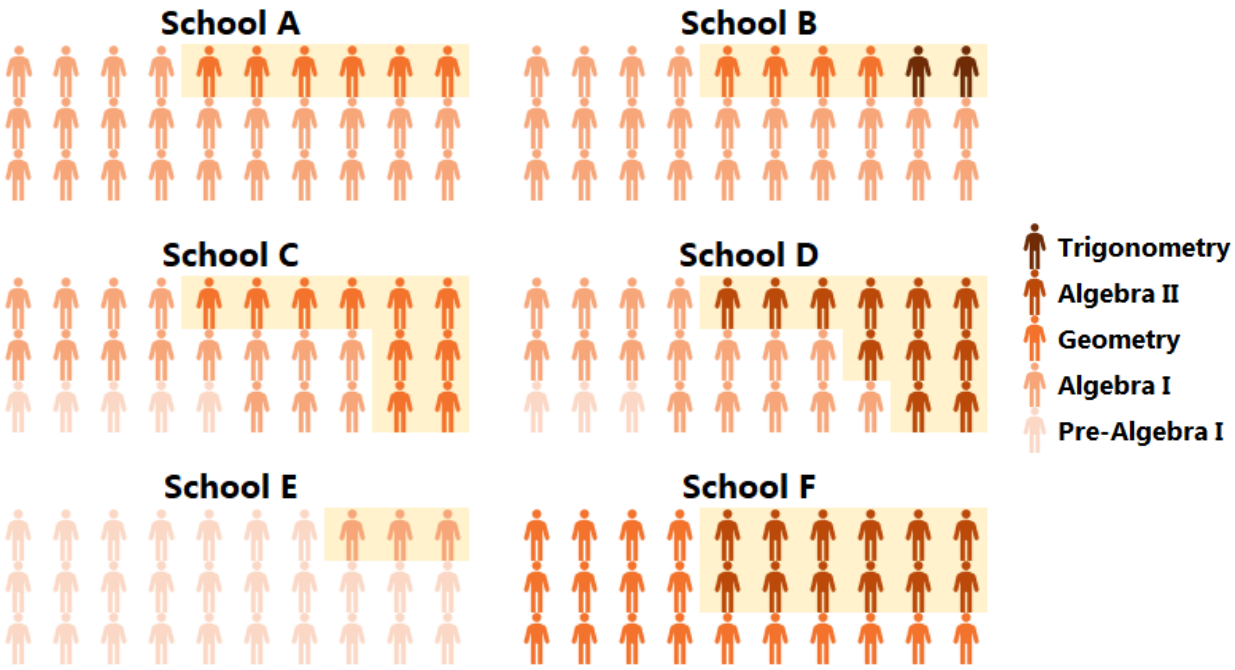
$$APcourse_{is} = \beta_0 + \beta_1 hightrack_{is} + \beta_2 X_{is} + u_{0s} + e_{is}$$

where $hightrack_{is}$ is a now dummy variable that $= 1$ if student i in high school s was sorted onto the higher-level math track in his or her school and 0 if not. The coefficient on the $hightrack_{is}$ variable (β_1) is the coefficient of interest. β_1 captures the mean difference in students' likelihood of taking various AP social studies courses for students who were sorted onto different math tracks.

To construct this measure of math track assignments, I observe the math courses that students took in ninth grade using their transcripts. Because math sequences can differ across schools, I assign math track placements relative to students within the same school. That is, I go school by school to assign students' math track placements. In my decision rules to assign track placements, I use the rule of thumb that most students nationally progress through algebra I then geometry then algebra II (Brown et al., 2018). I consider courses like "other math" and "basic math" to be lower-level courses. Figure 3.3 illustrates the variation in how I made these math

track placements using theoretical schools (that is, no specific data were used to preserve confidentiality).

Figure 3.3 Assignment of math track placements for theoretical schools



SOURCE: Authors' creation.

Because my assignment of students' math tracks is somewhat subjective, I perform several checks to confirm my track assignments. As shown in Table 3.3, the distribution of students within and across math tracks largely aligns with my expectations. That is, I assign a greater share of students to the lower math track than to the higher math track. The vast majority of students I assign to the lower math track enrolled in Algebra I in grade 9 and the remaining students mostly enrolled in courses below Algebra I in grade 9. In contrast, students on the higher-math track typically enrolled in Geometry or Algebra II in grade 9.

Furthermore, as expected, the students I assign to the higher math track have achievement scores on the standardized math assessment that are about one full standard deviation higher, on average, than students on the lower math track (see Table 3.3). However, although the students I assign to the higher math track are, on average, higher achieving than the students I assign to the lower math track, there is considerable overlap in the distribution of student achievement across the students on these two math tracks as shown in Figure C.2.

Table 3.3 Comparison of math track assignments

	Low track	High track
Percentage of students in highest ninth grade math course		
Basic math	3.0	0.0
Other math	3.1	0.0
Pre-algebra	7.7	0.0
Algebra I	80.9	4.3
Geometry	4.6	67.4
Algebra II	0.0	19.0
Other advanced math	0.8	9.3
Mean standardized achievement	49.8	58.8
N	5,650	3,950

NOTES: Zeros shown in table are true zeros, not rounding errors. N = 9,590 students.
SOURCE: High School Longitudinal Study of 2009.

Finally, I observed the expected differences in demographic characteristics across the student populations based on my math track assignments. As shown in Table 3.4, among those assigned to the high math track in my analytic sample, I observe the expected overrepresentation of Asian students and students from families in higher socioeconomic quintiles as well as an underrepresentation of Black students, Hispanic students, and students from lower socioeconomic quintiles.

Table 3.4 Demographic characteristics, by math track assignment

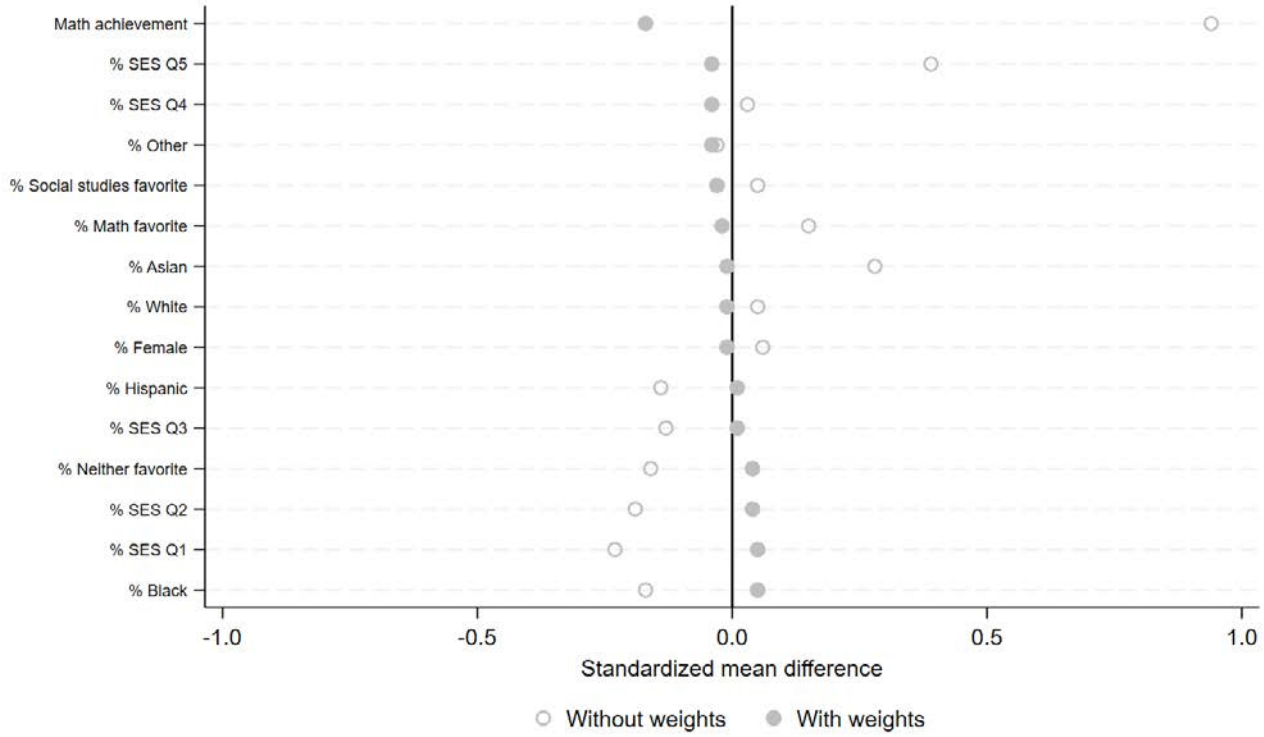
	All students	Low math track	High math track
Sex			
Male	50.1	51.2	48.3
Female	49.9	48.9	51.7
Race/ethnicity			
White	60.2	59.7	61.6
Black	8.1	9.5	5.3
Hispanic	13.3	15.1	10.4
Asian	9.4	6.2	14.3
Other	9.0	9.4	8.4
Family socioeconomic status			
Q1 SES	12.6	14.9	8.1
Q2 SES	14.9	17.4	10.8
Q3 SES	18.5	20.6	15.4
Q4 SES	22.8	22.5	23.6
Q5 SES	31.2	24.6	42.2
N	9,840	5,900	3,950

SOURCE: High School Longitudinal Study of 2009.

As before, I mitigate concerns about these observed differences in students' tracking assignments using inverse probability of treatment weighting. Specifically, I first use a logistic regression model to estimate the probability that a student was assigned to the high math track, conditional on their demographic characteristics (e.g., sex, race/ethnicity, family socioeconomic status), math achievement, and favorite subject. I then use this model to predict student i's probability of being on the high math track (π_i). I then assign students on the high track a weight $= 1/\pi_i$ and the students on the low track a weight $= 1/(1-\pi_i)$.

As shown in Figure 3.4, before propensity score weights were applied, there were large standardized mean differences between the two comparison groups across a range of covariates, especially math achievement. But after weights are applied, the observed characteristics of the student populations on low and high math tracks are much more similar.

Figure 3.4 Standardized mean differences before and after application of propensity score weights



N = 9,760. Standard mean difference calculated as the mean among students in the high track – students in the low track divided by the pooled standard deviation.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Research question 3

My third research question asks whether the association between students' math course placements in grade 9 and their subsequent AP social studies coursetaking in grades 10 through 12 is moderated by the structure of the high school that a student attends. To answer this research question, I retain the same basic regression framework described in research question two as well as the same assignment of students onto math tracks. I simply add some interaction terms to my multilevel linear regression models that capture various facets of schools' organizational structure. Specifically, I estimate the following regression model:

$$APcourse_{is} = \beta_0 + \beta_1 hightrack_{is} + \beta_2 structure_{0s} + \beta_3 hightrack\ x\ structure_{0s} + \beta_4 X_{is} + u_{0s} + e_{is}$$

I iterate over three aspects of schools' structure ($structure_{0s}$) as moderators: (1) its enrollment size, (2) whether the school uses block scheduling or traditional scheduling, and (3)

the number of course periods in the school day.[13] I interpret these school-level measures as rough proxies for the degrees of freedom that schools have in scheduling students for courses (or that students may have in selecting courses for themselves). In this analysis, the coefficient on the interaction term (β_3) is the coefficient of interest and captures whether math tracking differentially influences AP social studies coursetaking in different school environments. Below, I briefly describe each of the moderators in turn and how the measure is constructed. Each measure was captured at only one point during students' high school experience and is presumed to be constant for the duration of the study period.

(1) *School enrollment size*: This is a continuous variable capturing the total number of students enrolled in the high school as of the 2011–2012 school year, as reported directly by the school principal. Schools' enrollment sizes range from less than a few hundred students to more than 3,500 students, with a mean of 1,200 students and a median of about 1,100 students.

(2) *Schedule type*: This is a dummy variable capturing whether high schools used traditional or block scheduling for their academic instruction, as reported by the principal. About 38 percent of students in my analytic sample were in a high school that used block scheduling for their academic instruction.

(3) *Number of course periods*: Using students' transcript data, I observe how many courses students took at one time throughout the school year. I convert this to a mean number of courses taken per student per school. This variable ranges from 4 to 10 with a mean of 6.8 and a median of 7. When my analytic sample is restricted to the 62 percent of schools that only use traditional scheduling, this can be interpreted as a rough proxy for the number of periods in the school day.

Research question 4

My fourth research question asks whether high- versus low-achieving social studies students are differentially influenced by their math track placement. To investigate this research question, I retain the same basic regression framework and the same assignment of students onto math tracks. I now interact a measure of students' social studies achievement ($grade9gpa_{is}$) with their math track course placement. As described above, I measure students' social studies achievement level using their grade point average from ninth grade social studies courses. I estimate the following multilevel linear regression models:

$$APcourse_{is} = \beta_0 + \beta_1 hightrack_{is} + \beta_2 grade9gpa_{is} + \beta_3 hightrack\ x\ grade9gpa_{is} + \beta_4 X_{is} + u_{0s} + e_{is}$$

[13] Ideally, I would interact all three of these factors together to investigate whether it is the combination of these factors that, together, moderates the relationship between math tracking and students' AP social studies coursetaking. Unfortunately, my sample size is too small to support this analysis.

In these models, the coefficient on the interaction term (β_3) is the coefficient of interest and captures whether students' social studies achievement moderates the association between students' ninth grade math course placement and their likelihood of enrolling in AP social studies courses in subsequent school years.

Research question 5

My fifth research question focuses on whether students across subgroups are similarly disadvantaged from being sorted onto a lower math track. Again, I retain the same regression framework and the same assignment of students onto math tracks. I simply interact indicators capturing students' demographic characteristics (e.g., race/ethnicity, family socioeconomic status) with their math track assignment. As before, the coefficients on the interaction terms are my coefficient of interest and capture whether students across subgroups are similarly affected by their math track placement.

Results

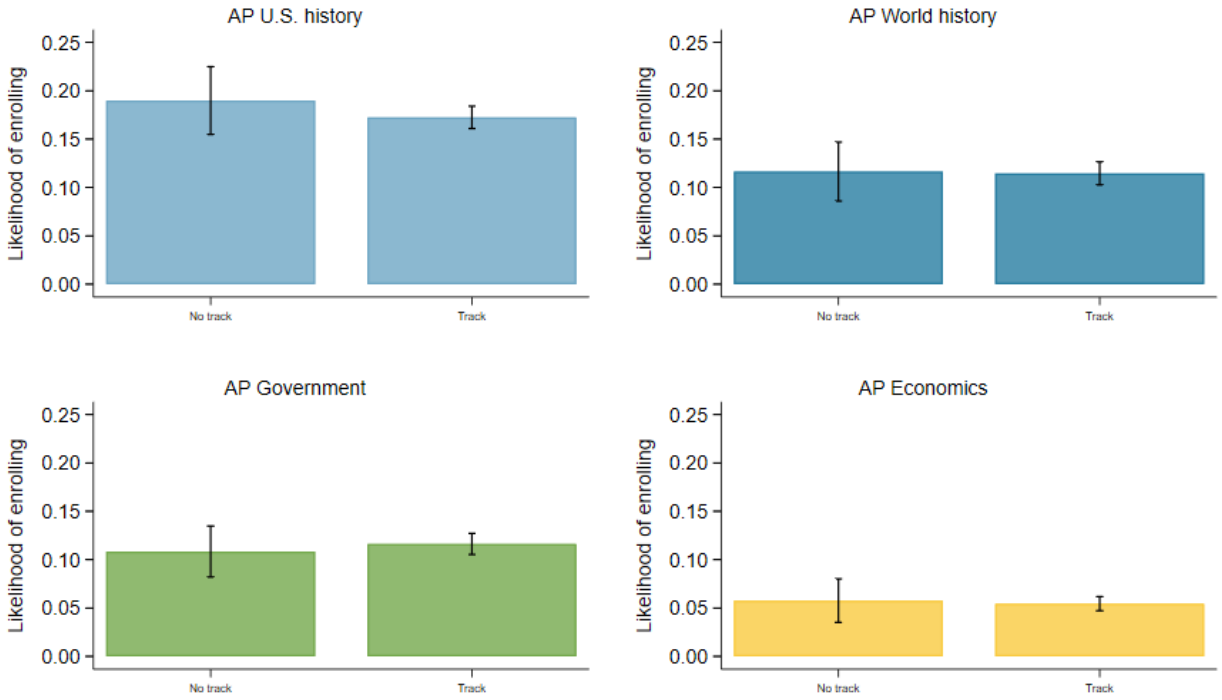
Research question 1

The first research question asks, "How do AP social studies course enrollments (overall and across student subgroups) compare in high schools that use math tracking versus those that do not?" I find that, on average, students' likelihood of enrolling AP social studies courses was no different in schools that used math tracking than in schools that did not (see Figure 3.5 and Table C.1). That is, I did not any observe any association between schools' use of math tracking and students' likelihood of enrolling in AP social studies courses. This was true for all the AP social studies courses I examined, including AP world history, AP U.S. history, AP government, and AP economics.

Furthermore, as shown in the full regression results in Table C.1, the coefficients on my control variables largely align with my expectations. For example, AP social studies course enrollments are higher among students who attend high schools where they have access to these courses. I observe the expected disparities in AP social studies coursetaking by student sex, race/ethnicity, and family socioeconomic status. For example, Table C.1 shows that Asian students are consistently statistically significantly more likely to be enrolled in AP social studies courses than students of all other racial/ethnic subgroups. Converting this to an enrollment rate to assist with interpretation, Asian students have AP social studies course enrollment rates that are 5 to 10 percentage points higher than their peers in the other racial/ethnic subgroups.

I also find that students whose favorite subject is social studies and who earned a higher GPA in their ninth grade social studies courses are more likely to be enroll in AP social studies courses in grades 10–12.

Figure 3.5 Students' likelihood of enrolling in AP social studies courses, by discipline and schools' use of math tracking



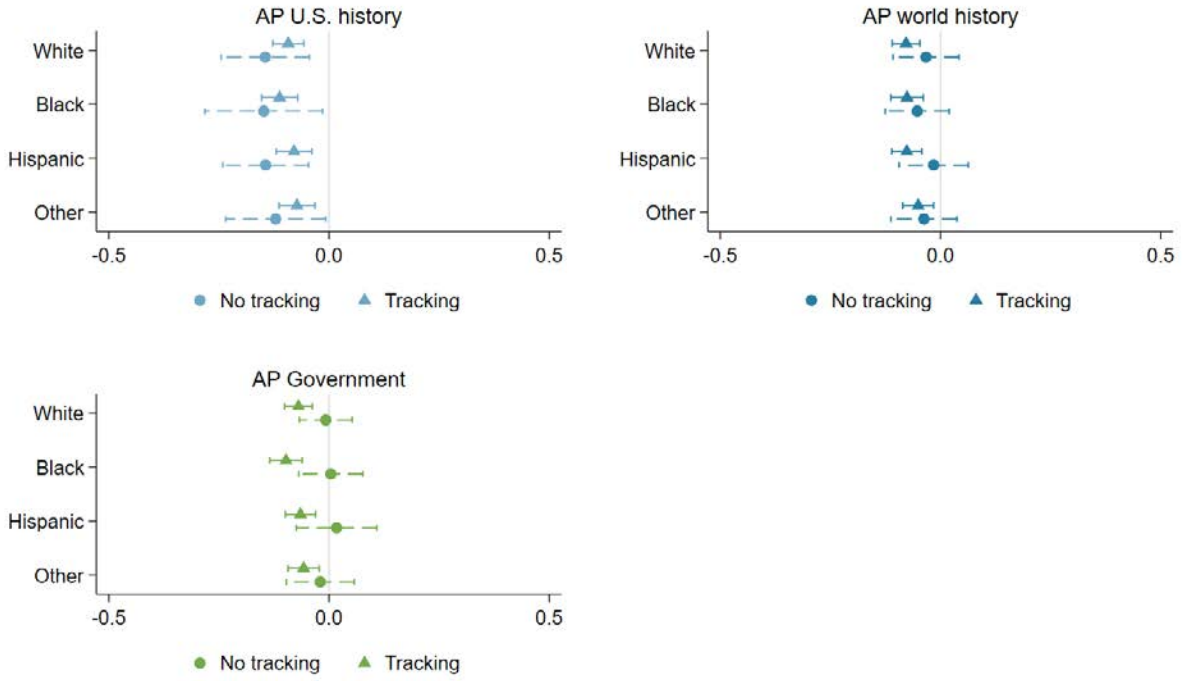
NOTES: N = 11,220. Results are predicted margins from multilevel linear regression models regressing AP social studies course enrollment on an indicator of whether the student was in a high school that used math tracking and a variety of controls. Regression models include inverse probability weights.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

When I add terms to my regression models that interact a student's demographic characteristics with a dummy variable capturing whether they were in a tracked school, I find some interesting results. I present the full set of results from this subgroup analysis in Table C.2. Although I investigated patterns by sex, race/ethnicity, and family socioeconomic status, I focus on the differences by student race/ethnicity because they are the largest. I caution readers that large confidence intervals make it difficult to draw definitive conclusions about what is exactly is going on in the data. Nonetheless, I discuss below a few findings that are suggestive of a pattern.

In Figure 3.6, I plot the difference in likelihood of enrollment in AP social studies courses for Asian students versus students of other racial/ethnic subgroups by whether students were in a school that used math tracking. Focusing first on AP government enrollments, I find that in nontracked schools, Asian students were no more likely than their peers in other racial/ethnic subgroups to be enrolled in such courses, after controlling for a variety of other predictors of coursetaking. In contrast, in schools that were tracked, Asian students were more likely than students of all other racial/ethnic subgroups to be enrolled in AP government courses. In fact, as shown in Table C.2, the Asian-Black enrollment gap was statistically wider in tracked schools than in nontracked schools. I observe this same general pattern for AP world history enrollments

too. However, I observe a different story among AP U.S. history enrollments. For this course, Asian students in *both* tracked and nontracked schools were more likely than their peers of other racial/ethnic subgroups to be enrolled. Figure C.3 also displays these same findings in an alternate format to help illustrate the patterns I observe in the data.

Figure 3.6 Racial/ethnic enrollment gaps (relative to Asian students) in AP/IB social studies courses, by schools' use of math tracking



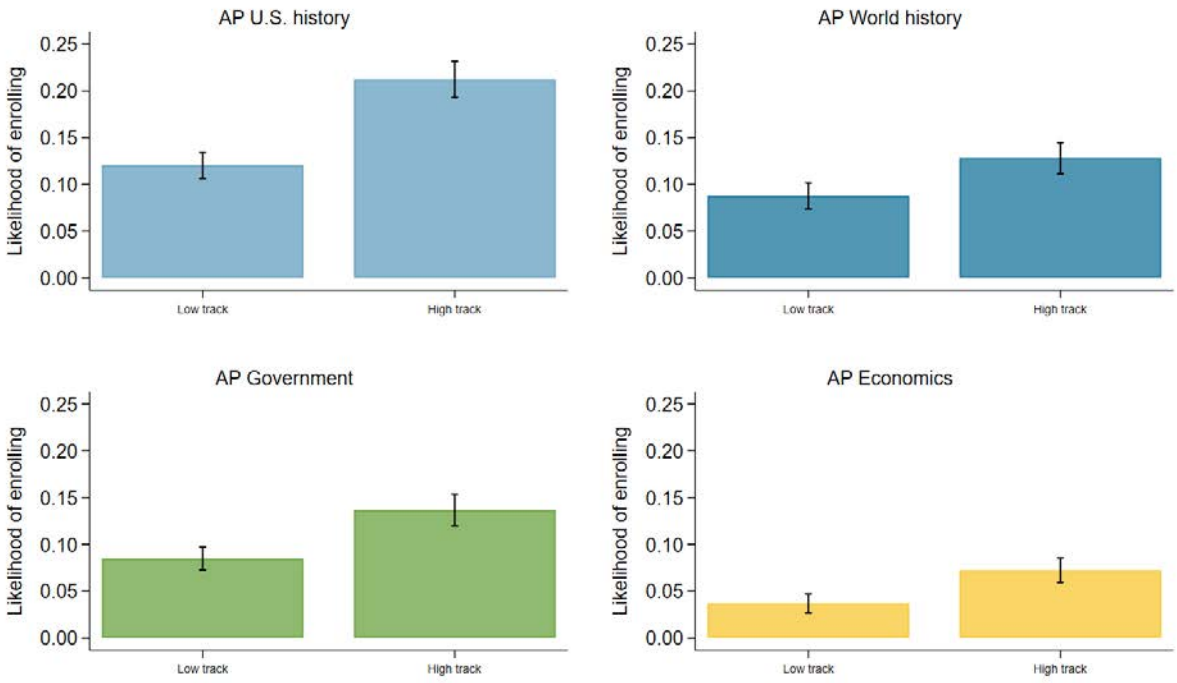
NOTES: N = 11,220. Figure displays the difference in the likelihood of enrolling in AP social studies courses for students in each racial/ethnic subgroup relative to Asian students. Results are from multilevel linear regression models regressing AP course enrollment on an indicator of whether the student was in a high school that used math tracking interacted with student demographic characteristics and a variety of controls. Regression models include inverse probability weights.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Research question 2

My second research question asks, "Is there an association between students' ninth grade math course placement and their likelihood of enrolling in AP social studies courses during their later high school years, after controlling for other factors associated with students' coursetaking?" As expected, I observe a positive association between students' math track placement and their likelihood of enrolling in AP social studies courses, even after controlling for other predictors of coursetaking. As shown in Figure 3.7, students sorted onto the high math track were consistently more likely to be enrolled in all AP social studies courses than their counterparts on the low math track. Those on the high math track were 9 percentage points more likely to be enrolled in an AP U.S. history course, 5 percentage points more likely to be enrolled

in an AP government course, 4 percentage points more likely to be enrolled in an AP world history course, and 4 percentage points more likely to be enrolled in an AP economics course (see also Table C.3).

Figure 3.7 Students' likelihood of enrolling in AP social studies courses, by discipline and students' math track placement



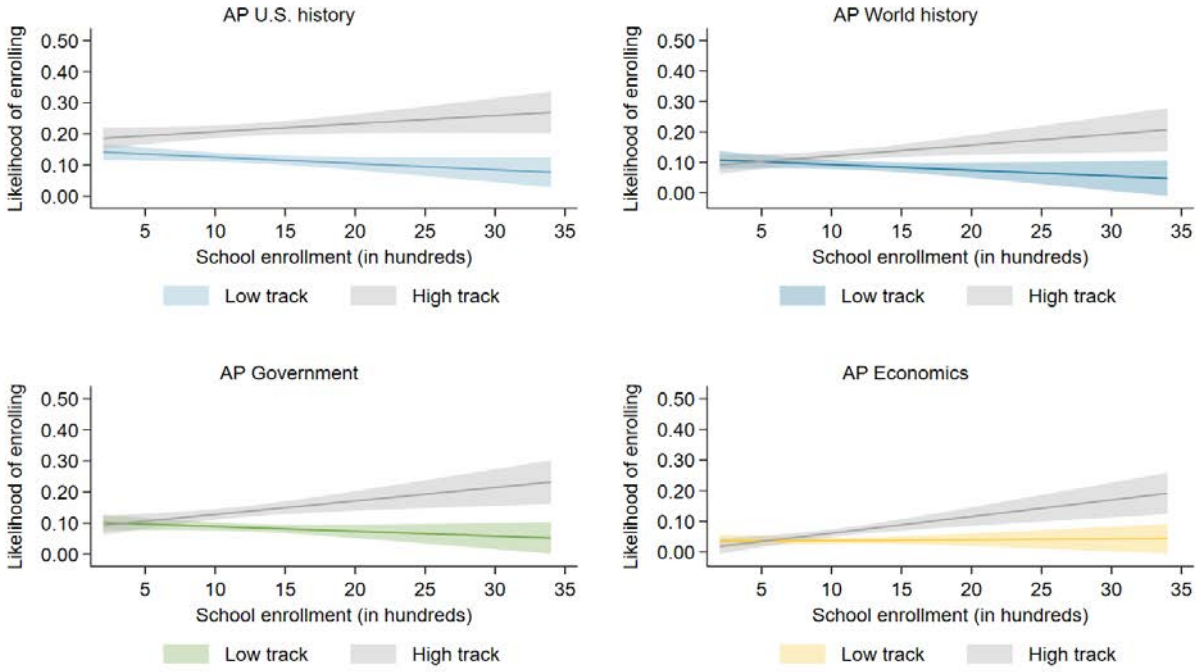
NOTES: N = 9,760. Results are predicted margins from multilevel linear regression models regressing AP social studies course enrollment on an indicator of math track placement and a variety of controls. Regression models include inverse probability weights.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Research question 3

This third research question asks whether the positive association between students' math track placement and their likelihood of enrolling in AP social studies courses is moderated by various aspects of their school structure, conditional on a variety of other predictors of coursetaking. I investigated the possibility that a school's enrollment size may affect this relationship. I also examined whether schools' master schedule may moderate this association by using two proxy measures: the number of course periods in the school day and use of block scheduling. As shown in Table C.4, the results of this analysis are a bit scattered, possibly because of the relatively coarse measures that are available in HSLS:2009. But in general, I do not find evidence that schools' course schedules meaningfully impact the relationship between math tracking and students' AP social studies coursetaking.

Instead, the starkest pattern I observe is for school enrollment size. As shown in Figure 3.8 (and Figure C.4), I find evidence of a differential association between students' math track placements and their likelihood of enrolling in AP social studies courses depending on the enrollment size of their high school. In the smallest high schools, students sorted onto low and high math tracks are similarly likely to end up enrolled in AP social studies courses. At best, there is a slight advantage for students sorted onto high math tracks. As schools' enrollment sizes increase, students' initial math track placements appear to matter more and more, especially for enrollment in AP U.S. history and AP government courses. Figure C.4 suggests that students' math tracks typically start to matter as schools near enrollment sizes of about 1,000 students. This finding is counterintuitive if we think that smaller schools are likely to have more scheduling constraints and fewer sections of each course. On the other hand, large schools are more likely to have a greater degree of curricular differentiation (that is, they might be more likely to offer more courses targeted at different levels).

Figure 3.8 Students' likelihood of enrolling in AP social studies courses, by discipline, math track placement, and school enrollment size



NOTES: N = 9,760. Results are predicted margins from multilevel linear regression models regressing AP social studies course enrollment on an indicator of whether the student was in a high school that used math tracking interacted with the school's enrollment size and a variety of controls. Regression models include inverse probability weights. Shading represents 95 percent confidence intervals.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

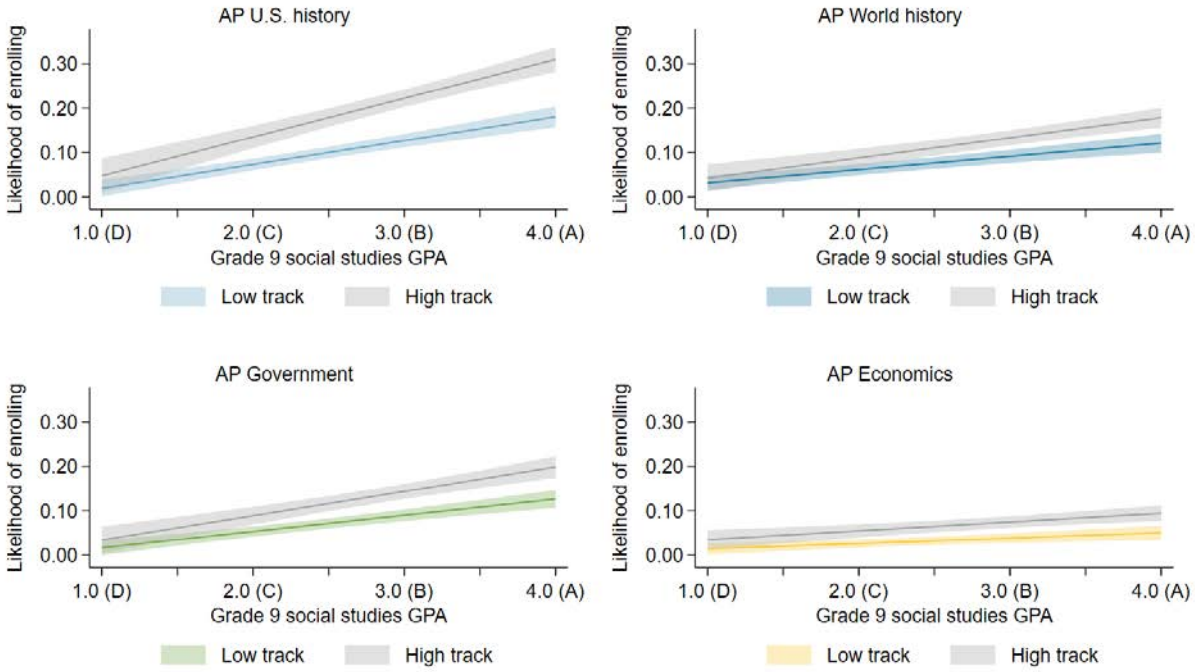
Research question 4

Research question four asks whether high- versus low-achieving social studies students are differentially influenced by their math track placement. As mentioned previously, I measure students' social studies achievement using their grade point average from social studies courses taken in grade 9. Unsurprisingly, students' likelihood of taking AP social studies courses is positively associated with the grade point averages they earned in their grade 9 social studies courses. That is, students that earned better grades in their ninth grade social studies courses are more likely to take AP social studies courses in the future. I observe this positive association among both students on low and high math tracks (see Table C.5).

However, I also find evidence that students' social studies grade point average in grade 9 moderates the relationship between math tracking and AP social studies course enrollments, as shown in Figure 3.9. That is, low-achieving social studies students—those who earned, say, "Cs" or "Ds" in their ninth grade social studies courses—were pretty unlikely to enroll in AP social studies courses in subsequent school years, regardless of whether they were sorted onto higher or lower math tracks. However, as students' GPAs from their ninth grade social studies courses increase, their likelihood of enrolling in AP social studies courses rises faster for students on higher math tracks. This divergence begins to happen for students who earned about a "C" average (see Figure C.5).

The AP social studies enrollment gap is widest for students who earned an "A" average in their grade 9 social studies courses. Take AP U.S. history as an example. I find that "A" students on high math tracks had a likelihood of enrolling in AP U.S. history of about 0.3. But "A" students on the low math track had a likelihood of enrolling in AP U.S. history of about 0.2. I observed a statistically significant widening of the enrollment gap between students on high versus low math tracks as students' grade point average increases for AP history and government courses. I observed this same pattern for AP economics courses too, but the differences were not statistically significant.

Figure 3.9 Students' likelihood of enrolling in AP social studies courses, by discipline, math track placement, and GPA in grade 9 social studies courses

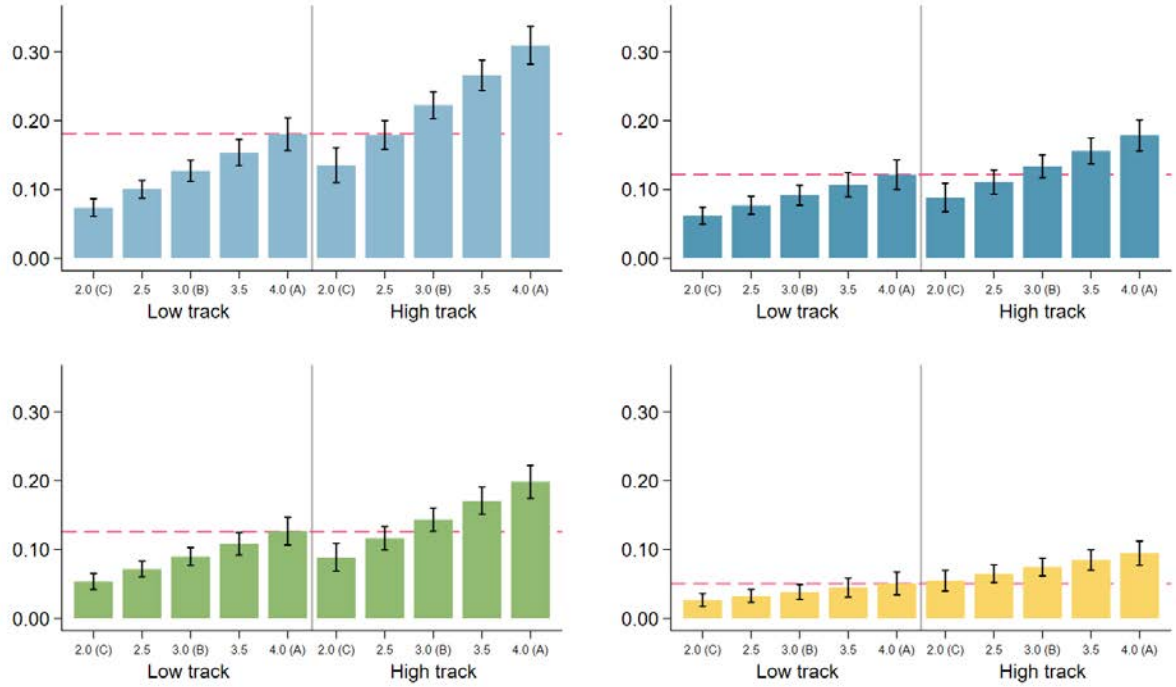


NOTES: N = 9,760. Results are predicted margins from multilevel linear regression models regressing AP social studies course enrollment on an indicator of whether the student was in a high school that used math tracking interacted with students' GPA in grade 9 social studies courses and a variety of controls. Regression models include inverse probability weights. Shading represents 95 percent confidence intervals.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Figure 3.10 offers another way to think about these differences. In Figure 3.10, I plot the predicted likelihood of AP social studies course enrollment by students' math track placement and their GPA in their ninth grade social studies course. The pink reference line is the probability of an "A" average student on a low math track enrolling in an AP social studies course. Looking at AP U.S. history courses as an example, I find that students with an "A" average on the low math track have roughly the same likelihood of enrolling in an AP U.S. history course as a student with a "C+/B-" average on a high math track. A student with an "A" average on a low math track is less likely to enroll than a student with a "B" average on a high math track. I observe the starkest differences for AP U.S. history, although I observe the same general pattern for the other AP social studies courses as well.

It may be tempting to discount this divergence, assuming that there are relatively few potentially high-achieving social studies students on low math tracks. As shown in Figure C.6, this student population is larger than one might expect. Some 15 percent of students on low math tracks earned an "A" average in their grade 9 social studies courses and another 15 percent earned about a "B+/A-" average. This means that roughly a third of students on low math tracks might be well suited to enrolling in AP social studies courses.

Figure 3.10 Students' likelihood of enrolling in AP social studies courses, by discipline, math track placement, and GPA in grade 9 social studies courses



NOTES: N = 9,760. Results are predicted margins from multilevel linear regression models regressing AP social studies course enrollment on an indicator of whether the student was in a high school that used math tracking interacted with students' GPA in grade 9 social studies courses and a variety of controls. Regression models include inverse probability weights. Shading represents 95 percent confidence intervals. Pink dashed reference line is the likelihood of an "A" social studies student on a low math track enrolling in the course.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Research question 5

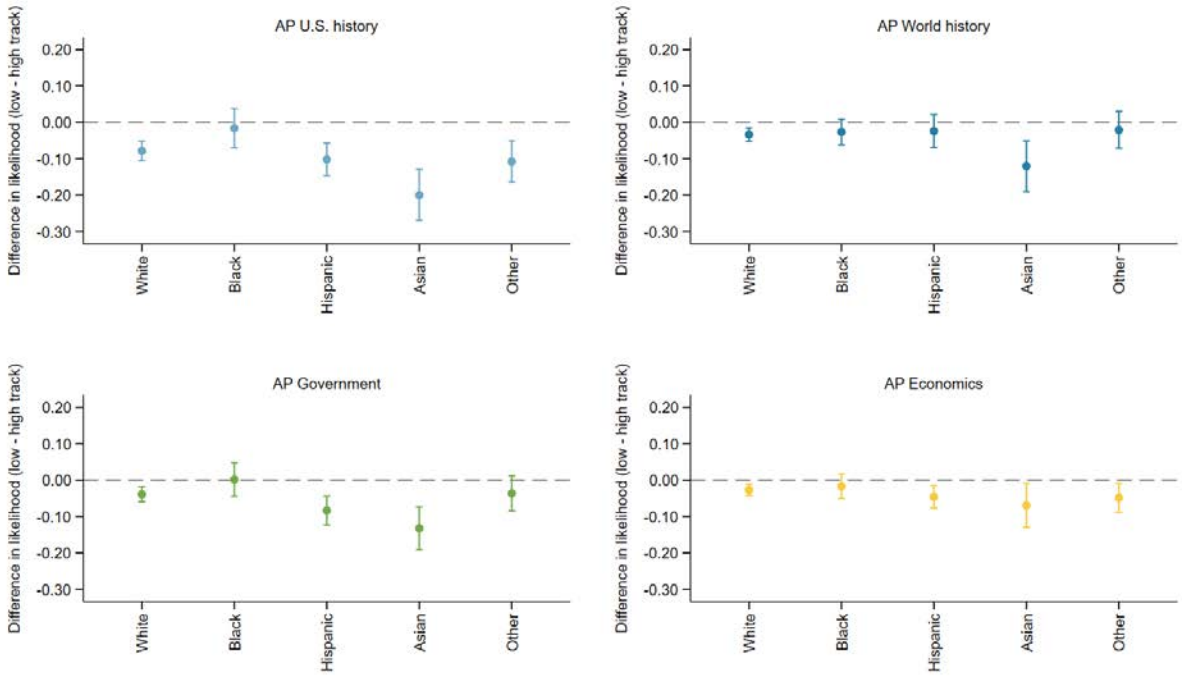
This final research question asks whether students across subgroups are similarly disadvantaged in terms of their AP social studies enrollments from being sorted onto a lower math track. I investigated differences in the association between math course placements and students' AP social studies coursetaking by several student subgroups (sex, race/ethnicity, and family income). The full set of results for all student subgroups is included in Table C.6. I focus here in the text on the racial/ethnic differences because they are consistently the largest and statistically significant differences.

I generally find evidence that students are not similarly disadvantaged (in terms of their likelihood of eventually enrolling in AP social studies courses) by being sorted into a low math course in grade 9. In Figure 3.11, I plot the difference in likelihood of enrolling in AP social studies courses based on whether students were sorted into a high or low math course in grade 9 for each racial/ethnic subgroup. A point estimate below the line means that students of that racial/ethnic subgroup on a low math track were less likely, on average, to enroll in an AP social studies course, compared with students on the high math track. A confidence interval that

straddles zero means there was no statistically significant difference in students' likelihood of enrolling in AP social studies courses based on their grade 9 math course.

As shown in Figure 3.11, White students who were sorted into a lower math course in grade 9 were only slightly less likely than their counterparts in higher math courses to enroll in AP social studies courses in subsequent school years. This was true for all four of the AP social studies courses I examined, although the gap was widest for AP U.S. history courses. Asian students on the low math track, on the other hand, were quite less likely than their counterparts on the high math track to enroll in AP social studies courses. As with White students, the enrollment disparity was widest for AP U.S. history courses. Black students were the exception to this rule: Black students on high math tracks were no more likely than their counterparts on low math tracks to enroll in AP social studies courses.

Figure 3.11 Difference in likelihood of enrolling in AP social studies courses, by discipline, math track placement, and student race/ethnicity

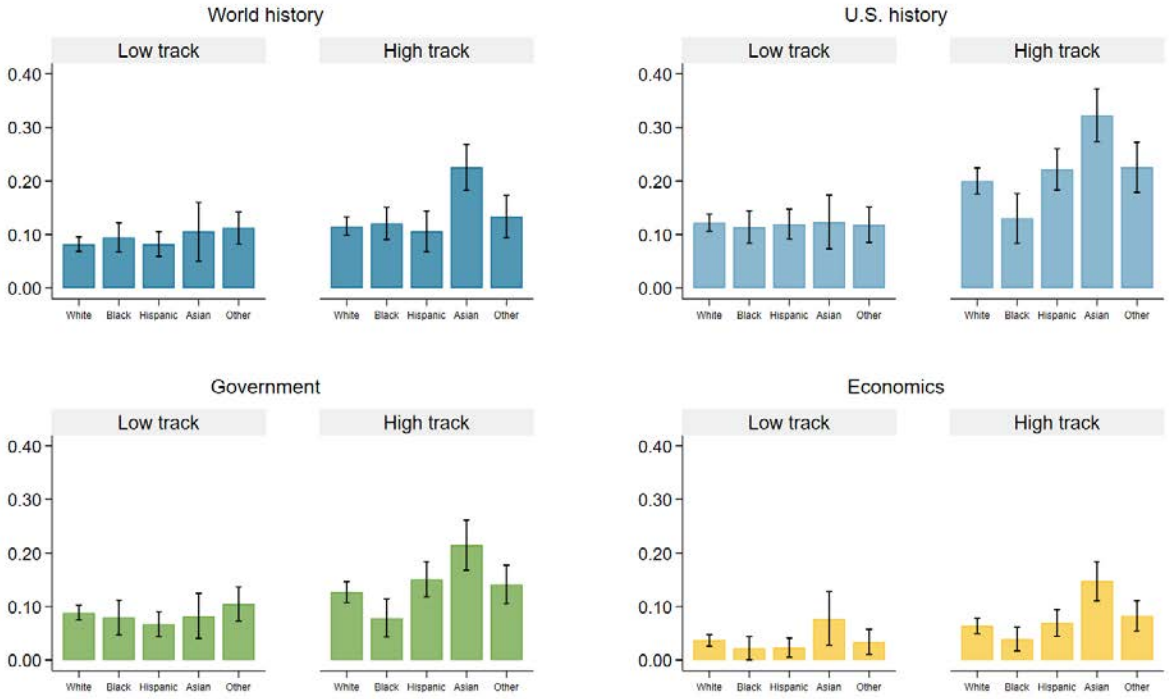


NOTES: Figure presents the coefficient and 95 percent confidence interval from multilevel linear regression models regressing AP course enrollment on an indicator of students' math track course placement interacted with their race/ethnicity and a variety of controls. Regression models include inverse probability weights.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

However, Figure 3.11 masks importance differences in the level of AP social studies course enrollments across student racial/ethnic subgroups. As shown in Figure 3.12, students of all racial/ethnic subgroups on low math tracks are roughly equally likely to (not) enroll in AP social studies courses. Figure 3.12 suggests the disparities in AP social studies course enrollments come mostly from students on the high track. Take Asian students, for example. The difference

in likelihood shown in Figure 3.11 does not stem from under-enrollment among students on low math tracks; it is coming from heightened enrollment among students on high math tracks. Black students, meanwhile, appear to have no disparity in Figure 3.11. But this is because enrollment rates in AP social studies courses are consistently low among Black students, regardless of which math track they are on.

Figure 3.12 Likelihood of enrolling in AP social studies courses, by discipline, math track placement, and student race/ethnicity



NOTES: N = 9,760. Results are predicted margins from multilevel linear regression models regressing AP social studies course enrollment on an indicator of whether the student was in a high school that used math tracking interacted with students' race/ethnicity and a variety of controls. Regression models include inverse probability weights. Black bars represent 95 percent confidence intervals.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Limitations

Although these analyses reveal some useful insights about the relationship between math tracking and students' social studies coursetaking, they do have a few limitations that readers should keep in mind. Most importantly, this study did not employ a causal research design, limiting my ability to conclude definitively that any observed differences in social studies coursetaking can be attributed directly to math tracking practices. Although I attempt to mitigate concerns about selection bias using propensity score methods, I am only able to adjust for observed differences in schools and students. Unobserved differences—like students' motivation to enroll in more advanced courses—likely remain. Relatedly, this study does not fully capture

the degree of choice that students had to enroll in their preferred math and/or social studies courses. Students' coursetaking, although it is shaped by policy, likely reflects student choice to an unknown degree. I do not know what policies schools had in place, if any, to gatekeep students' access to advanced math or social studies courses, nor how malleable any policies were to accommodate student and parent preferences. Future work on this topic should aim to include more detailed information about schools' course placement practices in both math and social studies to help disentangle how much of students' AP social studies coursetaking reflects choice versus policy.

Readers should also keep in mind that the tracking assignments made in this study are rough classifications based on observed course enrollments among an incomplete set of students. Schools offer many different math courses with many different titles. Students' coursetaking is a complex web (see American Institutes for Research, undated; Brown et al., 2018). That is, students can take multiple math courses at one time. They can move linearly along a prescribed pathway, or they can repeat or skip courses or fall off the pathway entirely. And even if a school enrolls all their students in Algebra I, they may enroll some students in regular Algebra I courses and others in honors Algebra I courses. Or even within courses, schools may group students by ability level (Steiner et al., 2024). In sum, the tracking assignments made in this study are a necessary oversimplification of the complexity of students' math coursetaking. Future work might try to address this problem by tracking enrollment patterns for all students in a small set of schools or districts to obtain more accurate classifications of tracking practices and assignments.

I also focus solely on student enrollment in AP social studies courses and ignore other high-level social studies courses (like honors courses) that students may enroll in. I make this choice for simplicity. But I also make it because of the ubiquity of AP courses and the central role these courses play in students' college and career pathways and because honors courses seem to be relatively rare in social studies (see Figure B.4). Nevertheless, my analyses may fail to capture enrollments in other more advanced social studies courses taken by students.

Finally, the measures of student achievement used in this study are not ideal. It is critical to capture at least some indication of achievement in math and social studies because advanced coursetaking is clearly associated with prior achievement and omission of such a variable would likely bias results. Ideally, however, I would have achievement measures from standardized assessments in both math and social studies that were administered in grade 8—that is, achievement measures that precede students' high school course assignments (and if these achievement measures were actually used in making course placements this would be even better). My measure of math achievement—students' scores on a standardized assessment administered in fall of the 2009–2010 school year—is not ideal in the sense that it was administered *after* ninth grade math course placements were already assigned and, thus, may be a function of students' ninth grade math coursetaking to some degree. However, because student achievement is so highly correlated over time, it is unlikely that many students' eighth grade assessment scores would differ so substantially from their ninth grade assessment scores that it

would bias my results. My measure of students' social studies achievement—their grades in social studies courses taken in grade 9—is more temporarily appropriate. But relative to a standardized assessment score, it is more clearly a direct function of student's coursetaking. I try to adjust for these concerns by treating students' entire ninth grade year as a single time point and only examining AP social studies coursetaking patterns in subsequent school years (i.e., when students are in grades 10 through 12).

Summary

A variety of indicators—spending, instructional supports, academic standards, assessment, accountability policies, instructional time—consistently suggest that K–12 schools prioritize students' STEM education over their social studies education. This paper hypothesized that there is yet another aspect of K–12 schools that potentially prioritizes students' STEM education over their social studies education: math tracking. More specifically, this paper hypothesized that students' math track placements—which are based on students' math ability and are often made before students reach high school—may be associated with students' opportunity to enroll in more rigorous courses in other academic subjects, like social studies.

Using multilevel modeling with propensity score weighting, this paper investigated to what extent students' math course placements in grade 9 are associated with their likelihood of enrolling in AP social studies courses in subsequent school years. My analyses reveal a complicated picture of to what extent math tracking is associated with students' AP social studies coursetaking. In this section, I briefly review the key findings from these analyses. I conclude by discussing a few implications for policy and practice.

Review of key findings

First, I find that, at least on average, students in high schools that use math tracking are no more or less likely to be enrolled in AP social studies courses in grades 10–12 than their counterparts in schools that do not use math tracking. However, use of math tracking may distort the composition of students enrolled in these courses. If one were to look at Figure 3.5 only, he or she would conclude that AP social studies course enrollment outcomes are similar in both tracked and nontracked schools. In some ways, this finding may not be surprising. Conditional on school demographics like enrollment size and poverty level, tracked and nontracked schools probably offer similar numbers of sections of AP courses and, thus, are probably able to serve roughly similar numbers of students in AP courses overall. However, these totals mask a more nuanced equity story. As mentioned above, large confidence intervals make it difficult to draw definitive conclusions. But my analyses suggest that schools that track in math may have a different *composition* of students in their AP social studies courses than schools that do not track in math (see Figure 3.6). That is, there are larger disparities across student racial/ethnic subgroups in the schools that do track in math than in the schools that do

not. Notably, the observed distortion in enrollments by student race/ethnicity are consistent with those I would expect if tracking were changing the composition of enrollments in AP social studies. That is, I find that Asian students are more likely to be tracked highly in math, and Black and Hispanic students less so. If math tracking is associated with students' likelihood of enrolling in AP social studies courses, I would expect these racial/ethnic disparities to be carried over into social studies—more so than in nontracked schools. And it is the tracked schools that seem to have disproportionately more Asian students and disproportionately fewer Black students in their AP social studies courses.

Second, I observe a strong positive association between students' math course placements in grade 9 and their likelihood of enrolling in AP social studies courses in subsequent school years. That is, I find that students sorted onto high math tracks were more likely to end up enrolling in AP social studies courses than students sorted onto lower math tracks. Importantly, I observe this positive relationship even after controlling for other explanatory factors, like student interest in both academic subjects, prior achievement, and various aspects of the school's environment (see Figure 3.7).

I observe this positive association across student subgroups with one exception: I find that Black students on high math tracks were no more likely than their peers on low math tracks to enroll in AP social studies courses. This begs the question of why this positive association does not extend to Black students. I have a few hypotheses. For one, this null finding could simply be because my analytic sample contains few Black students, leading to imprecise estimates. Another hypothesis is the slippage that happens in students' math course pathways. Prior research shows that Black students may be particularly likely to fall off the higher-level math pathway (e.g., Grissom et al., 2020; Han, 2023; Irizarry, 2021; Riegle-Crumb, 2006), which I suspect might weaken the association between students' original math course placement in grade 9 and their likelihood of taking AP social studies courses in later school years. It may also be that schools or teachers encourage fewer Black students to enroll in AP social studies courses, regardless of their math track placement. That is, if schools do have separate screening processes for AP social studies courses, these processes may be similarly biased against Black students as those in math.

Third, I find that school size moderates the association between students' math track placements and their likelihood of enrolling in AP social studies courses in subsequent school years. That is, students sorted onto low math tracks in large schools are particularly unlikely to enroll in AP social studies courses in subsequent school years. I was initially concerned that constraints brought on by schools' master schedules may disproportionately prevent low-tracked students in small schools from enrolling in AP social studies courses. Instead, my analyses suggest that disparities arise more so in large schools than in small schools. I find that students' math track placements become more strongly associated with their likelihood of ending up in AP social studies courses as schools' enrollment sizes get larger (see Figure 3.8). Students' math track placements begin to matter for their subsequent AP social studies course enrollments as schools' enrollment sizes grow somewhere between 500 and 1,000

students (see Figure C.4). My findings are consistent with the explanation that the additional diversity of course offerings common to large schools (see Figure A.3) leads to a stratification of the student population across academic subjects (Lee et al., 2000). That is, in small schools, students' math track placements might be less strongly correlated with their subsequent AP social studies course enrollments because all students are equally disadvantaged by low levels of course access (see Figure A.3).

Fourth, my analyses show that high-achieving social studies students sorted onto lower math tracks enroll in AP social studies courses at lower rates than middle-achieving social studies students on high math tracks. A student with an "A" grade point average in social studies on a low math track is less likely to enroll in an AP U.S. history course than a student with a "B" average on a high math track (see Figure 3.10). This pattern suggests that a student's enrollment in an AP social studies course may be more strongly correlated with the student's achievement in *off-subject* courses (math) than in *on-subject* ones (social studies). This raises concerns about whether we believe that this is how tracking should work.

Implications

Results from the first research question showing similar results for tracked versus nontracked schools, on average, but subgroup differences is an excellent example of why it is critical to disaggregate reporting by student subgroup. These results suggest that it is not enough to monitor overall AP course enrollments across schools—examination of course enrollments (and other indicators of education quality and opportunity) must include disaggregation by student subgroups. The absence of subgroup monitoring may lead to inaccurate conclusions about equity in access to and enrollment in AP courses, such as those in social studies. This view is echoed in the Every Student Succeeds Act and the U.S. Department of Office of Civil Rights' Civil Rights Data Collection (CRDC), both of which mandate reporting by protected classes of students (see more on this point in Chapter 5). However, neither of these data collections currently includes a focus on social studies course access, enrollment, and achievement. To effectively monitor equity in social studies course access and enrollment, for example, the U.S. Department of Education should build social studies into the CRDC and require schools to disaggregate AP social studies course enrollments by protected classes of students.

Public discussions about the benefits and drawbacks of math tracking should include recognition that any choices made about math tracks may inadvertently extend to other subjects too. My analyses revealed a positive association between students' math track placements and their likelihood of enrolling in AP social studies courses, even after controlling for student interest in the academic subjects, prior achievement, and various aspects of the school's environment. This suggests that math tracks do seem to have "spillover" effects into other academic subjects. Though widely used, math tracking remains a highly controversial practice and remains the subject of much public debate. This is because the problems with math

tracking are well documented: researchers were raising concerns about the racial and socioeconomic stratification in K–12 schools brought on by tracking policies as early as the 1980s (e.g., Oakes, 1987; Oakes, 1990). The debate over math tracking has re-ignited in the last few years. This is likely for several reasons, including its centrality in the very public discussions about revisions to the California Math Framework and heightened attention on policies that potentially perpetuate or exacerbate existing inequalities (e.g., Coe, 2020; Galchen, 2022; Huffaker et al., 2023; Loveless, 2021; Schwartz, 2023b). Of course, these are important topics that merit additional research and public discussion.

But in these very public disagreements, there is little to no discussion, or even acknowledgement, that any decisions we make about math tracking may influence students' opportunities to learn in other academic subjects too. Any evaluation of the positive and negative effects of math tracking must recognize the possibility of interdependence across other academic subjects like social studies. Although my analyses focus on the association between math tracking and social studies enrollments, this association plausibly extends to the other subjects like ELA and science.

High-achieving social studies students on low-math tracks are likely under-enrolling (or "under-matching") in courses that may be appropriate for their achievement level. This might be because schools are not (or may not be doing a good job of) screening students for higher-level courses independently by subject. Schools may need to identify these high-achieving social studies students on low math tracks and nudge them to pursue more advanced social studies coursework. Being sorted onto lower math tracks may shift students' confidence and their perceptions about their ability, which may predict their subsequent coursetaking in math and in other subjects. Said another way, students sorted onto lower math tracks may not believe that higher coursework, math or other subjects, is supposed to be for them. Prior work shows that some high-achieving students—especially those from disadvantaged backgrounds—"under-match" when it comes to college (e.g., Black et al., 2015; Dillon & Smith, 2012; Hoxby & Avery, 2012) but that nudges targeted to this population of students can be effective in changing behavior (e.g., Kozman & Sanders, 2019). The same principle might apply here. Targeted messages directed at high-achieving social studies students on low-math tracks may help to boost enrollments in AP social studies courses among this population of students.

Chapter 4: Which course(s) is the source? The association between social studies coursetaking and civic engagement

Abstract

Students take many different social studies courses while in high school that could theoretically shape their civic development and, ultimately, their civic engagement in early adulthood. However, it is not clear *how many* or *which* of these courses that students take while in high school actually contribute to their civic engagement after leaving. Using linear probability models with propensity score weighting and student transcript data collected from roughly 10,550 students in the High School Longitudinal Study of 2009, I investigate which aspects of students' high school social studies coursetaking—such as the disciplines in which they earn their social studies credits and the rigor of the courses they take—are associated with students' likelihood of being registered to vote or to have spent time volunteering three years after leaving high school. I find a positive association between the total amount of social studies credits earned and students' likelihood of spending time volunteering, but I find no association with registration to vote. I also find weak evidence that *how* students earn these social studies credits might matter for their subsequent civic engagement. For example, earning a greater share of credits in world history courses is positively associated with students' likelihood of having spent time volunteering while earning a greater share of credits in government courses is positively associated with students' likelihood of being registered to vote. Meanwhile, I find no association between enrollment in or share of total credits earned in economics and geography courses and students' subsequent civic engagement. The findings raise questions about how students should spend their social studies credits to maximize their civic outcomes in early adulthood given limited time during the school day.

Introduction

A key objective of students' social studies education is to prepare them for citizenship. As stated by the National Council for the Social Studies, "social studies prepares learners for a lifelong practice of civil discourse and civic engagement in their communities" (NCSS, 2023). Accordingly, the four core social studies disciplines (government/civics, history, economics, and geography), both independently and in aggregate, have been conceived of as directly and indirectly supporting students' civic development and their eventual roles as democratic citizens (NCSS, undated). Thus, at least in theory, there is a potential link between students' social studies education, broadly defined, and their civic engagement after leaving the public education system.

In secondary schools, students' social studies education is typically relegated to discipline-specific courses. These social studies courses typically span a range of disciplines including history, government, economics, geography, psychology, and sociology, among others. Students across the United States typically take multiple discipline-specific courses over the course of their high school experience. Data from federal transcript studies suggest that most students nationally take about four credits' worth of social studies courses (see Figure 1.1). By the time they are done with high school, most students will have taken courses in covering three to five different social studies disciplines, although not always the same ones (see Figure A.7). And even within disciplines, the specific courses that students take can differ in terms of their content, length, and rigor (see Figure A.5). In brief, students' (middle and) high school social studies coursetaking is a complicated web comprising multiple dimensions.

Although we may hypothesize that the social studies courses that students take while in high school matter for their subsequent civic engagement, we actually do not know if this is the case. That is, it remains unclear *which* dimensions of students' high school social studies coursetaking, if any, are associated with students' civic outcomes in early adulthood. For example, it could be that the *number* of social studies courses taken predicts students' subsequent civic engagement or it could be the *nature* of these courses. It may be that enrollment in a specific social studies course like a government course strongly predicts students' civic engagement after leaving high school. Or it could be that enrollment in a specific combination of complementary social studies courses more strongly predicts students' subsequent civic engagement. Identification of which social studies course, or courses, seem to matter most for students' civic outcomes can help policymakers, school system leaders, educators, and families determine which high school social studies courses should be prioritized to maximize students' civic outcomes.

Current study

In this exploratory study, I investigate which aspects of students' high school social studies coursetaking, if any, are associated with students' civic engagement in early adulthood. This analysis is a first attempt to unpack the multidimensionality of students' high school social studies coursetaking and asks which aspects of this coursetaking seem to matter the most for students' civic outcomes. I use as my outcomes two indicators of civic engagement—registration to vote and time spent volunteering—each measured three years after students completed high school. I investigate the following research questions, each roughly corresponding to one dimension of students' high school social studies coursetaking:

(1) To what extent is the total *number of social studies credits* that a student earns while in high school associated with their subsequent civic engagement?

(2) To what extent are the *discipline(s)* in which these social studies courses are taken (e.g., government, economics) associated with students' subsequent civic engagement?

(3) To what extent is the *rigor* of social studies courses taken (e.g., regular course, AP/IB course) associated with students' subsequent civic engagement?

(4) To what extent is a student's social studies *course pathway* associated with their subsequent civic engagement?

Taken together, these research questions help isolate which aspects students' high school social studies coursetaking seem to have the strongest association with students' subsequent civic engagement. I answer these research questions using linear probability models with propensity score weighting and student transcript data collected from roughly 10,550 students in the High School Longitudinal Study of 2009.

To preview my results, I find a positive association between the total number of social studies credits earned and students' likelihood of spending time volunteering, but I find no association with registration to vote. I also find weak evidence that *how* students earn their social studies credits might matter for their subsequent civic engagement. For example, earning a greater share of credits in world history courses is positively associated with students' likelihood of having spent time volunteering while earning a greater share of credits in government courses is positively associated with students' likelihood of being registered to vote. Meanwhile, I find no association between enrollment in or share of total credits earned in economics and geography courses and students' subsequent civic engagement. The findings raise questions about how students should spend their social studies credits to maximize their civic outcomes in early adulthood given limited time during the school day.

Background

Overview and trends in civic engagement

Civic engagement is the foundation of a healthy and sustainable democracy (Hope, 2022; Kaufman et al., 2022; National Civic League, undated). In a democratic system of government, decisionmaking power is held by the people and government actions are intended to reflect the preferences of the population. The stability and success of a democracy, then, depends upon the engagement of its people. Civic engagement encompasses a variety of individual and collective actions, including community service activities, electoral activities or political involvement, and partaking in activities intended to drive social change or show political voice (Adler & Goggin, 2005; Center for Civic Engagement, undated; Ekman & Amnå, 2012; Kaufman et al., 2022; Keeter, 2002).

Regardless of what form it takes, evidence generally suggests civic engagement in the United States is generally low. For example, despite rising in recent years, voter turnout hovers somewhere around 60 percent, notably below the levels observed in other similarly developed countries (Desilver, 2022; U.S. Elections Project, undated). Minorities of U.S. adults report engaging in other civic activities beyond voting, such as volunteering (42 percent), attending

community meetings (29 percent), donating to campaigns (12 percent), participating in protests (3 percent), or working for a political campaign (3 percent) (American National Election Studies [ANES], 2016). And not only is civic engagement in the United States low, it is also highly unequal. Civic engagement has historically been higher among women, white individuals, higher-income individuals, and individuals with higher levels of education attainment (e.g., Campbell, 2009; Dittmar, 2018; Foster-Bey, 2008; Jenkins, 2005; Kawashima-Ginsberg & Thomas, 2013; Levinson, 2010; Pew Research Center, 2023). These concerning civic engagement gaps by gender, race/ethnicity, income, and educational attainment have persisted for decades (e.g., Gaby, 2016; Jacobsen & Wilder Linkow, 2012; Syvertsen et al., 2011).[14]

Voting and volunteering rates among youth

Importantly, civic engagement in the United States has historically been *especially* low among youth (those in their late teens and twenties). As shown in Table 4.1, youth ages 18–24 are less likely to engage in a wide range of civic activities, including voting, volunteering, making political donations, contacting public officials, charitable giving, and boycotting.[15]

Table 4.1 Percentage of individuals who engaged in various civic activities in 2021, by age group

Civic engagement measure	18–24	25–44	45–54	55+
Talking with friends and family	95	97	96	96
Learning about issues	75	83	85	87
Discussing issues with friends and family	64	73	71	69
Talking with neighbors	52	66	73	76
Voting in local elections	34	51	59	66
Informal helping	34	49	55	57
Posting views online	28	25	21	16
Charitable giving	25	46	54	57
Volunteering	18	23	27	23
Discussing issues with neighbors	18	28	34	36
Organizational membership	14	21	25	29
Taking action with neighbors	12	16	20	21
Buycotting or boycotting	11	19	19	17
Contacting public officials	3	9	11	12
Attending public meetings	3	9	11	8
Donating to a political cause	2	8	10	14

SOURCE: 2017–2021 CEV Findings: National Rates of All Measures by Demographics from the Current Population Survey Civic Engagement and Volunteering (CEV) Supplement.

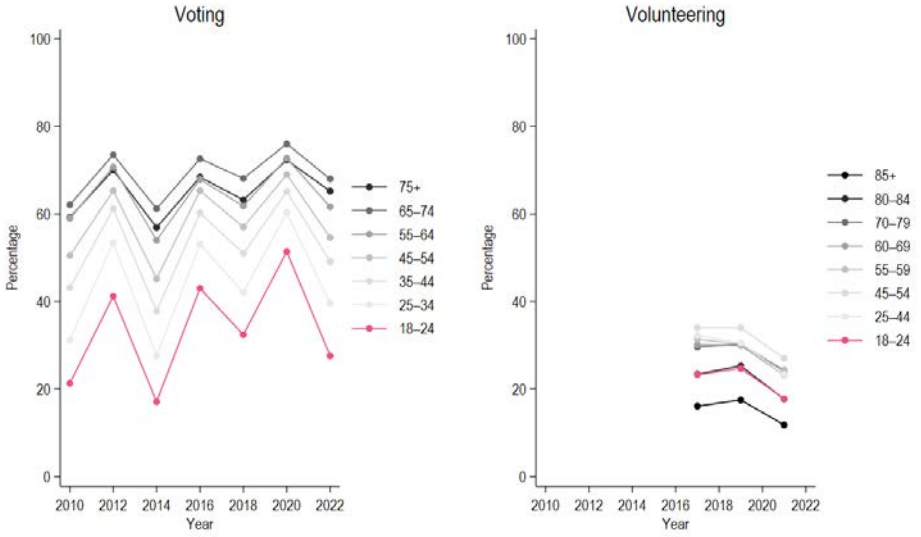
[14] Prior research has documented gaps by immigrant generation too, although the heterogeneous nature of immigrant populations—both in terms of their racial/ethnic composition as well as their citizenship status—make it difficult to make broad generalizations about the direction of these gaps (e.g., Brettell, 2020: Ishizawa, 2014; Stepler & Ishizawa, 2021; Qi & Gonzalez, 2021).

[15] Despite this historic trend, there are some indications that civic engagement among youth may be rising or perhaps that current youth are engaging differently than previous generations (CIRCLE, undated; Medina et al., 2023). For example, the rise of social media offers new opportunities for individuals to engage in civic activities online and data suggest younger individuals are most likely to post about their views online (see Table 4.1). Youth also have been especially active in protests (ANES, undated; Barroso & Minkin, 2020).

Two of the most widely tracked indicators of civic engagement are voting and volunteering. This is because both voting and volunteering are widely viewed as responsibilities, if not duties, of citizenship and necessary for a functioning democracy (e.g., Dionne & Rapoport, 2020; Pew Research Center, 2018). As evidence of the preeminence of these two indicators, the U.S. Census Bureau conducts two surveys every other year to monitor national trends in civic engagement—one focused on voting and one focused on volunteering. Voting is captured in the construct of civic engagement as political/electoral involvement or participation (Adler & Goggin, 2005; Ekman & Amnå, 2012; Kaufman et al., 2022). Casting a vote in local, state, and national elections is perhaps the most foundational way in which individuals participate in a democracy and make their preferences known. Meanwhile, volunteering typically is captured in the conceptualization of civic engagement as community service (Adler & Goggin, 2005; Ekman & Amnå, 2012). Although it can take many forms, broadly, volunteering is hypothesized to help foster social cohesion or trust among members of a community (Davies, 2024).

Evidence consistently suggests that voting and volunteering rates are especially low among youth (e.g., AmeriCorps, undated-a; American National Election Studies, 2016; Center for Information & Research on Civic Learning and Engagement [CIRCLE], undated; U.S. Census Bureau, 2017b). For example, as shown in Figure 4.1, 18- to 24-year-olds consistently have the lowest rate of volunteering of any age group except those 80 or older. Similarly, only 28 percent of 18- to 24-year-olds reported voting in the most recent national election. This was by the far the lowest percentage of any age group.

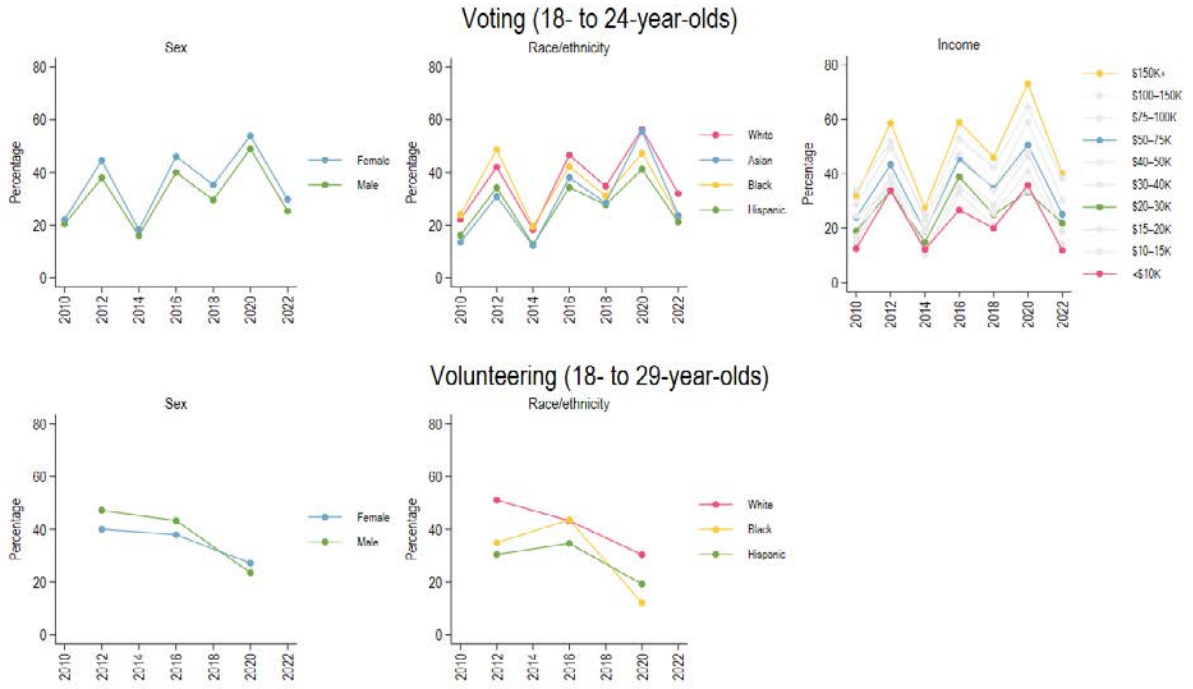
Figure 4.1 Percentage of individuals who reported voting and volunteering, by year and age group



NOTE: For voting data, population includes only U.S. citizens.
SOURCE: Voting data come from U.S. Census Bureau, Voting and Registration in the Election of November [Year], P20 detailed tables. Volunteering data come from 2017-2021 CEV Findings: National Rates of All Measures by Demographics from the Current Population Survey Civic Engagement and Volunteering Supplement.

Furthermore, mirroring patterns among all U.S. adults, civic engagement among youth is also highly unequal (e.g., CIRCLE, 2023a; Gaby, 2016; Enchautegui, 2014; Medina, 2023). Figure 4.2 plots voting and volunteering rates among youth by sex, race/ethnicity, and income. As shown in Figure 4.2, White individuals have consistently had among the highest voting and volunteering rates over time, while Hispanic individuals have had among the lowest. Youth in the families with higher incomes had consistently voted at higher rates over the last decade than youth in families with lower incomes.

Figure 4.2 Percentage of individuals who reported voting and volunteering, by year and age group



NOTE: For voting data, population includes only U.S. citizens.
SOURCE: Voting data come from U.S. Census Bureau, Voting and Registration in the Election of November [Year], P20 detailed tables. Volunteering data come from American National Election Studies.

This situation—persistently low and inequitable civic engagement among all U.S. adults, but especially among youth—is problematic because democracy hinges upon an assumption that many (if not all) individuals participate and that all have equal opportunity to shape the democratic process. This begs the question of not only how to increase youth civic engagement, but how to make it more equitable.

The theoretical role of schools in shaping students' civic development and engagement

The solution to this problem of persistently low and unequal civic engagement among youth is likely multifaceted. However, many have pointed to K–12 public schools as a critical

component of any solution. In fact, since their inception and initial proliferation, public schools have served as critical civic institutions to support students' civic development and future civic engagement. At least in theory, K–12 schools support students in developing their civic knowledge, skills, and dispositions through both formal and informal learning opportunities. As defined by Vinnakota (2019), *civic knowledge* refers to "an understanding of government structure, government processes, relevant social studies knowledge and concepts, and American history and political thought in a global context"; *civic skills* refer to "competencies in the use of one's voice, including basic writing, speaking, and listening skills and skills of research, investigation, and critical thinking; competencies in the use of practices of democratic coordination, political institutions, and media literacy"; and *civic dispositions* refer to "attitudes important in a democracy, such as a sense of civic duty, sense of efficacy, concern for the welfare of others, and commitment to trustworthiness and bridge-building."

Schools may engage in many activities intended to directly or indirectly build students' civic knowledge, skills, and dispositions. For example, some states and schools have volunteering or community service requirements (Shapiro & Brown, 2018; Wrabel et al., 2024). Schools may run voter registration drives (CIRCLE, 2023b; Wrabel et al., 2024). They might also provide opportunities to participate in civics-focused extracurricular activities (e.g., student government, debate teams), discussions of current political and social issues, or simulations of democratic processes, among others (Gould, 2011; Guilfoile et al., 2016; Levine & Kawashima-Ginsberg, 2017). Taken together, these opportunities are theorized to help students build their knowledge, skills, and dispositions, which then in turn shape their engagement (Cohen & Chaffee, 2013; Hart et al., 2007; Kahne & Sporte, 2008; Kirlin, 2003; Maiello, 2003; Torney-Purta et al., 2001).

What we know about the association between students' high school coursework and subsequent engagement and what we do not

Another way that schools theoretically contribute to students' civic development and eventual civic engagement is through coursetaking. That is, students take courses while in high school that are thought to directly or indirectly help them build the civic knowledge, skills, and dispositions needed to become democratic citizens. The high school courses that we might theorize to have the strongest duty to build this knowledge and disposition are ones in the social studies disciplines.

Government courses in particular have perhaps the most obvious theoretical connection to students' future civic engagement, especially voting. To vote, for example, one needs to have a basic understanding of how voting works, the skills to navigate the voting process for him or herself, and a positive attitude toward engagement. Beyond factual knowledge, government or civics courses may also seek to shape students' civic dispositions, like their sense of civic duty or the responsibilities of citizenship, concern for others, and commitment to their community (Vinnakota, 2019). Prior research has revealed positive associations between civics instruction,

factual civic knowledge, civic attitudes, and students' expectations of voting (Cohen & Chaffee, 2012; Niemi and Junn, 1998, Torney-Purta, 2001).

Although there is a theoretical link between students' high school social studies coursetaking and their civic outcomes after leaving high school, few prior studies have empirically investigated this relationship. I focus here on three empirical studies which have all focused explicitly on the association between government/civics coursetaking and students' likelihood of voting in early adulthood. First, in a working paper, Bachner (2010) used national samples of students from the 1988 and 2022 National Education Longitudinal Studies (NELS) to investigate this relationship. Bachner used high school transcripts to obtain coursetaking measures and student surveys to obtain students' self-reports of voting. After propensity score matching and controlling for demographics, home resources, and other civic involvement (e.g., extracurricular activities), Bachner found that students who took a full-year government course were 3 to 6 percentage points more likely to vote in the first election after high school than their counterparts who did not take a government course at all. In a similar second study, Siegel-Stechler (2019) used a nationally representative survey of students in 2012, asking them whether they voted in the most recent election and whether they took a civics or government course in high school. After controlling for a similar set of factors like demographics and parental involvement, Siegel-Stechler too found a positive association between taking a civics course and voting in subsequent years. In summary, these early papers found empirical evidence to support the theoretical claim that taking a government course in high school is positively associated with students' likelihood of voting in later years.

Importantly, however, both of these first two papers relied on observational designs that cannot isolate the causal link between government or civics coursetaking and voting. In a later paper, Weinschenk & Dawes (2022) employed perhaps the most robust research design of the existing work on this topic. In a similar manner to previous studies, Weinschenk & Dawes used transcript data and student surveys from the nationally representative National Longitudinal Study of Adolescent to Adult Health. However, Weinschenk & Dawes's model design was different. That is, they employed sibling fixed-effects models, comparing the voting outcomes of siblings over time with different levels of exposure to civics coursework. Using this more robust research design, they concluded that civics courses likely have a null effect on voting in adulthood, or at most one that is substantively small. Taken together, these three prior studies found, at best, a tenuous link between government or civics coursetaking and voting. That is, although there is a theoretical link between government/civics coursetaking and subsequent civic engagement, prior work on this topic has not found strong empirical evidence to support this theoretical link.

Importantly, however, the three prior empirical studies on this topic suffer from two main limitations: (1) exclusion of other civic engagement measures and (2) exclusion of other social studies courses theorized to shape students' civic development. Below, I briefly describe each

limitation in turn, including why I perceive omission of these items to be a limitation of previous work and how I address it.

First, prior research on this topic has focused exclusively on voting as the civic engagement outcome of interest. While voting is an obvious outcome of interest given its importance for democracy, it is likely not the *only* outcome of interest. There are many ways that youth might be civically engaged beyond voting. And high school coursetaking plausibly affects students' likelihood engaging in a wide variety of civic activities in early adulthood, such as those listed in Table 4.1. As a test of this hypothesis, I expand the focus of previous literature to include not just voting, but volunteering as a civic engagement outcome.

Second, and perhaps more importantly, prior research has failed to explore the complexity of students' high school coursetaking and its potential relationship with students' subsequent civic engagement. As described above, the three previous empirical studies on this topic have focused solely on high school government/civics courses. But government courses themselves can vary, including by the length of the course (e.g., a full year or a semester) and the rigor of the course (e.g., regular level, Advanced Placement level).[16] Furthermore, government courses are not the only social studies courses that students take in high school that are theoretically related to their future civic engagement. Social studies education comprises coursetaking in multiple disciplines beyond government, including history (both U.S. history and world history), economics, and geography. Instruction in each of these disciplines has been conceptualized, at least in theory if not yet empirically, to students' role as democratic citizens. Below, I briefly detail the theoretical link between coursetaking in these other social studies disciplines and students' subsequent civic engagement.

Economics: The primary goal of economics education is to build the economic literacy needed for citizenship (Crowley & Swan, 2018; Miller, 1988). As defined by Schug, "The goal of economic education, then, is to foster in students the thinking skills and substantive economic knowledge necessary to become effective and participating citizens," (Schug, 1985). National frameworks to guide economics instruction include topics like understanding economic indicators to analyze the economy, evaluation of monetary and fiscal policies, and the role of economic institutions (National Council for Economic Education, 2010; NCSS, undated) and many economics textbooks integrate civic concepts, touching on the roles of citizens and institutions (Morgan & Banaszk, 1988). Understanding basic economic concepts like opportunity cost, incentives, market failures, and resource distribution is likely key for citizens to be able to understand the world around them and may shape how they interpret or participate in it. Building off of Westheimer & Kahne (2004), Crowley & Swan (2018) conceptualizes economics instruction as building four types of economic citizens: (1) the "personally responsible citizen"

[16] Previous studies do recognize that not all government courses that students take in high school are the same. Bachner (2010) and Weinschenk & Dawes (2022) both investigate the possibility that the content included in government courses has a relationship with students' likelihood of voting. However, Bachner (2010)'s analyses is limited by categories that are likely not coarse enough to pick up meaningful differences. The categorization of courses used by Weinschenk & Dawes (2022) is more difficult to interpret, but findings generally suggest that the civics courses that may be associated with voting are those that focus on experiential learning or multicultural/international topics.

(i.e., one who maximizes long-term stability by making responsible choices like budgeting or saving), (2) "the participatory economic citizen" (i.e., one uses economics tools and works within existing structures to drive desired outcomes) (3) the "justice-oriented economic citizen" (i.e., one who tends toward collective action to understand and address policy failures) and (4) "the discerning economic citizen" (i.e., one seeks to understand, discuss, and break down social, political, and economic issues).

Geography: Geography education too has been conceived as foundational for citizenship (Hong, 2018; Stoltman, 1990; Thornton, 2018). As stated by Stoltman (1990), "Important elements of citizenship are embedded within the five fundamental themes of geography—location, place, relationships within places, movement, and regions." Geography education is not just focused on physical locations, but on how people interact with their natural environment and with each other. Beyond just building geographic literacy, geography education is hypothesized to shape students' perspective of the world and their place in it (Stoltman, 1990).

History: History has historically been the predominant social studies discipline (Coleman, 2021; Thornton & Barton, 2010). The relevance of history education for citizenship has been somewhat controversial (Puaca, 2004). On the one hand, a shared knowledge of past events might promote social cohesion and a collective understanding and action to address future problems (Cartwright, 1960). On the other hand, others have feared that the integration of history and citizenship education is feared to promote nationalism and unwillingness to engage with past wrongs (Thornton & Barton, 2010). Nevertheless, a basic factual understanding of historical persons and events, both in the U.S. and across the world, may shift a student's propensity to engage in their community, either by voting or volunteering.

In summary, it is theoretically possible that these other social studies courses—either on their own or in combination—predict students' civic engagement after leaving high school. Previous work fails to capture the complexity and multidimensionality of students' high school social studies coursetaking and how this might be associated with students' civic engagement after leaving high school. Students vary in terms of their total quantity of coursework, the number and specific disciplines in which they take courses, the sequence in which they take these courses, the specific content included in these courses, and the level at which they take these courses. That is, students' high school social studies coursetaking varies along several different dimensions. But it is unclear *which* aspects of students' coursetaking matter most for their later civic outcomes. It could be that only the total *number* or quantity of social studies courses taken is associated with students' later civic engagement. Or it could be that the *nature* of the social studies courses taken (e.g., courses taken in specific disciplines, the rigor of the courses taken, or the combination of courses taken) predicts students' later civic engagement.

However, if we are able to isolate which aspects of students' high school social studies coursetaking have the strongest relationships with students' subsequent civic engagement, this can help students prioritize which social studies courses to enroll in given limited time in the school day. This information can also assist policymakers and school system leaders in crafting

policies that incentivize students to enroll in these courses. If, for example, enrollment in full-year government courses is strongly associated with students' civic engagement after leaving high school, this evidence might support states and schools in adding this as a graduation requirement (Shapiro & Brown, 2018). On the other hand, if taking a diversity of social studies courses has a strong relationship, states and school systems might instead focus on developing course pathways that expose students to many different disciplines. Or, if AP courses are the only courses that predict civic engagement, school systems might instead double down on getting more students to enroll in these courses.

In summary, students need to know which social studies courses to take in high school to maximize their future outcomes. But states, school systems, and parents cannot guide students appropriately in this decisionmaking if they do not know which courses matter for their civic outcomes.

Methodology

Data sources

To investigate these research questions, I use restricted-use data from the High School Longitudinal Study of 2009 (HSLS:2009) administered by the National Center for Education Statistics (NCES). HSLS:2009 is composed of a single cohort of roughly 23,000 students who began ninth grade in the fall of the 2009–2010 school year (subsequently referred to as the base year). NCES identified these students using a probability-based, two-stage sampling scheme. The agency first sampled nearly 2,000 public and private high schools across the United States. Of the 944 high schools that agreed to participate, NCES subsequently sampled about 25,000 ninth grade students from schools' registrars. In total, about 21,000 students participated in the base year data collection. For more information about HSLS:2009's sampling scheme and response rates, see Ingels et al., 2011.

HSLS:2009 followed these ninth-grade students through the rest of their high school career and into postsecondary education and the labor market. Data collection occurred in multiple waves. For example, in the base school year (2009–2010), students completed questionnaires touching on a variety of topics including their demographic information, their engagement in academic and extracurricular activities, their perceptions of the coursework they were completing at school, and their future educational plans, among many other topics. A first follow-up survey that collected data on a similar set of topics was conducted during the 2011–2012 school year (when most participating students were in grade 11). And after the vast majority of participating students graduated high school in spring 2013, NCES collected high school transcript records for graduated students. Students were surveyed again in 2016, this time primarily about their enrollment in postsecondary education (e.g., their choice of college major, intended career path) and labor force participation. However, this second follow-up survey also

collected information about life factors, including students' family situation, socioeconomic status, participation in military service, and civic engagement, among many others. Survey data collected directly from students was periodically supplemented by data collected from other sources including parent surveys; high school teacher, administrator, and school counselor surveys; standardized assessments; postsecondary transcript records; and student loan records.

The analyses in this paper primarily rely on two key sources of data contained within HSLS:2009: (1) students' high school transcripts collected in 2013 and (2) the second follow-up survey administered in 2016. Below, I provide some additional details about these data sources before turning to explain how I leveraged them in my analyses.

Students' high school transcripts

Student transcript data were collected in the summer of 2013, coinciding with the end of students' high school career assuming they made standard grade progression (which the vast majority of students did). Students' high school transcripts include detailed data on the courses that students took while in high school. Transcript records include information such as course titles, course levels (e.g., regular, honors, remedial, AP, IB), number of Carnegie credits attempted and earned,[17] and course grades earned. NCES was able to obtain complete high school transcript coverage for about 18,500 students, or about 80 percent of the students for whom they sought data. These students have complete transcript data that covers coursetaking that occurred between the 2009–2010 and 2012–2013 school years. For more information about how HSLS:2009 transcript data were collected and processed, see Ingels et al., 2015.

To address the problem that schools use a wide range of titles to refer to roughly comparable courses, NCES relied on the School Courses for the Exchange of Data (SCED) classification system. In brief, NCES tagged each course on each student's high school transcript with a five-digit number that provides detailed information about the course. The analyses presented in this paper rely on the subset of courses classified by SCED as "social studies" courses (identified by the first two digits of the five-digit number). The remaining digits help identify the discipline of the course (e.g., economics, government), the level of the course (e.g., AP/IB), and the content included (e.g., early U.S. history versus modern U.S. history). This is the primary source of data I use to build indicators of what courses students took in high school and what these courses were.

Second follow-up survey

The second critical HSLS:2009 data source is the second student follow-up survey. This survey was administered between March 2016 and January 2017, roughly three to four years after most students had finished high school. In this survey, participating students were asked

[17] A Carnegie unit is a standardized of measurement of enrollment for secondary education that corrects for variation in course length stemming from differences in the structure of schools' calendars. One Carnegie unit is equivalent to the completion of a course that meets one period per day for one school year, where a period is typically at least 40 minutes.

two questions about their civic engagement: (1) Were you registered to vote in February 2016? and (2) In calendar year 2015, about how many hours per month (on average) did you volunteer or perform community service that was not required by [a college, trade school,][an employer,][or] the criminal justice system? In an effort to increase response rates during the end phases of data collection, NCES offered students the opportunity to complete an abbreviated survey. Unfortunately, the shortened survey excluded the civic engagement survey items. Although the survey participation rate for the second follow-up survey was high (about 75 percent), this means that the civic engagement outcome data is missing for about a third of the initial HSLS:2009 sample. For more information about the design and administration of the second follow-up survey, see Duprey et al., 2018.

Analytic sample

To create an analytic sample for these analyses, I defined a set of inclusion criteria. Most importantly, to ensure that I do not interpret incomplete transcript information as indication that students did not enroll in specific courses while in high school, I exclude those students that do not have complete transcript data available. Secondly, because eligibility to vote in the United States is restricted to U.S. citizens, I exclude a small number of individuals (less than 3 percent) who were known not to be U.S. citizens at the time of data collection as well as a handful of other individuals who said they were not eligible to vote for other reasons. Although this eligibility constraint does not apply to volunteering, I consistently apply these criteria so that I have the same analytic sample throughout the paper. I also exclude a small number of individuals (less than 0.3 percent) who reported an implausibly large amount of time spent volunteering. I also drop students who are missing data on civic outcomes. Furthermore, because I include school- and state-level covariates, I require students to remain in the same school for the entirety of their high school career.

After making these restrictions, my analytic sample contains 10,550 students distributed across the United States. In Table 4.2 below, I compare the demographic characteristics of the students in my analytic sample with the national population of young adults (those aged 20- to 24-year-old) at the time of data collection. As shown in Table 4.2, even with restrictions applied, my sample remains large, diverse, and generally representative of the national population, with a few exceptions. Notably, my analytic sample has a slight over-representation of White and Asian students and a slight under-representation of Black and Hispanic students. Presumably, my sample also has a slight over-representation of students from families in the highest socioeconomic quintile, although I could not contain comparable data on this demographic.

Table 4.2 Demographic characteristics of analytic sample

	Analytic sample	National population
All	1.00	1.00
Sex		
Male	0.48	0.50
Female	0.52	0.50
Race/ethnicity		
White	0.59	0.54
Black	0.09	0.15
Hispanic	0.14	0.21
Asian	0.09	0.06
Other	0.09	0.04
Family socioeconomic status		
Quintile 1 (Lowest)	0.13	---
Quintile 2	0.15	---
Quintile 3	0.18	---
Quintile 4	0.22	---
Quintile 5 (Highest)	0.33	---
N	10,550	22,000,000

NOTES: National population data are for 20 to 24-year-olds, roughly corresponding to the age of students in the HSLS:2009 sample in 2016.
SOUCRE: Analytic sample data come from the High School Longitudinal Study of 2009. National population data come from the U.S. Census Bureau (Census Bureau, 2016).

Analytic strategy

To answer each of my research questions, I employ the same general analytic strategy. Specifically, I retain the same basic regression model specification, dependent variables, and control variables. However, I iterate over different permutations of the independent variable, each of which corresponds to one of my research questions. For brevity, I first describe the shared analytic approach. I then turn to discuss the specific conceptualizations of the independent variable intended to address each of my research questions. I conclude by describing the shared set of controls I employ in all analyses.

Regression specification

To estimate the relationship between various aspects of students' high school social studies coursetaking and their civic engagement three years after leaving high school, I estimate a series of regression models with propensity score weighting. Given HSLS:2009's two-stage sampling scheme, I first test whether using a multilevel model is necessary to account for possible clustering. I find little to no evidence that the civic outcomes of students in the same schools or states are highly correlated (see Table E.1). Therefore, I estimate linear probability models all of the form:

$$civic_i = \beta_0 + \beta_1 coursetaking_i + \beta_2 X_i + \varepsilon_i$$

where $civic_i$ represents one of two civic engagement outcomes for student i (that is, whether student i was registered to vote as of February 2016 or whether student i spent any time volunteering in 2015). Constructed using self-reported data from students in the second follow-up survey, $civic$ represents a binary variable that equals 1 if student i said "yes" they were registered to vote or equals 1 if student i reported more than zero hours per month (on average) volunteering.[18] Although my civic engagement outcomes are binary, I use linear probably models (as opposed to a logit or probit model) for ease of interpretation.

$Coursetaking_i$ is the independent variable of interest and captures various aspects of student i's high school social studies coursetaking. To answer my research questions, I iterate over various constructions of this independent variable as I describe in more detail in the next section. In all models, the coefficient on the $coursetaking_i$ variable (β_1) is the coefficient of interest and captures the strength of the relationship, if any, between that aspect of students' high school social studies coursetaking and their subsequent civic outcomes. Meanwhile, X_i represents a vector of student, family, school, and state controls.

Ideally, to estimate the causal relationship between a student's high school social studies coursetaking ($coursetaking_i$) and their subsequent civic engagement ($civic_i$), I would randomly assign students to take specific social studies courses holding all other factors constant and then observe any differences in their subsequent civic engagement. Of course, this is not a feasible research design. Instead, I am only able to observe which courses students take and their subsequent civic outcomes and draw conclusions about these relationships based on observed patterns. This observational study design is problematic because students' enrollment patterns in social studies courses while in high school are likely driven by a variety of factors including student interest, ability, and motivation. These same factors are likely to be related to a student's likelihood of engaging in a variety of civic-related activities, like voting or volunteering. For example, a student who is particularly interested in government might be more motivated to take more courses or more rigorous courses in this discipline and may also be more motivated to vote or volunteer in their community. In sum, there are likely systematic differences in the types of students who take certain social studies courses while in high school and those who do not, and these differences are likely meaningfully related to my outcomes of interest. This selection bias limits my ability to isolate the relationship between students' high school social studies coursetaking and their subsequent civic engagement, especially because some of these differences cannot be observed.

To mitigate this selection bias issue, I use inverse propensity score weighting (also called inverse probability of treatment weighting) to balance observable differences in students across

[18] The voter registration rate among my analytic sample was 61 percent. Meanwhile, 39 percent of students in my analytic sample spent any time per month volunteering; among those who volunteered, the mean time spent volunteering was 13 hours per month and the median time was 8 hours.

coursetaking conditions.[19] Other studies (e.g., Bohrnstedt, 2023) that have used HSLS:2009 to estimate relationships between students' high school coursetaking and their subsequent college and career outcomes have also used this method to mitigate selection bias concerns. Inverse probability of treatment weighting has two main steps. First, a "propensity score"—capturing one's likelihood of receiving "treatment" (in this case, enrolling in a specific social studies course)—is estimated as a function of individuals' baseline characteristics. Second, weights equal to the inverse of this propensity score are calculated; when applied to the sample, these weights re-balance students in different "treatment" conditions so that, at least on observable characteristics, students across groups are similar (Chesnaye, 2021).

For each research question, I use a logistic regression model to estimate a student's probability of coursetaking as a function of their baseline characteristics. I convert these propensity scores to weights and apply them in all regression models. Importantly, however, because my coursetaking (or "treatment") variables are a mix of continuous, dummy, and categorical variables, this necessitates slightly different methods to estimate these propensity score weights. Therefore, I employ similar, but slightly different methodologies to calculate propensity score weights and re-balance student subgroups across coursetaking conditions depending on the variable construction as I outline in the next section.

Independent variables of interest

As mentioned above, in all regression models, $coursetaking$ is the explanatory variable of interest. However, there are many different dimensions of coursetaking, including which specific social studies course(s) students take, for how many credits, at what levels, and in what combination. To make this more complex, these dimensions are also interrelated. To capture the complexity of social studies coursetaking, I use data from students' high school transcripts to construct multiple indicators of coursetaking that capture this complexity. Specifically, I create variables that capture specific dimensions of coursetaking, each of which corresponds to one of my research questions.

Research question 1: Number of social studies credits earned

I first hypothesize that the total amount of social studies coursework taken in high school is positively associated with students' civic outcomes. To answer this first research question, I use a continuous measure corresponding to the total number of Carnegie credits earned in social studies. This measure includes credits earned in all social studies disciplines in grades 9 through 12. The students in my analytic sample earned between 0 and 12 Carnegie credits in social studies, although the middle 90 percent of students earned between 2.5 and 6 credits. The mean student earned 3.9 credits and the median student earned 4 (see Figure E.1).

[19] I employ propensity score weighting over other similar methods (like propensity score matching) largely to preserve sample size and representativeness (Austin, 2011).

One might think of this continuous measure of Carnegie credits as akin to variation in "treatment" dosage, with some students earning many social studies credits and others earning relatively few. To help mitigate the selection bias stemming from which students earn many credits and which earn few, I calculate generalized propensity scores following guidance from Bia & Mattei (2008) and Guardabascio & Ventura (2014). In brief, I divide students into intervals based on the total number of social studies credits they earned (<=2.5 credits, 2.5 to 3 credits, 3 to 3.5 credits, 3.5 to 4 credits, 4 to 4.5 credits, and more than 4.5 credits). As shown in Table E.2, application of propensity scores likely mitigates some, though not all, observed differences in the demographic characteristics between students in each interval and their counterparts in other intervals.

Research question 2: Disciplines in which social studies courses are taken

Of course, students can earn their social studies credits in many different ways. This second research question focuses on one dimension across which social studies coursetaking differs: the specific disciplines in which courses are taken. To investigate research question two, I first create a series of dummy variables capturing whether a student ever enrolled in a course in a specific discipline while in high school. More specifically, I create dummy variables corresponding to "ever enrollment" in U.S. history courses, world history courses, government courses, economics courses, and geography courses. Although students may take courses in other social studies disciplines too, I focus on these four disciplines since there is a clear theoretical link between coursetaking in these disciplines and students' subsequent civic engagement. These dummy indicators equal 1 if a student took a course in that discipline, regardless of the level of the course or whether it was a core course or an elective. Coursetaking among the students in my analytic sample varied by discipline: 93 percent ever enrolled in U.S. history, 92 percent in world history, 84 percent in government, 53 percent in economics, and 24 percent in geography.

To apply propensity scores, I first estimate the probability that students took discipline-specific courses as a function of their student and school demographics. I omit state as a covariate in these models because state predicts coursetaking perfectly in some states leading to large numbers of students being excluded from models in ways that is likely to bias my results. Per DuGoff et al. (2013), I convert these propensity scores (p) to weights, where students who did not take a course in that discipline receive a weight of $1/(1-p)$ and students who did take a course receive a weight equal to $1/p$. As shown in Figure E.2, before propensity score weights are applied, there is a high degree of systematic sorting across courses. After propensity score weights are applied, however, the standardized mean differences between students who did and did not take courses in specific social studies disciplines decline substantially, at least on observable characteristics. The standardized mean differences remain notably larger for the history courses than for courses in other disciplines since high enrollment rates in these course limit sample sizes.

Of course, ever enrollment is an oversimplification of students' coursetaking patterns because students can earn differing numbers of credits within the same discipline (see Figure E.3). If they enroll in history courses, students tend to earn one credit or more. On the other hand, students who enroll in government, economics, or geography courses tend to earn at most one credit or possibly just 0.5 credits. Because Carnegie credits are a rough proxy for course length, this implies that students are spending differing amounts of time in their social studies courses. Therefore, I scale the number of credits that students earn in specific social studies disciplines by the total number of credits that they earn in social studies. This allows me to conceptualize a measure of the share of total credits, or total time, that students spend in courses of each discipline. Conceptualizing coursetaking in this way helps to think of the disciplines as in conflict which one another, since any time spent in government courses, for example, is time not spent in a world history course. As in research question one, one might think of this continuous measure as akin to variation in "treatment" dosage, with some students earning many social studies credits in one discipline and others earning relatively few. As before, I calculate generalized propensity scores to adjust students who spend different shares of their total social studies coursework in different disciplines on observable differences.

Research question 3: Rigor of courses taken

For this research question, I focus on the rigor of the social studies courses students that take and their association with students' subsequent civic engagement. Of primary interest is students' enrollment in AP and/or IB courses which are generally considered to be the most rigorous courses in which students enroll while in high school. Unlike in other disciplines like science where students may first take a regular course in a discipline before enrolling in a more rigorous course in that discipline (e.g., taking a regular-level physics course before enrolling in an AP or IB physics course), AP/IB social studies courses tend to be substitutes rather than complements to regular-level courses in the same discipline.[20]

To investigate whether enrollment in more rigorous courses has a stronger association with civic engagement than enrollment in regular courses, I define a series of categorical variables capturing the rigor of courses taken in each discipline. These variables equal 0 if students did not ever enroll in a "core" course in the discipline, equals 1 if students enrolled in a regular course in the discipline, and equals 2 if students enrolled in an AP/IB course in that discipline. I focus on here on what I deem to be "core" courses, excluding what might be considered more elective-style courses (e.g., "Law Studies," "Medieval European History").

As in prior research questions, I am concerned about the systematic sorting of students into these more rigorous social studies courses. Therefore, as before, I first estimate the probability (π_i) that students took regular or AP/IB courses in specific disciplines as a function of their student and school demographics. I omit state as a covariate in these models because state

[20] Although this is true in all social studies disciplines, world history courses have the highest share of students who enroll in a non-AP/IB world history course in addition to the AP/IB course.

predicts coursetaking perfectly in some states leading to large numbers of students being excluded from models in ways that is likely to bias my results. I weight those students who took regular-level courses or AP/IB-level courses to look more similar on observable characteristics to students who took no courses at all. That is, students who did not take a course at all receive a weight $= 1$ and students who took a regular or AP/IB level course receive a weight $= (1 - \pi_i)/\pi_i$. As shown in Table E.3, there is clear evidence of systematic sorting of students into these AP/IB courses. To mitigate this selection bias, again I estimate propensity scores and re-weight those students who took a regular course or an AP/IB course to be more similar, at least on observable characteristics, to students who took no course. As shown in Table E.3, after propensity scores are applied, standardized mean differences in my comparison groups decreases substantially and very few remaining differences are statistically significant.

Research question 4: Combination of courses taken

This final research question asks what relationship, if any, the diversity of social studies courses that a student takes while in high school has with their civic engagement three years after leaving. As described in the previous research questions, students' high school social studies coursetaking varies across a variety of dimensions such that students have the potential to progress through many different theoretical course pathways while in high school. A social studies course pathway might look something like "geography in grade 9, world history in grade 10, AP U.S. history in grade 11, and a half semester each of AP Economics and AP government in grade 12" for one student, but "geography in grade 9, U.S. history in grade 10, government in grade 11, and nothing in grade 12" for another student. The difficulty is capturing the variation in social studies course pathways while identifying a manageable number of pathways to compare.

To balance these objectives, I use a *k* means cluster analysis. Specifically, I first define a specific social studies course pathway for each high school student. A student's course pathway captures the number of courses taken, for what length, in what disciplines, in what order, in what grade, and at what level (regular versus AP/IB). For example, the course pathway for the first previously described student would be "ggwwUUEV," where *gg* represents enrollment in a year-long geography course, *ww* represents enrollment in a year-long world history course, *UU* represents enrollment in a year-long AP U.S. history course, *E* represents enrollment in a semester-long AP economics course, and *V* represents enrollment in a semester-long AP government course. For simplicity, I exclude a small number of high school students who are enrolled in schools which use a trimester (as opposed to a semester or a quarter) system. Furthermore, I only allow students to have one social studies course in a given semester or grade. Most, but not all, students take only one social studies course in a given semester or grade, but when students take multiple social studies courses in the same semester, I prioritize enrollments in higher-level courses. My construction of students' social studies course pathways is a necessary oversimplification of the complexity of students' social studies coursetaking

After sorting students onto specific course pathways, I further reduce the large number of social studies pathways identified (about 4,500) into a more manageable number using a *k* means cluster analysis. The same method was used by Han and colleagues (2023) to classify mathematics course pathways. Ogut & Circi (2023) also rely on a similar idea in their recent analysis of students' math, science, and English language arts coursetaking pathways. Like Han et al., (2023), I develop several indicators to capture specific information about a student's social studies course pathway: (1) the number of semesters taken within each of the social studies disciplines, including courses in "other" disciplines outside of the main core four (history, government, economics, and geography), (2) how many semesters in which the student didn't take a social studies course at all, and (3) how many semesters of AP/IB coursework the student took.

After creating these indicators, I performed multiple *k* means clustering analyses, allowing the number of groups *k* to fluctuate between 1 and 10. After reviewing results from each *k* means solution, with guidance from Makles (2012), I determined the optimal number of *k* means clusters to be seven, which each cluster corresponding to a different social studies course pathway typology. To assist with interpretation, I reviewed the most prevalent pathways among each of the seven typologies and present the results in Table E.4. I also assigned each typology a name intended to broadly capture the types of pathways common to that typology. For example, students with a social studies course pathway typology that I nicknamed "The Bare Minimum" sequence tend to have greater numbers of semesters where they do not enroll in any social studies courses. Students on the "Replace with Other," tend to have more semesters in which they took social studies courses outside of the four core disciplines (e.g., psychology, sociology). This does not mean that no students in other typologies took courses in the "other" disciplines or that every student sorted into this course typology took multiple courses in other disciplines. These typologies are just intended to be rough bins capturing the different ways that students tend to move through social studies courses while in high school.

As in prior research questions, I am concerned about the systematic sorting of students onto these specific course pathway typologies and mitigate this concern by weighting my comparison groups to be more similar on observable characteristics. Specifically, I weight the group of students in each course typology to be more similar, at least on observable characteristics, to those students who took the least amount of coursetaking (i.e., those on "The Bare Minimum" pathway). As shown in Table E.5, after propensity scores are applied, standardized mean differences across my comparison groups decreases substantially.

Control variables

The goal of this paper is to better understand the relationship between students' high school social studies coursetaking and their civic engagement. However, civic engagement is likely shaped by many other factors beyond an individual's high school coursetaking. If there are factors that are correlated with both students' coursetaking (the independent variable of interest)

and their civic engagement (the dependent variable) that are not included in this analysis, this raises concern about the potential for omitted variable bias or that observed relationships may be explained by other phenomena. To mitigate this concern, I define a set of variables to use as controls in my regression models. Below, I briefly describe these student, family, school, and state covariates, including when and how data were collected, how the measure is defined, and the theoretical justification for including these covariates. My covariates are notably similar to the categories of controls used in previous studies on this topics (e.g., Bachner, 2010, Siegel-Stechler, 2019; Weinschenk & Dawes, 2022) within the constraints of the data that are available in HSLS:2009.

(1) *Sex*. Prior work shows civic engagement is higher among women (e.g., Kawashima-Ginsberg & Thomas, 2013) (see also Figure 4.2). Furthermore, there is some evidence of gender gaps in higher-level (AP/IB) social studies coursetaking, and these gender gaps may be larger than those observed for AP/IB math and science coursetaking (Conger et al., 2009) (see also Figure A.10). Sex was self-reported by students in the base year, although missing data were filled in from other sources. Sex is dummy variable, where 1 = female.

(2) *Race/ethnicity*. Similarly, prior work has revealed large and persistent civic engagement gaps by race/ethnicity (e.g., Levinson, 2010) (see also Figure 4.2). The coursetaking literature—which thus far has primarily focused on math and science—has shown that minority students are consistently underrepresented in the most rigorous AP/IB courses (e.g., Conger et al., 2009; Klopfenstein, 2004; Rodriguez & McGuire, 2019) (see also Figure A.10). Student race/ethnicity was self-reported in the base year questionnaire, although missing data were filled in from alternate sources. Student race/ethnicity is a categorical variable with 5 categories: White, Black, Hispanic, Asian, and Other.

(3) *Family socioeconomic status*. Individuals in higher income families are more likely to engage in a variety of civic activities and are also more likely to enroll in more rigorous courses while in high school (see Figures A.10 and W.2). HSLS:2009 contains an index measure of socioeconomic status that captures parental education, parental occupation, and family income (data provided through parent questionnaires) and that has been adjusted for urbanicity. This index was constructed using information provided by students' parents in the base year. This index was then collapsed into quintiles, where the bottom quintile (Q1) represents the poorest families, and the top quintile (Q5) represents the wealthiest families.

(4) *Student achievement*. Students are who are high achievers are probably more likely to engage in civic activities like voting and volunteering and also more likely to take more rigorous courses while in high school. Prior work has connected instruction or coursetaking with civic and political knowledge, which in turn is associated with civic engagement (Niemi & Junn, 1993; Niemi & Junn, 1998; Torney-Purta et al., 2001; Torney-Purta, 2002). Ideally, I would use a measure of achievement that directly captures student learning in social studies. However, the only measures of social studies achievement available in HSLS:2009 are measures that are either a direct measure of coursetaking (e.g., social studies GPA) or are

only available for a small subset of students (e.g., social studies AP exam scores, PSAT scores). The only measure of standardized achievement that is universally available and temporarily appropriate is the student's score on a math assessment focused on algebraic reasoning that was administered to students in the fall semester of the base year, just as they were beginning high school. I use the student's standardized score on this math assessment as a measure of achievement assuming that achievement across subjects is generally correlated—an assumption that is generally well supported by the literature (e.g., Roof & Chimuma, 2022) (see also Appendix D).

(5) *Favorite or least favorite subject*. High school coursetaking likely reflects student choice to some degree, and students' choices presumably reflect their interest. Students who have an interest in say, history or government, are probably more likely to take courses in these areas and may also be more likely to engage in activities aligned with these interests after high school, such as volunteering with a local organization. As a proxy for student interest, I use two survey questions that capture students' favorite subject. In the base year survey, students were asked "Not including lunch or study periods, what is your favorite school subject?" and "Not including lunch or study periods, what is your least favorite school subject?" Students were provided a list of 13 academic and nonacademic subjects, one of which was "Social Studies, History, Government, or Civics." I create a 3-category variable (Social studies is favorite subject, least favorite subject, or neither) using students' responses to these items.

(6) *School demographics*. Students' social studies courestaking likely depends on the type of school they attend. For example, students who attend larger and better resourced schools tend to have access to a wider diversity of course offerings (see Figures A.2 and A.3). Larger and well-resourced schools are more likely to offer a diversity of civics-focused extracurricular activities (Diliberti & Wrabel, 2024). In particular, urban schools and schools serving predominately students of color are more likely to offer voter registration drives and to have community service requirements; access to these sorts of opportunities at school may, in turn, impact students' likelihood of civic engagement later on down the road (Wrabel et al., 2024). I control for widely-used indicators of school demographics including the school locale (city, suburban, town, rural), the share of students eligible for free or reduced-price lunch (a proxy for the school poverty level), the student racial/ethnic composition, and enrollment size.

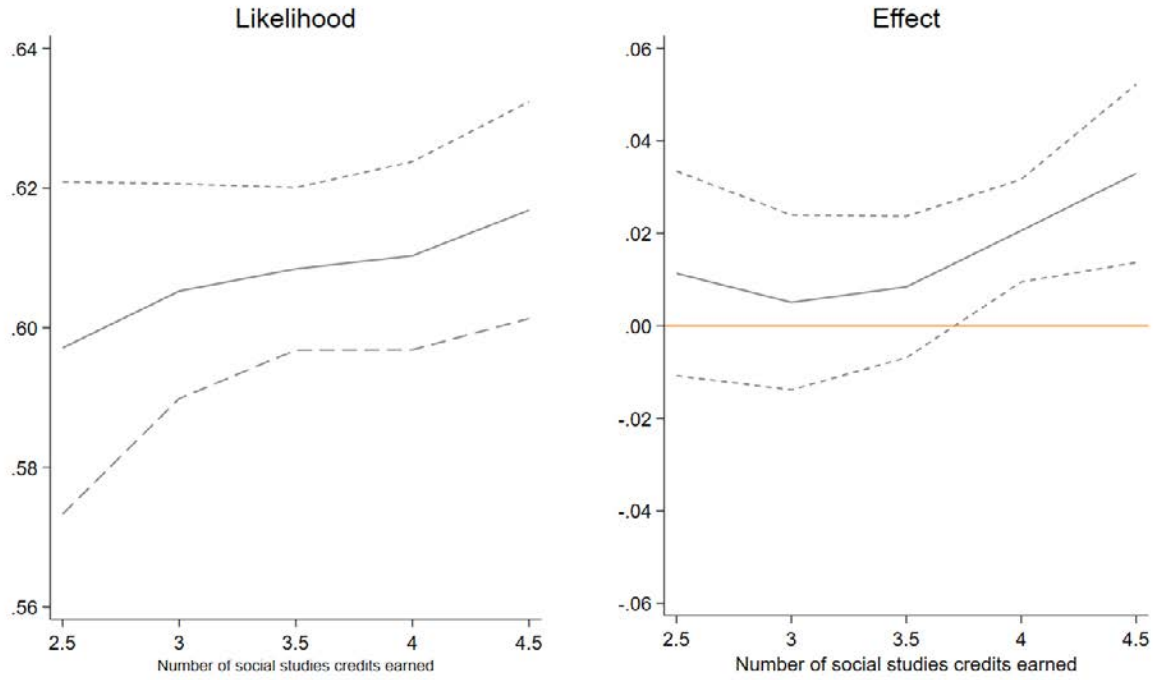
(7) *State.* The state in which a student attended high school impacts students' coursetaking to some degree because states put in place different policies (e.g., graduation requirements) that potentially shape high school coursetaking (see Figure 2.12). Furthermore, voter registration and rates of volunteering varies substantially by state (AmeriCorps, undated-b; U.S. Census Bureau, 2023). This may be because states have different policies and procedures for voting (National Conference of State Legislatures, 2023; vote.org, undated), and these differential state policies may play some role (though perhaps not a large role) in shaping disparities in voter turnout (e.g., Alvarez, 2008; Brians & Grofman, 2001; Fullmer, 2014; Highton, 1997; Rosenstone & Wolfinger, 1978).

Results

Research question 1: Number of social studies credits earned

I first investigate whether there is a relationship between the total number of social studies credits earned while in high school and students' subsequent civic engagement. As shown in Figure 4.3 there is a positive, though mostly not statistically significant, association between the total number of social studies credits that a student earns while in high school and their likelihood of being registered to vote three years after leaving high school. The only notable exception is at the very upper end of the distribution, around 4 or 4.5 credits, where there is a small statistically significant effect.

Figure 4.3 Association between number of social studies credits earned and registration to vote

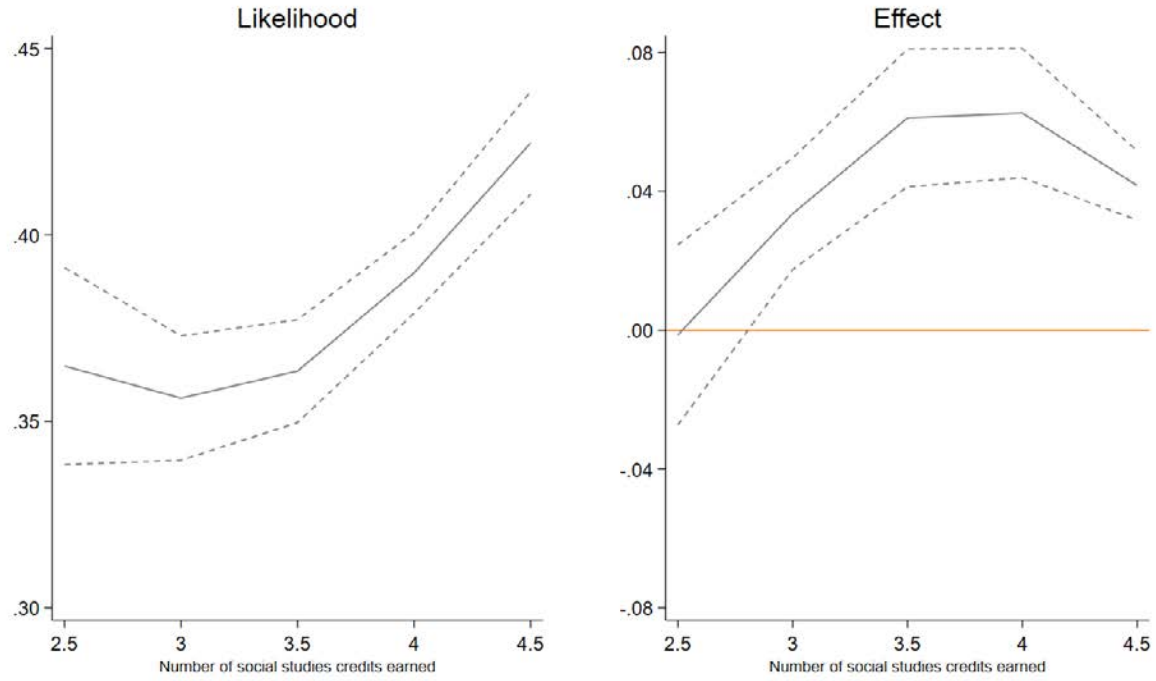


NOTES: N = 9,490. Results from regression models with generalized propensity scores included. Controls include sex, race/ethnicity, family socioeconomic status, favorite subject in school, achievement, school demographics, and state. Dashed lines represent 95-percent confidence intervals. Effect = E[Voting(t + 1)] - E[Voting(t)]
SOURCE: High School Longitudinal Study of 2009.

The association with time spent volunteering was more dramatic, as shown in Figure 4.4. For every additional social studies credit that a student earns in high school, there is roughly a 4 to 6 percentage-point increase in the likelihood of having spent time volunteering each month in the preceding year. The only exception is for students at the very bottom of the distribution in terms of total number of social studies credits earned. Said another way, about 35 percent of

those students who earned three credits in social studies spent time volunteering in 2015. But among those who earned 4.5 social studies credits, more than 40 percent spent time volunteering.

Figure 4.4 Association between number of social studies credits earned and time spent volunteering



NOTES: N = 9,490. Results from regression models with generalized propensity scores included. Controls include sex, race/ethnicity, family socioeconomic status, favorite subject in school, achievement, school demographics, and state. Dashed lines represent 95-percent confidence intervals. Effect = E[Volunteering(t + 1)] - E[Volunteering(t)]
SOURCE: High School Longitudinal Study of 2009.

Research question 2: Disciplines in which social studies courses are taken

I now turn to the second research question to investigate the association between students' coursetaking in specific social studies disciplines and subsequent civic engagement. Overall, I find no association between ever enrolling in a course in a specific social studies discipline and students' likelihood of being registered to vote or having spent some hours per month volunteering in the previous calendar year (see Table 4.3). For example, I find that students who enrolled in a government course while in high school were no more likely than their counterparts who did not enroll in a government course to be registered to vote three years after high school. I observe the same pattern of no association for courses in all social studies disciplines, regardless of whether I control for other social studies courses taken as well.

Table 4.3 Association between ever enrollment in courses taken in specific disciplines and civic outcomes

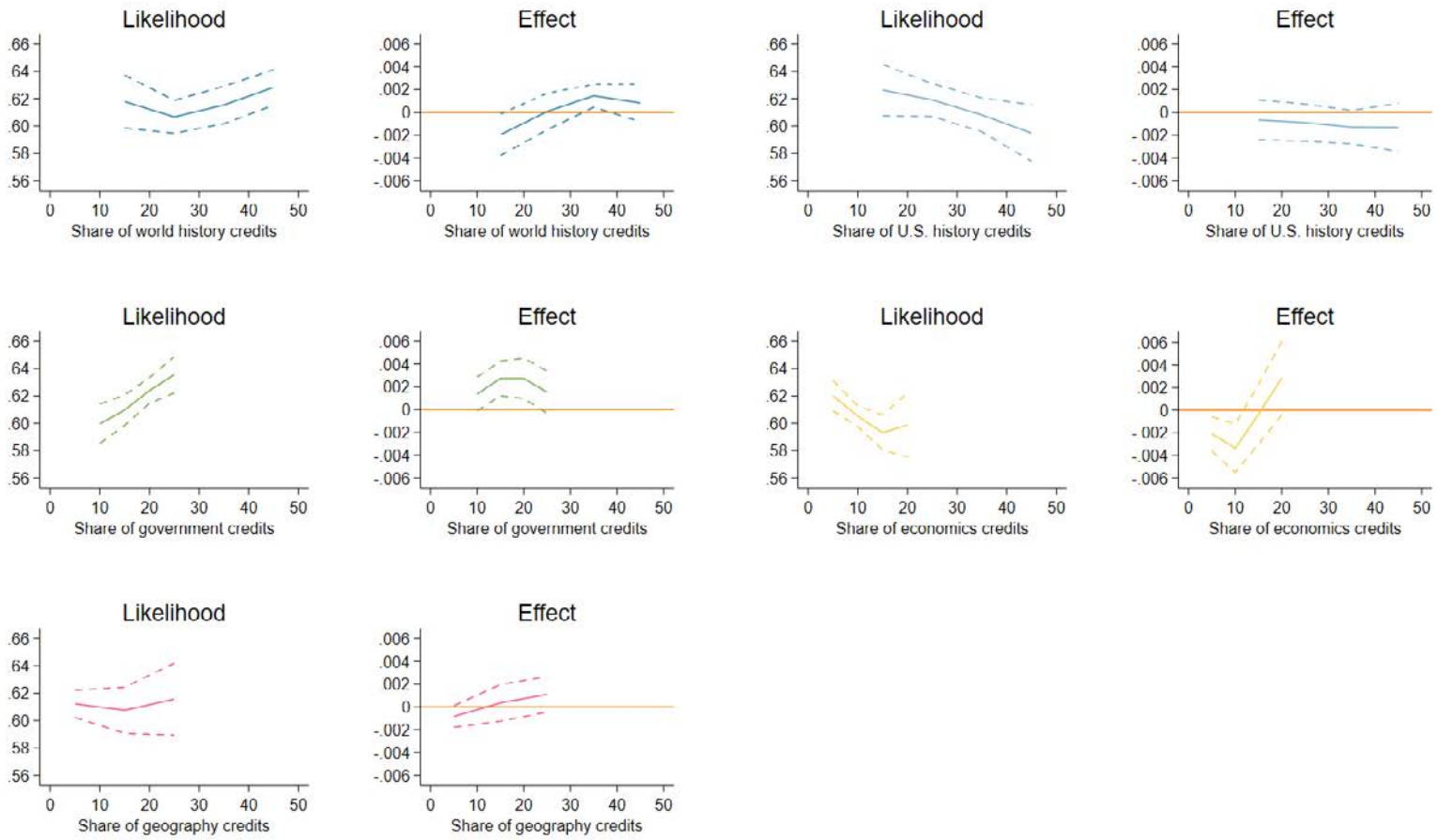
	Government		World history		U.S. history		Economics		Geography	
	Registered to vote									
Ever enrollment	0.03	0.03	0.01	0.02	-0.01	0.00	0.00	-0.01	0.01	0.01
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
Controls?										
Student-level	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
School-level	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
State	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Other courses		Y		Y		Y		Y		Y
N	9,490	9,490	9,490	9,490	9,490	9,490	9,490	9,490	9,490	9,490
R^2	0.05	0.05	0.07	0.07	0.06	0.07	0.04	0.04	0.05	0.05
	Spent any time volunteering									
Ever enrollment	0.00	0.00	0.02	0.04	-0.03	-0.04	0.00	0.00	0.01	0.01
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
Controls?										
Student-level	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
School-level	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
State	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Other courses		Y		Y		Y		Y		Y
N	9,490	9,490	9,490	9,490	9,490	9,490	9,490	9,490	9,490	9,490
R^2	0.10	0.10	0.11	0.11	0.08	0.08	0.09	0.09	0.10	0.10

NOTES: There are no asterisks because no coefficients are statistically significant at any level. Includes propensity score weights.
SOURCE: High School Longitudinal Study of 2009.

However, the results presented in Figures W.5 and W.6 complicate my understanding of this relationship. Figure 4.5 plots the association between the share of credits earned in specific social studies disciplines and students' likelihood of being registered to vote three years after leaving high school after adjusting for observed differences in the populations of students who took different amounts of coursework. The main takeaway is that the association between the share of credits earned and registration to vote varies by discipline. Most importantly, as shown in Figure 4.5, an increase in the share of credits earned in government courses is positively associated with a student's likelihood of being registered to vote. Meanwhile, earning greater shares of credits in history courses, economics courses, and geography courses has no association with students' likelihood of being registered to vote. Earning increased shares of credits in U.S. history courses appears to have a negative association with voting, although the difference is not statistically significant.

Despite the nonzero association for government courses, it is important to keep in mind that these are moderately small effect sizes. That is, students who earn roughly 10 percent of their total credits in government courses—roughly equivalent to about a semester of coursework—have a likelihood of being registered to vote of about 0.60. Students who earn 25 to 30 percent of their total credits in government courses—roughly corresponding to about a full year of coursework—have a likelihood of being registered to vote of 0.63.

Figure 4.5 Association between share of social studies credits earned in specific disciplines and students' likelihood of being registered to vote

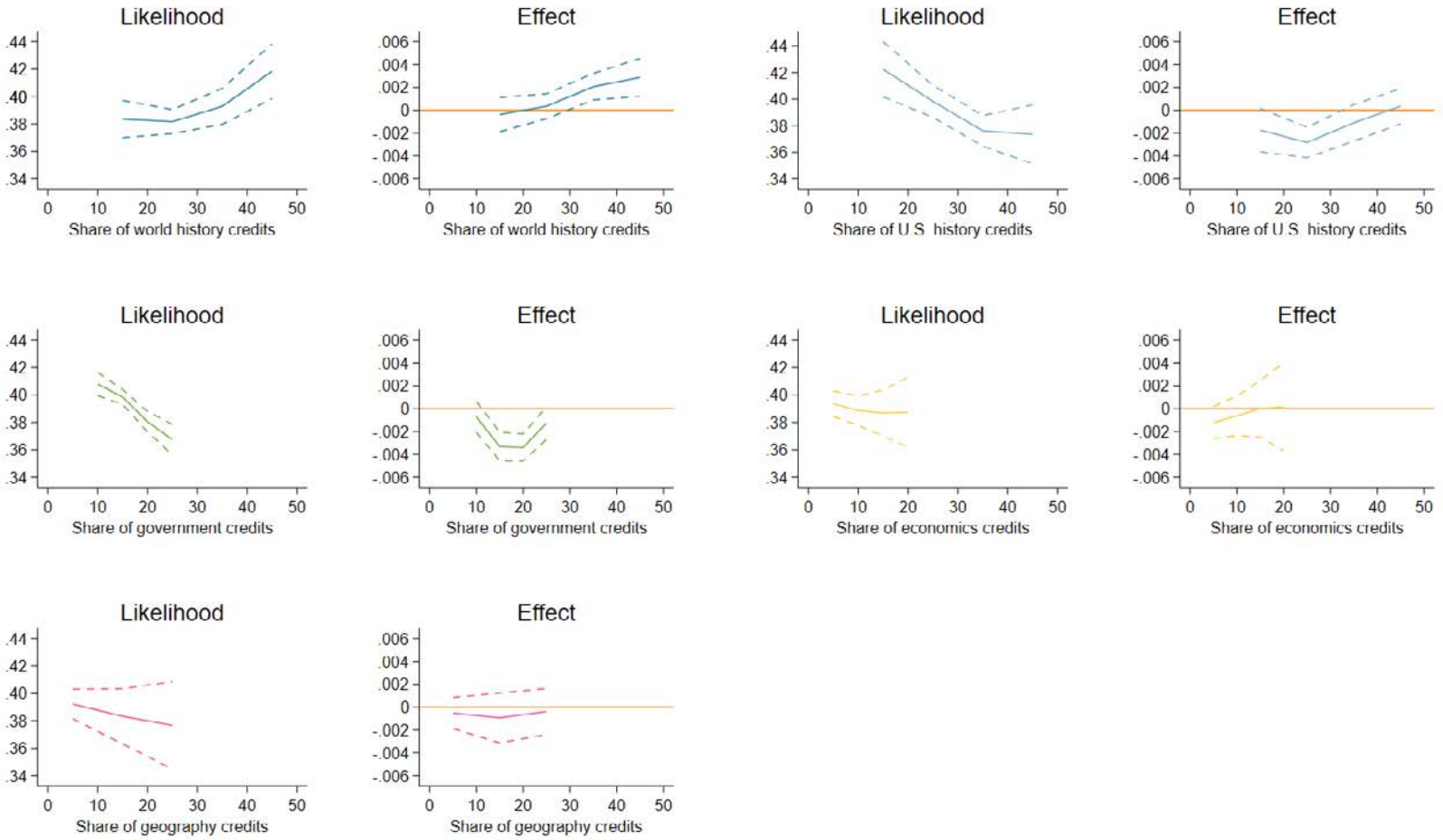


NOTES: N = 9,480. Results from regression models with generalized propensity scores included. Controls include sex, race/ethnicity, family socioeconomic status, favorite subject in school, achievement, school demographics, and state. Dashed lines represent 95-percent confidence intervals.
SOURCE: High School Longitudinal Study of 2009.

Figure 4.6 provides the same set of plots but for time spent volunteering. Again, I observe the same main takeaway that the association between the share of total credits earned and students' likelihood of volunteering differs by discipline. As before, I observe a negative (though not always statistically significant) association between increased shares of credits earned in U.S. history courses and students' likelihood to have spent time volunteering. Unlike before, I also observe a negative association between increased shares of credits earned in government courses and students' likelihood of volunteering. I also newly observe an association for world history courses, at least among those students who take a large share of their social studies courses in world history: that is, I find that students who earned increased shares of social studies credits in world history courses are more likely to have spent time volunteering. Meanwhile, I observe no association between increased shares of credits earned in economics and geography courses and students' likelihood of having spent time volunteering.

In some ways, these inverse relationships are not entirely surprising because social studies coursetaking can be conceptualized as somewhat of a zero sum game. Assuming that students roughly earn a similar number of social studies credits overall, any credits earned in one social studies discipline are credits not earned in another social studies discipline (see Figure E.1). The number of credits that students earn in U.S. history courses is strongly negatively associated with the number of credits they earn in government and world history courses (see Table E.6). (This interpretation of social studies courses acting as substitutes is also supported by the analyses presented in Figure 2.12). Putting this altogether, I interpretation these patterns as an indication that there may be a negative association between earning additional shares of credits in U.S. history courses and students' civic outcomes because this is time not spent in world history or government courses.

Figure 4.6 Association between share of social studies credits earned in specific disciplines and students' likelihood of having spent time volunteering



NOTES: N = 9,480. Results from regression models with generalized propensity scores included. Controls include sex, race/ethnicity, family socioeconomic status, favorite subject in school, achievement, school demographics, and state. Dashed lines represent 95-percent confidence intervals.
SOURCE: High School Longitudinal Study of 2009.

Research question 3: Rigor of courses taken

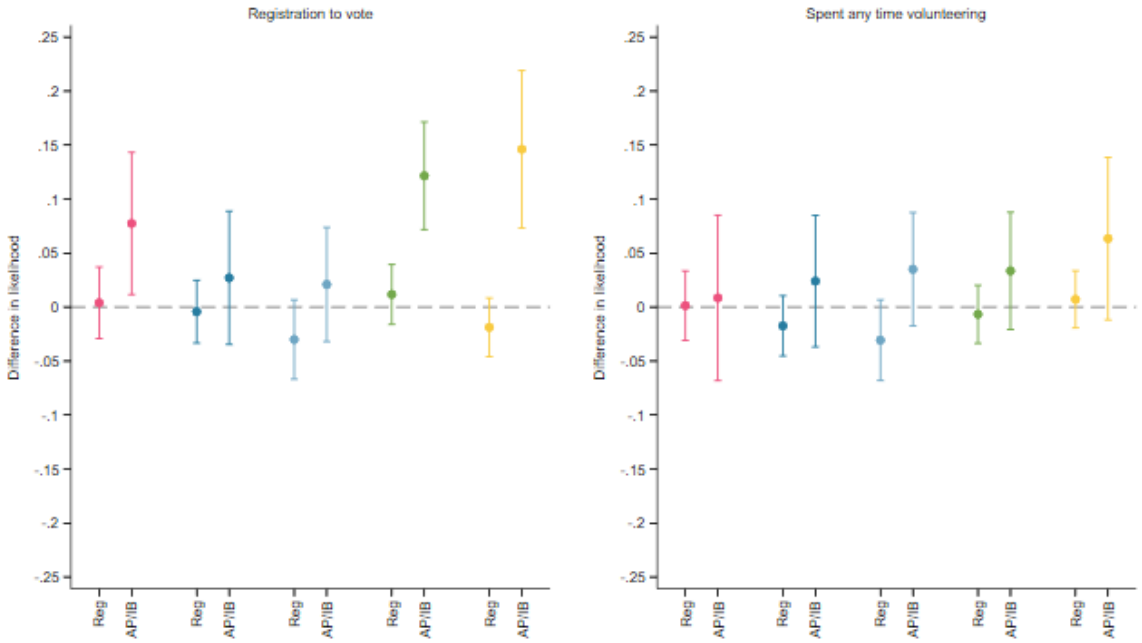
In Figure 4.7, I plot coefficients from a regression model comparing the likelihood that students were registered to vote or have spent time volunteering in the previous year by whether students enrolled in regular or AP/IB social studies courses relative to no course at all. As shown in Figure 4.7, there is a clear association between the rigor of the social studies courses that students take and their likelihood of being registered to vote three years after leaving high school. In general, I find that students who take regular-level courses are no more likely than their peers who do not take a course in that discipline at all to be registered to vote. This broadly aligns with the findings in research question two, suggesting that ever enrollment by itself is not associated with civic outcomes.

In contrast, students who enroll in AP/IB social studies courses are more likely to be registered to vote three years after leaving high school than their peers who do not take courses at all. For example, students who take an AP/IB government courses are roughly 12 percentage points more likely to be registered to vote three years after leaving high school than their counterparts who did not take a government course at all. Interestingly, I only observe this pattern for AP/IB geography, AP/IB government, and AP/IB economics courses, not for AP/IB world or AP/IB U.S. history courses. I also do not observe any relationship between AP/IB social studies coursetaking and likelihood of spending time volunteering.

It is highly likely this finding is driven, at least in part if not in full, by differences in the types of students who tend to take AP courses. Although I attempt to mitigate this selection bias by using propensity score weighting to correct for observed differences, it is highly likely that unobserved differences (such as students' motivation) remain.[21]

[21] There is some evidence to suggest that this is the case. I conducted placebo tests examining correlations between enrollments in AP courses in other academic subjects (ELA, math, and science) and students' civic outcomes. As these courses are not theoretically intended to directly influence students' civic outcomes, I would expect to see null results. However, I observe nonzero associations, increasing my suspicions that these results are driven at least in part by selection bias in which types of students are likely to opt into AP courses.

Figure 4.7 Association between rigor of courses taken in specific social studies disciplines and civic engagement outcomes



NOTES: N ranges between 2,720 and 9,200 depending on the course and level. Results are coefficients from linear regression models comparing civic engagement among students who took courses of a specific rigor with students who did not take any course at all. Controls include sex, race/ethnicity, family socioeconomic status, favorite subject in school, achievement, school demographics, state, and the level of courses taken in the other disciplines. Pink = GE, dark blue = WH, light blue = US, green = GV, and yellow = EC. Includes propensity score weights. Bars represent 95-percent confidence intervals.
SOURCE: High School Longitudinal Study of 2009.

Research question 4: Combination of courses taken

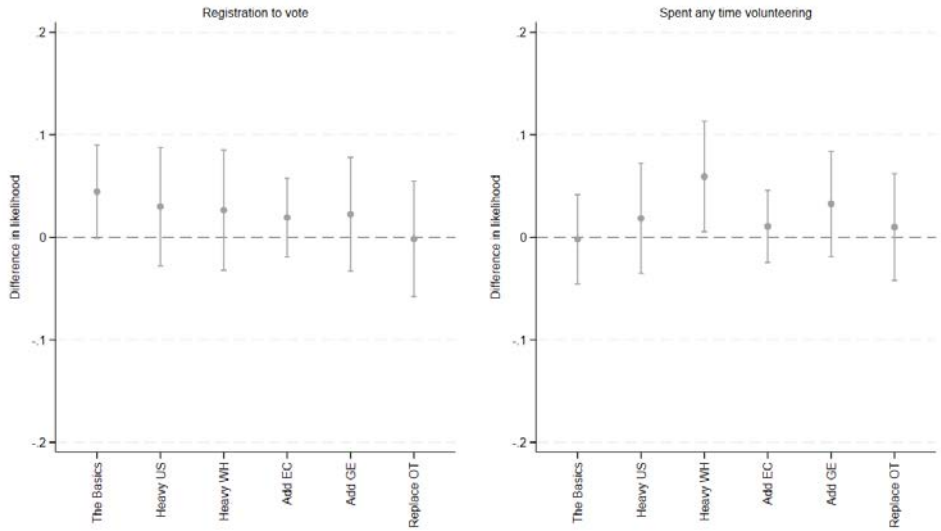
In this last research question, I examine the association between progressing through a specific social studies course pathway and students' subsequent civic engagement. As shown in Table E.4, a *k* means cluster analysis revealed that there are roughly seven different types of social studies course pathway typologies, which I have nicknamed as follows: (1) the "bare minimum" typology, where students typically have multiple semesters in which they do not take any social studies courses; (2) the "heavy world history" typology, where students typically take multiple school years' worth of world history courses; (3) the "heavy U.S. history" typology, where students typically take multiple school years' worth of U.S. history courses; (4) the "basics" typology, where students typically take history and government courses; (5) the "add economics" typology, where students typically enroll in an economics course in addition to the history and government courses; (6) the "add geography" typology, where students typically take a geography course in addition to history, government, and sometimes economics; and (7) the "replace with other" typology, characterized by students taking several semesters' worth of

courses in "other" social studies disciplines outside of the core four disciplines (economics, government, geography, and history).

In Figure 4.8, I compare the civic engagement outcomes of students who progressed through each of these social studies course pathway typologies, relative to the students who were enrolled in a "bare minimum" sequence. Looking first at registration to vote, I find no association between students' course pathway typologies and their likelihood of being registered to vote three years after leaving high school. Students who are on the other social studies course pathway typologies—regardless of the specific composition of their coursework—have civic engagement outcomes that are no higher than their peers who progressed through the "bare minimum sequence."

Overall, I observe a similar story of no association for time spent volunteering, too. However, I do observe one exception to the rule: I observe a positive association between enrollment on the "heavy world history" pathway and students' likelihood of spending time volunteering after high school. Students who progressed through a course pathway categorized in the "heavy world history" typology were roughly 6 percentage points more likely to have reported having spent time volunteering in the previous year than their counterparts on a "bare minimum" pathway. This finding broadly aligns with that shown in Figure 4.6, suggesting that spending a greater share of social studies time on world history is positively associated with volunteering.

Figure 4.8 Association between social studies course pathway typologies and civic engagement outcomes



NOTES: N ranges between 2,350 and 3,750 depending on the course pathway typology. Results are coefficients from linear regression models comparing civic engagement among students who were on a specific course pathway typology relative to students who were on the "bare minimum" course pathway typology. Controls include sex, race/ethnicity, family socioeconomic status, favorite subject in school, achievement, school demographics, and state. Includes propensity score weights. Bars represent 95-percent confidence intervals.
SOURCE: High School Longitudinal Study of 2009.

Limitations

This study has several important limitations that readers should keep in mind when interpreting the results. First, and most importantly, the analytic strategy employed in this paper does not allow for a causal interpretation of findings. Based on the evidence presented in this paper, we can only conclude that certain aspects of high school social studies coursetaking—things like taking more rigorous courses like AP/IB courses—are positively associated with students' subsequent civic engagement. But we cannot be certain coursetaking *caused* heightened civic engagement. There are two primary problems that prevent causal interpretation of these relationships. The first is a concern about selection bias which stems from the observational nature of the study design. It is likely that students who are more motivated in general and who are more interested in the topic area are more likely to take more and possibly more rigorous social studies courses. These same students are likely to also be the ones who would be most motivated to vote or volunteer in their communities, *regardless of what social studies courses they took in high school*. Although I attempt to mitigate this selection bias by using inverse propensity score weighting, I likely do not account for all unobserved differences between students who engage in different types of coursetaking while in high school. Others (e.g., Bohrnstedt, 2023) who have used HSLS:2009 to investigate relationships between students' high school coursetaking and students' later outcomes have struggled with this same issue and have mitigated the problem using similar propensity score weighting methods.

The second concern is one of omitted variable bias. The apparent association between government courses and subsequent civic engagement may be due to a recency bias since most students take these courses at the end of high school (see Figure A.8). Furthermore, students' civic development and civic engagement in early adulthood is likely shaped by many other aspects of their high school experience beyond the courses they take such as their participation in civics-focused extracurricular activities (e.g., class field trips, mock trials, model United Nations), engaging service learning activities, volunteering, and family engagement. State policy and/or the state (or local) political environment may also shape students' coursetaking as well as their civic engagement. The most obvious connection might be states' voter registration policies, particularly their use of automatic voter registration, which differ widely from state to state. Implementation of the automatic voter registration policies that we might think of as having the strongest association with students' likelihood of being registered typically did not occur until after the time when HSLS:2009 students were surveyed, although Oregon, Connecticut, and Georgia were enrolling out these policies right around the same time (National Conference of State Legislatures, 2024). It is likely that participation in a combination of things above and beyond coursetaking as well as the state and local policy and political context is associated with students' later civic engagement.

Unfortunately, because HSLS:2009 was designed to focus on math and science coursetaking, I do not have data on these other school factors that likely influence civic engagement.

HSLS:2009 did ask families about how often they engage in discussions with their children about community, national, and world events, which could be a proxy for family engagement. However, these data are missing for about half the analytic sample making these data virtually unusable for analysis. The omission of other state-, school- and family-level factors may lead me to incorrectly estimate the impact of high school social studies coursetaking on civic engagement in early adulthood. Future work should aim to examine the multidimensionality of students' high school experience by taking into account the complexity of their social studies coursetaking as well as their participation in other related activities. This is likely to be difficult to undertake due to a lack of data availability. Overall, future work in this space must move toward more causal research designs to help us better understand to what extent students' high school experience directly influences their civic engagement in young adulthood.

A second set of concerns relates to the civic engagement outcome measures. Most importantly, these analyses rely on self-reported measures of civic engagement, including voter registration and hours spent volunteering. It is possible respondents felt pressured to respond in a socially desirable way and reported higher levels of civic engagement than they actually engaged in. There is mixed evidence to support whether or not there is reason to be concerned about the accuracy of students' self-reports. The voter registration rate in my analytic sample as of February 2016 (61 percent) was only slightly higher than the voter registration rate among 18- to 24-year-olds reported by the U.S. Census Bureau that same year (55 percent) (U.S. Census Bureau, 2017a). Furthermore, I generally observe voter registration patterns in my analytic sample (e.g., higher voter registration among White individuals than Hispanic individuals, higher voter registration among students from families with higher incomes) that align with population data from the U.S. Census Bureau (U.S. Census Bureau, 2017a) (see Figure 4.2 and Table E.7). For the most part, I observe these same subgroup differences in my volunteering rates too. That said, students' self-reported rates of volunteering do appear to be higher than those reported in other federal surveys (e.g., Bureau of Labor Statistics, 2016). However, it is difficult to know for certain whether this difference is due to social desirability bias because different surveys use different survey items to inquire about volunteering. Others who have done work on this topic (e.g., Siegel-Stechler, 2019) have noted the same concerns about a social desirability bias in using self-reported measures of civic engagement. Future work could mitigate the concern that self-reported measures of civic engagement may be unreliable by using administrative data systems, where available.

Relatedly, HSLS:2009 only collected data on students' voter registration status as of February 2016, not whether students actually voted. I suspect the second follow-up survey inquired about voter registration instead of voter participation for two reasons. First, since the vast majority of participating students were born in 1995, most would have been old enough to vote in the 2014 midterms (the last federal election before data collection began). But asking students to recall whether they voted in a midterm election over two years ago—even if it was the first national election that this cohort of students could have participated in—probably would

have produced unreliable reports. Secondly, the data collection window for the second follow-up survey asking about civic engagement began in March 2016 and continued through the end of the calendar year. This means the data collection window occurred in advance of the 2016 presidential election, but during the 2016 primary season, or a time period in which students might have been registering to vote if they had not already done so for the 2014 midterms. Thus, collection of voter registration data as opposed to voter participation data in HSLS:2009 was probably the result of a misalignment between the data collection window and U.S. federal election cycles. Although voter participation is a preferable outcome measure to voter registration, voter registration is still an important indicator of civic engagement. For one, voter registration is a necessary first step to voter participation in almost every state, and individuals often must overcome many barriers to become and remain registered (Brennan Center, 2015). The concerning gaps by sex, race/ethnicity, income, and age observed for voter participation are similarly reflected in voter registrations, further underscoring the importance of this measure (e.g., Fabina & Scherer, 2022).

Furthermore, voter registration and time spent volunteering are the only two measures of civic engagement available in HSLS:2009 and thus are the only two measures used in this analysis. However, it is plausible the courses students take in high school predicts other aspects of civic engagement too, such as engagement in activism efforts like protesting or canvassing. Future work should aim to connect students' high school coursetaking with a broader range of civic engagement activities, particularly those that seem to be particularly common among Generation Z like discussing political and social issues on social media platforms.

Another limitation is that my analytic sample appears to be slightly more advantaged than the national population of youth (see Table 4.2). This is an important limitation because it potentially explains some of the null results observed in this paper. That is, we probably expect there to be less of a relationship between coursetaking and civic engagement outcomes as students become more advantaged. This is because more advantaged students are likely to have more opportunities to build their civic development at home with supports from their families. Said another way, social studies coursetaking, or formal instruction in a school setting, might not matter as much for these students because they have other opportunities to build civic knowledge, skills, and dispositions. In sum, the overrepresentation of advantaged students in my analytic sample raises concerns that I should not expect to see positive associations because these students are the least likely students to potentially be impacted by formal social studies coursework.

A final set of concerns relates to the measures of coursetaking used in this analysis. First, I use course titles as an indication of the type of instruction generally included in these courses. However, these course titles are likely a rough proxy at best. SCED 2.0 identifies over 100 distinct categories of social studies courses, which I condense into a small number of categories for this analysis. For example, I classify courses on world area studies, modern European history, ancient civilizations, and contemporary world issues as world history courses, when these

courses likely contain very different content. Furthermore, academic standards for social studies topics like civics and U.S. history vary significantly across states (Stern et al., 2021), meaning that the content included in courses, even those with the same title, likely varies across states. Compounding this problem, teachers have a high level of autonomy in this subject area (perhaps to an even greater degree than for other core academic subjects), meaning across classrooms, teachers likely emphasize different concepts or use different curriculum (e.g., Diliberti et al., 2023; Farkas & Duffett, 2010; Hamilton et al., 2020a). In sum, this means the *quality* of such courses likely differs from classroom to classroom, which likely has implications for how much a single course shapes students' civic development and thereby their later civic engagement.

Finally, these data are now over ten years old, raising concerns about to what extent the patterns observed in this study generalize to present day. First, the longitudinal nature of the study means there is necessarily a delay between initial data collection and analysis. Although HSLS:2009 might feel outdated, it is the most recent national longitudinal study available upon which to do this analysis. Second, and relatedly, it can take many years for longitudinal outcomes, like civic engagement, to develop. Even though the cohort of students followed in HSLS:2009 have been out of high school for over a decade now, these millennials are now present-day voters. In fact, they are part of one of the largest voting blocks in present day. Thus, studies like this can help explain the civic knowledge and skills possessed by adults in the present day.

Summary

Civic engagement among youth in the United States is both low and highly unequal. It is possible that variation in the social studies courses that students take while in high school helps to explain some of these civic engagement trends. Students' high school social studies coursetaking varies along multiple dimensions, but, until now, it has been unclear which dimensions of this coursetaking actually contribute to students' subsequent civic outcomes. In this exploratory paper, I investigated which aspects of students' high school social studies coursetaking were associated with their likelihood of voting or volunteering three years after leaving high school. I considered both the *number* and *nature* of the courses taken, including the total number of credits earned, courses taken in specific social studies courses, and the rigor of these courses. I also considered whether the combination of social studies courses that students took across their entire high school career predicted their subsequent civic engagement. Identification of which social studies course, or courses, seem to matter most for students' civic outcomes can help policymakers, school system leaders, educators, and families determine which high school social studies courses should be prioritized to maximize students' civic outcomes.

In this section, I review the key findings from my analyses. I then discuss their implications for policy and future research.

Review of key findings

Overall, I find little evidence that the total number of social studies credits earned in high school is associated with students' likelihood of being registered to vote in early adulthood. However, this association appears stronger for volunteering. For registration to vote, my results suggest that if there is any positive association between total social studies credits earned and students' likelihood of registering to vote, it is concentrated at the very top of the distribution. In contrast to registration to vote, I do observe a consistently, and perhaps surprising, positive association with students' likelihood of volunteering. For every additional social studies credit that a student earns in high school, there is roughly a 4 to 6 percentage-point increase in the student's likelihood of having spent time volunteering each month in the preceding year. It is not immediately obvious why I observe a positive association for only one of my civic engagement outcomes. This could be simply a measurement issue; the registration to vote measure could be too coarse or the volunteering measure might be over inflated due to student self-reports. Or it could be that taking more social studies courses does influence students' dispositions (and perhaps encourages them to get involved in their communities), but that this does not extend to activities like voting.

Second, I find only weak evidence that government coursetaking is positively associated with students' likelihood of being registered to vote three years after leaving high school—challenging previous findings in the literature. Government courses are the courses we might hypothesize to have the most direct relationship with students' future civic outcomes. When I first looked at ever enrollment, I did not observe an association between government coursetaking and registration to vote (see Table 4.3). But I did observe a relationship when I focused on the share of total credits spent in government courses (see Figures 4.5 and 4.6). My null finding on the ever enrollment measure contradicts findings from previous studies, in particular those from Bachner (2010) and Siegel-Stechler (2019), and is more line with that from Weinschenk & Dawes (2022). The contradiction between my findings and theirs could be explained by the differing constructs used as an outcome variable; my study uses registration to vote as an outcome whereas other studies have used self-reported voting. Registering to vote is notably a lower obstacle to overcome than actually voting; thus, it is possible that taking a government or civics course does not boost students' likelihood of registering to vote.

On the other hand, I did observe a positive association when I focused on the share of credits spent on government courses—possibly a proxy for increased time spent in government courses. It could be that year-long government courses simply allow teachers more time to clarify content and for students to absorb it. Additional time may also allow teachers to cover more expansive topics and perhaps more opportunities to bring in a greater diversity of activities and content believed to be important for students' civic development. Overall, my results provide mixed evidence about whether government coursetaking is positively associated with voting—a finding that is indicative of the current state of the literature.

Third, I consistently observe no relationship between economics and geography coursetaking and students' subsequent civic engagement. This is true when I use a measure of ever enrollment and when I shift to examine the share of credits earned (see Table 4.3, Figure 4.5, and Figure 4.6). I observe an empirically null relationship despite a theoretically strong supposition that literacy in these topics is an important knowledge and skillset for citizenship—a position that is well supported by the literature (Crowley & Swan, 2018; Hong, 2018; Miller, 1988; Stoltman, 1990; and Thorton, 2019). This null relationship could be for many reasons. For example, it could be that the outcome is too distal to pick up any measurable influence of coursetaking on students' civic engagement. Or it could be that economics and geography courses shape other civic attitudes or activities, but do not specifically shape voting or volunteering. This interpretation of the results broadly aligns with findings from Allgood et al. (2012). That study, which looked at enrollment in postsecondary level economics courses, found a positive link between postsecondary economics coursetaking and political affiliation and political donations, but not with voting or volunteering (Allgood et al., 2012). It may also be that although national frameworks support the conceptualization of economics and geography courses as fostering the knowledge and dispositions necessary for citizenship, these courses are not operationalized this way in practice.

Fourth, I observe a positive association between students' AP/IB coursetaking (in non-history disciplines) and students' likelihood of being registered to vote. For example, students who take an AP/IB government courses are roughly 12 percentage points more likely to be registered to vote three years after leaving high school than their counterparts who did not take a government course at all. Of course, I am particularly concerned here that these results may be driven by selection bias—that is, that more interested and motivated students are more likely to enroll in AP/IB social studies courses and that these students are likely to be registered to vote regardless of what social studies courses they take in high school. On the other hand, I did not observe positive associations for all AP/IB social studies courses nor for all civic outcomes, perhaps increasing my confidence that results are not due purely to selection bias.

Implications

Different social studies courses might be better suited to shape different civic outcomes than others. My analyses revealed a positive association between spending more credits (time) in world history courses and students' likelihood of spending time volunteering, but no association with being registered to vote (see Figure 4.6). On the other hand, they also revealed a positive association between spending more credits in government courses and students' likelihood of being registered to vote, though no association with volunteering (see Figure 4.5). These differential associations suggest that we cannot expect one social studies course to do all of the work: specific courses might have different benefits in terms of students' future outcomes. The problem, of course, is that there is limited time during the school day. And, in some ways, all of these social studies courses are in competition with each other. That is, any time spent in a

government course is time not spent in a world history course. Thus, this finding that different courses may be better suited to produce different civic engagement outcomes raises concerns about which courses students should prioritize given limited amount of time during the school day. Because time spent in high school is finite, students will necessarily have to make tradeoffs between social studies courses, and my results suggest that these tradeoffs might come at the expense of some of their future civic outcomes.

AP/IB social studies courses seem to be particularly important for students' likelihood of registering to vote in the future, raising concerns about which students get access to these courses. The finding that AP/IB social studies courses have a stronger association with students' likelihood of being registered to vote than regular-level coursetaking has two clear implications. Given the seeming importance of these courses, the first implication is how to get more students enrolled in AP/IB social studies courses and how to make these course enrollments more equitable. Only about 11 percent of students enroll in AP/IB government courses, even though many more have access (see Figures A.1 and A.6). Given how predictive these courses seem to be for students' likelihood to be registered to vote in early adulthood, inequities in AP/IB course enrollments raise concerns about to what extent these enrollment disparities contribute to long-standing civic engagement gaps by gender, race, and family income. Of course, the question is how to raise AP/IB social studies course enrollments and increase parity in enrollments. Results from Chapter 2 suggest adding discipline-specific graduation requirements can only marginally raise AP/IB coursetaking in that discipline and may have the unfortunate side effect of increasing disparities in course enrollments by subgroup. Additional school-level mechanisms, beyond math tracking, also need to be explored here, such as how schools develop mechanisms to funnel students into these courses.

The second implication is the need for a closer examination of why only AP/IB courses seem to be related to students' subsequent civic engagement and courses at the regular level may not be. This incongruence seems to raise concerns perhaps about the quality of content delivered in regular-level social studies courses. As previously mentioned, we know that states' social studies standards vary dramatically (Stern et al., 2021) and that teachers have a high degree of autonomy over what is being covered in their classrooms. Teachers may not always be providing instruction aligned with national frameworks like the C3 (NCSS, undated). Figuring out how to build foundational content—or the content that students might be more likely to get in an AP course—into the regular-level courses is a key way to make sure that all students are getting access to high-quality instruction.

Future studies examining the association between coursetaking and student outcomes should play closer attention to how coursetaking measures are operationalized. When I first examined ever enrollment in courses across the four core social studies disciplines, I observed no association with students' civic engagement outcomes three years after leaving high school (see Table 4.3). But when I shifted to examine the share of credits earned in each of the core social studies disciplines, I began to observe associations between social studies coursetaking and civic

outcomes (see Figures 4.5 and 4.6). The discrepancy between these findings suggests that ever enrollment may not be a sufficiently complex construct to appropriately measure relationships. Said another way, the incongruence in findings between the *ever enrollment* measure and the *share of credits* measure suggests there is something about length of time spent in courses and not just attendance in courses that might matter for students' subsequent civic engagement. More importantly, this incongruence suggests that *how* coursetaking measures are operationalized in research studies may influence the results, and, therefore, the conclusions drawn from the research. Future studies focused on the relationship between coursetaking and students' college, career, and civic outcomes might consider using additional or more complex measures of coursetaking than simply ever enrollment.

Overall, my results contribute to a larger body of work showing schools' theoretically strong, but thus far empirically limited ability to influence students' civic development and subsequent civic engagement. In aggregate, my findings generally suggest a minor, if not, null association between students' high school coursetaking and their subsequent civic engagement. In particular, results from the pathways analysis show that students who take a wide range of social studies course pathways—e.g., some who take multiple years of U.S. history versus some that take economics and geography in addition to government and history—all have similarly low levels of civic engagement after leaving high school. A generous way to interpret these results is that multiple different routes can get students to the roughly equivalent civic engagement outcomes. A more cynical way to view these results is that none of the options that schools are currently providing are producing sufficiently high outcomes.

The key implication of these results is that schools' ability to influence students' civic outcomes via social studies coursetaking may be more limited that we might theorize. And this finding—that schools have a theoretically strong, but thus far empirically limited ability to influence students' subsequent civic engagement—largely aligns with the broader literature on this topic. For example, other prior research has also revealed that schools' civic-minded interventions struggle to actually shift civic engagement. For example, evidence suggests that state-mandated civics tests do not increase voter turnout (Jung & Gopalan, 2023). Other research has shown that volunteering mandates do not create lifelong volunteers (Helms, 2013).

But we should not stop trying to find out what it is exactly that is the source of students subsequent civic engagement and what schools can do to promote it—even if it is not high school social studies coursetaking.

Chapter 5. Conclusion

Relative to other core academic subjects like math and science, comparatively little attention has been paid to students' coursetaking in social studies. The field lacks a basic landscape of students' social studies coursetaking patterns, including which courses students enroll in and why; to what extent national coursetaking patterns are explained by state and local policy; and ultimately whether differences in students' high school social studies coursetaking matter for their college, career, and civic outcomes.

Using transcript data collected from a nationally representative sample of high school students, this dissertation was a first attempt to unpack the black box that is students' high school social studies coursetaking. In Chapter 1 (and in the supplemental Appendix A), I show evidence that students' social studies coursetaking varies widely across disciplines and by student subgroups. In Chapter 2, I illustrate that social studies coursetaking—especially for government courses, economics courses, geography courses, and "other" courses—varies widely across states, and that differences in states' policies are at least partially responsible for national coursetaking patterns. In Chapter 3, I find that students' propensity to take more advanced social studies courses (i.e., those at the AP level) is heavily associated with their math course placement at the beginning of high school. In Chapter 4, I capture the complexity of students' social studies course pathways and highlight the importance of certain courses for students' civic outcomes.

In this final chapter, I reflect on five cross-cutting themes from my analyses. I briefly discuss the implications of these findings for policy practice. I also offer some recommendations and ideas for future research.

Theme 1: Many students are likely exiting high school without taking courses in a diversity of social studies disciplines

The Elementary and Secondary Education Act of 1965 identifies history, geography, civics/government, and economics as among the subjects necessary for students to receive a "well-rounded education" (U.S. Department of Education, 2016). This view is similarly underlined by the NCSS's C3 Framework which defines history, government/civics, geography, and economics as the four "core" social studies disciplines. As stated by the C3 framework, "The four core disciplines within social studies provide the intellectual context for studying how humans have interacted with each other and with the environment over time. Each of these disciplines—civics, economics, geography, and history—offers a unique way of thinking and organizing knowledge as well as systems for verifying knowledge."

Yet despite this recognition that these four core social studies disciplines are all important for student learning, data from periodic federal transcript studies has consistently revealed that not all high school students take courses in these core social studies disciplines (see Figure 1.2). My analyses suggest that roughly four in ten students nationally graduate high school without taking an economics course, and seven in ten graduate without a geography course (see Figure 2.7). Meanwhile, about one in ten students nationally graduates without taking a government course (see Figure 2.7). In fact, only 17 percent of students graduate having taken courses across all of these disciplines (see Figure A.7). And the share of students graduating without taking social studies courses in all these disciplines in even higher in some states. For example, in North Carolina, Pennsylvania, and Washington, a quarter of students graduate high school without taking a government course (see Figure 2.7).

In sum, my analyses suggest that many students across the United States are graduating high school without taking what we might conceive of as basic or foundational social studies courses. My analyses also suggest that this is, at least in part, due to gaps in state policy. As of 2013, many states did not require students to take courses in all four "core" social studies disciplines (see Figure 2.3). Looking at enrollment patterns for the class of 2013, I found that when states did not require students to take courses in these disciplines, many students in these states did not elect to enroll in them on their own (see Figure 2.12). And because even today many states still do not require these basic social studies courses, many students nationally likely continue to graduate the public school education without taking them.

It is possible that my analyses overstate a concern that many students may be missing out on foundational content knowledge by not taking basic social studies courses. For example, it is possible that these coursetaking gaps are somewhat explained by differences in students' middle school coursetaking. This might be especially true for geography courses (Zadrozny, 2020), that students do not need to take this course in high school because they already took one in middle school. It is more difficult to believe this might be true for other disciplines, like economics courses. Some students may also fill in some coursetaking gaps during their postsecondary education if they attend. And it is also possible that students may receive instruction about a discipline without taking a course specifically within that discipline (e.g., a student may learn something about geography in a history course).

But even if students do have exposure to some additional coursework not captured in my analyses, my analyses still provide a strong indication that a sizeable minority of students in the U.S. leave high school without taking courses in all the social studies "basics." And this is potentially concerning for multiple reasons. First, there are the consequences for students' own college, career, and civic outcomes. My analyses suggest, for example, that taking more government credits is positively associated with students' likelihood of being registered to vote while taking more credits in world history is positively associated with spending time volunteering in the community (see Figures W.5 and W.6). And yet, only 77 percent of students nationally are required to take government course to graduate high school and only 61 percent

are required to take a world history course (see Table B.2). While my analyses showed limited relationships between coursetaking and civic engagement outcomes beyond these, more work is needed to fully understand the relationship between coursetaking and additional college, career, and civic outcomes. Other courses, beyond government, likely matter too, if not for students' civic outcomes than their college and career outcomes. For example, per Ahlstrom (2021), taking an economics AP Economics course in high school is associated with a higher likelihood of majoring in economics while in college.

And beyond students' personal outcomes, there are the consequences for our society too. Today, the millennial students who participated in HSLS:2009 are in their early thirties. One might think of the coursetaking patterns identified in HSLS:2009 as a rough proxy for what social studies courses all millennial voters took while they were in high school. Millennials and their younger siblings are about to become the largest voting bloc in the United States (Winograd, 2023). We might be concerned whether these voters—many of whom did not take an economics course while in high school, for example—have the appropriate knowledge base to weigh in about economic issues like inflation or federal deficits.

There are multiple things that state policymakers and school system leaders can do to try and increase enrollments in these basic social studies courses. For one, if state policymakers believe these core social studies courses to be fundamental for students' college, career, and civic outcomes, they should mandate that students take these courses in the form of discipline-specific graduation requirements. My analyses suggest this is likely to lead to increased course enrollments for students of all subgroups (see Figure 2.12). States and school systems should also deal with the problem of why many students do not seem to decide to enroll in all of these courses when they are not required to do so and how to increase students' perceived relevance of these courses. National frameworks developed by content experts like C3 framework and the EAD framework can offer teachers a road map for how to make social studies courses more relevant to students. For example, a well-constructed geography course—and by that I mean one that is aligned with the C3 Framework—should be touching on topics immediately relevant to students' current and future lives such as globalization and climate change (NCSS, undated). Similarly, high-quality government courses should be including discussions of current events—not just emphasizing memorization of names and dates. In summary, rethinking how we approach this subject area may be one way to increase enrollments in these disciplines in the absence of state mandates.

Theme 2: Policies matter when it comes to coursetaking

My analyses also suggest that students' high school social studies coursetaking is heavily influenced by state and local policy. For example, as shown in Figure 2.12, states' graduation requirements are positively associated with enrollments in government courses, economics courses, geography courses, and courses in the "other" social studies disciplines. Schools' use of

math tracking—a widely-used local-level policy—may not shift the total number of students enrolled in AP social studies courses. But it may shift the *composition* of students enrolled in these courses (see Figure 3.6). Furthermore, use of math tracking may increase AP social studies course enrollments particularly among middle-achieving students on high-math tracks (see Figure 3.10). Understanding these nuanced relationships between common state and local policy mechanisms and students' social studies coursetaking is important for two reasons. First, it gives state and school system leaders confidence that they can use these policies as levers to achieve their desired outcomes. Perhaps more importantly, it can help state and school system leaders match the correct policy lever to the outcome that they are intending to achieve.

Say, for example, that a school is looking to boost enrollments in their AP social studies courses, particularly among minority students. My analyses show that adding discipline-specific graduation requirements is unlikely to substantively move AP course enrollments (see Figure 2.13). If anything, doing so could exacerbate existing inequities in AP course enrollments (see Figures 2.18 and 2.19). But my analyses also suggest that high-achieving social studies students sorted onto low math tracks are potentially undermatching to AP social studies courses that could be appropriate for their level (see Figure 3.10). Recognizing this fact, this school might choose to nudge their best social studies on low math tracks—who are likely to be disproportionately minority or low-income—to pursue more advanced social studies coursework. In short, my analyses reveal that policy matters when it comes to students' social studies coursetaking—but also that because different policies may influence different social studies courses differently, states and schools need to choose their policy levers with care.

Of course, two primary policies investigated in this dissertation—states' graduation requirements and schools' use of math tracking—are likely not the only state and local policies that influence students' social studies coursetaking. For example, colleges' minimum entry requirements—either those set by state mandate or those set directly by the institutions themselves—likely shape which social studies courses students enroll in while in high school. Local school systems may also enact their own coursetaking requirements above and beyond those set by state minimums. Local school systems may also set eligibility criteria for students to enroll in AP social studies courses and/or develop processes to screen students for more advanced courses. Seven states are currently experimenting with policies that offer students a "civics seal" on their high school diploma for engaging in various civics-focused activities, one of which is coursetaking (Thompson, 2023). States continue to push schools to expand their AP course enrollments, and some even subsidize AP exam fees (College Board, undated; Kim-Christian & McDermott, 2022). All of these policies likely contribute to shape students' social studies coursetaking. Future research should investigate which of these mechanisms matter most for coursetaking and whether different policies differentially benefit certain groups of students.

Theme 3: Small schools have an access problem; large schools have a stratification problem

My analyses also consistently show that school's enrollment size—another policy choice—is also clearly associated with students' social studies coursetaking. But small and large high schools have different issues when it comes to students' social studies coursetaking. Small high schools (those serving only a few hundred students) consistently offer fewer social studies courses than their larger counterparts (see Figure A.2). This is especially true of courses at the AP level (see Figure A.3). This means that students who attend small high schools consistently have less access to a diversity of social studies course offerings. Although only a small minority of students nationally (15 percent) attend small high schools (NCES, 2022b), there is some evidence that these small high schools tend to be concentrated in certain locations (NCES, 2022c). This means the students in these areas might be systematically boxed out from accessing more and more rigorous social studies courses. Solving the access problem in small schools is likely challenging, because these schools are unlikely to have the resources or demand to offer a wide diversity of course offerings. Small schools might need to consider other solutions to provide these courses, like dual enrollment programs with local universities or encouraging their students to pursue these courses through a virtual school.

Large schools, on the other hand, have a different problem. These schools are offering more and more rigorous social studies courses. But my analyses suggest that there is likely some bias in terms of which students in these schools make it into the most rigorous social studies courses, at least in part because of math tracking. For example, I find evidence that high-achieving social studies students on low math tracks are less likely than their counterparts on high math tracks to actually make it into these more rigorous social studies courses (see Figure 3.10). I also find that students' ninth grade math track placements are especially predictive of their likelihood of ending up in AP social studies courses in subsequent school years in larger schools (see Figure 3.8). Putting these two findings together, this means that students' track placements are particularly sticky in large schools, even at the expense of boxing out potentially high-achieving social studies students who, for whatever reason, ended up on a low math track. This is concerning because much research has provided evidence of large and persistent ethnoracial and socioeconomic biases in which students get sorted onto lower math tracks. And my analyses suggest that these enrollment gaps—which have been widely studied in math—are likely getting carried over into social studies too, even though no one is paying attention to them.

In summary, small schools need to figure out how to offer more courses. Large schools do not necessarily need to offer more or more advanced social studies courses. They just need to take a hard look at *which* students are currently enrolling in their existing courses and examine whether any practices that they have in place, like math tracking, are contributing to disparities in course enrollments.

Theme 4: Inequities in social studies coursetaking are real and concerning

A fourth, and related, theme in this work are the clear inequities in which students take which social studies courses while in high school. Enrollment rates in social studies courses, especially in the most rigorous AP courses, vary widely across states (see Figure B.4). Enrollments in honors courses, too, vary widely across states (see Figure B.4). Black students and low-income students are consistently underrepresented in AP social studies course enrollments (see Figure A.10)—perhaps in part because these students tend to be sorted onto lower-level math tracks which are a predictor of future AP social studies coursetaking (see Figure 3.7). Access to a diverse array of social studies courses—especially economics courses and AP courses—is lower in smaller schools and in higher-poverty schools (see Figures A.2 and A.3).

Put together, these findings suggest that there are very real and concerning inequities in students' high school social studies coursetaking. The observed disparities in the AP social studies course enrollments are especially concerning since these are the courses that are most strongly associated with students' likelihood of being registered to vote after leaving high school (see Figure 4.7).

Unfortunately, in contrast to other core academic subjects—especially math—no one is regularly paying attention to these ethnoracial and income gaps in AP course enrollments. The U.S. Department of Education, through its Civil Rights Data Collection, regularly collects information from school systems on course access and course enrollments in advanced mathematics and science courses disaggregated by student race/ethnicity. The Department uses this data source to monitor (and hopefully address) extreme disparities. But there is no infrastructure to monitor enrollment disparities for social studies—even though the evidence suggests they are likely just as concerning as those in math (and possibly even created by those in math). The U.S. Department of Education could help to rectify this problem and focus attention to disparities in AP social studies course enrollments by adding AP social studies course enrollments into the CRDC.

Future research should also investigate to what extent disparities in students' high school social studies coursetaking help explain longstanding gaps in students' college, career, and civic outcomes. As shown in Figure 4.2, there are longstanding civic engagement gaps by gender, race/ethnicity, and income. Differential access and participation in high school social studies courses—particularly government and AP courses—may help explain why we observe such pronounced and longstanding civic engagement gaps.

Theme 5: Researching social studies is challenging

A final theme is that conducting research on social studies education is very difficult. This is for many reasons. For one, there is a high degree of local control over the subject area—perhaps to a greater degree than for the other core academic subject areas—making it difficult to get a handle on what is actually going on in this subject area. Social studies education is also

becoming increasingly politicized, creating dis-incentives for researchers, policymakers, and practitioners to do serious work in this area.

But beyond these challenges, social studies education is mostly difficult to research because the data infrastructure is largely absent—at least relative to the other core academic subject areas. For example, there are very few social studies assessments, a key data source for measuring and monitoring student performance. Many states do not assess in social studies (ECS, 2018); national assessments are infrequent and do not have sufficient sample sizes to produce state-level estimates; the U.S. does not even participate in the international civics assessment; and common benchmark assessments like MAP and iReady do not include social studies. Furthermore, large scale federal education studies—like the High School Longitudinal Study of 2009 which I use in all of the analyses I present here—never have a focus on social studies. The data source used in this analysis contained hundreds of data points on math and science, including assessment scores, students' participation in related subject-focused extracurricular activities, student perceptions of the subject area, parental involvement, teachers' perceptions of students' learning in math and science, and on and on. In comparison, there were a handful of questions about social studies instruction. HSLS:2009 did not survey teachers, parents, and students about their social studies instruction or involvement in civics-focused extracurricular activities. It did not assess students in social studies. Nor did it ask schools how it placed students into social studies courses. And social studies is not just absent from HSLS:2009. It is absent from other federal data collections as well. For example, the Civil Rights Data Collection (CRDC), the National Assessment of Educational Progress, and the Middle Grades Longitudinal Study, to name just a few, also have minimal to no focus on social studies education.

Of course, researching social studies can be much different than researching other subject areas, in part because the social and political context surrounding social studies is much different than math and science. But researchers, like myself, will never be able to conduct rigorous, high-quality, large-N studies of social studies education if we do not build out the data infrastructure to do so. But this is a fixable problem. For example, the U.S. Department of Education can include questions specifically about social studies education in future longitudinal studies. It can also add questions about social studies course enrollments to existing data collections like the CRDC. The U.S. Department of Education and state departments of education could increase assessment of social studies, either by administering individual assessments or reimagining existing ELA assessments to also focus on social studies.

A missing data infrastructure is not just bad for research—it is bad for student learning. The few indicators that we do have suggest that students are not learning what they need to in social studies (NCES, undated-b; undated-c). We cannot fix what we cannot measure. So let us all—district leaders, policymakers, and researchers—do a better job of building out the data infrastructure to support social studies research.

References

Abram, D., Horsham, Z., & Davies, B. (2023). *Linking volunteering and social cohesion: Causal evidence in the UK and beyond*. Centre for the Study of Group Processes, University of Kent. https://kar.kent.ac.uk/101468/3/Social%20cohesion%20and%20volunteering%20lit%20review_19_5_KAR.pdf

Achieve. (2015a). *Class of 2015 graduation requirements* [Data set].

Achieve. (2015b). *The algebra II variable: State policies for graduation requirements, assessments, and alignment to postsecondary expectations*. https://www.achieve.org/files/Achieve_StateMathematicsPolicyLandscape_FINAL.pdf

Achieve. (2018). *Graduating ready data explorer* [Data set]. https://nces.ed.gov/programs/statereform/tab3_3-2020.asp

Alabama State Department of Education. (2010). *2010 Alabama course of study*. https://www.alabamaachieves.org/wp-content/uploads/2021/03/2010-Alabama-Social-Studies-Course-of-Study.pdf

Ahlstrom, L. J. (2021). Does advanced placement economics exam participation and performance predict undergraduate economics major completion? *The American Economist, 66*(1), 110–127.

Alder, R. P., & Goggin, J. (2005). What do we mean by "civic engagement"? *Journal of Transformative Education, 3*(3), 236–253.

Alexander, L., Duncan, A., King, J., Paige, R., Riley, R., & Spellings, M. (2021, March 2). America needs history and civics education to promote unity. *The Wall Street Journal*.

Alfonseca, K. (2023, July 5). Gov. Ron DeSantis' push for 'civics' education: What does it look like? *ABC News*.

Allgood, S., Bosshardt, W., Van der Klaauw, W., & Watts, M. (2012). Is economics coursework, or majoring in economics, associated with different civic behaviors? *The Journal of Economic Education, 43*(3), 248–268.

Alston, N., Baker, Z., Beins, B., Blair-Broeker, C., Miller, R., Nielsen, A., Rozanas, D., Wang, R., & Whitlock, K. (2019). *High school psychology is science*. American Psychological Association.

Alvarez, R. M., Bailey, D., & Katz, J. N. (2008, January). *The effect of voter identification laws on turnout.* (California Institute of Technology Social Science Working Paper No. 1267R).

American Academy of Arts & Sciences. (n.d.-a). *Advanced placement exams taken in the humanities.* https://www.amacad.org/humanities-indicators/k-12-education/advanced-placement-exams-taken-humanities

American Academy of Arts & Sciences. (n.d.-b). *Credits earned by graduating high school seniors*. https://www.amacad.org/humanities-indicators/k-12-education/credits-earned-graduating-high-school-seniors

American Institutes for Research. (n.d.). *Why does high school coursework matter? The case for increasing exposure to advanced courses*. [Interactive dashboard].

American Institutes for Research. (2023, May 2). *Social studies standards map*. [Interactive map]. https://www.air.org/social-studies-standards-map

American National Election Studies. (2016). *The ANES guide to public opinion and electoral behavior*. https://electionstudies.org/data-tools/anes-guide/

American Psychological Association. (2022). *National standards for high school psychology curricula*. https://www.apa.org/education-career/k12/national-standards

AmeriCorps. (n.d.-a). *Demographics*. https://americorps.gov/about/our-impact/volunteering-civic-life/demographics

AmeriCorps. (n.d.-b). *Volunteering and civic life in America research summary*. https://americorps.gov/sites/default/files/document/volunteering-civic-life-america-research-summary.pdf

Annenberg Public Policy Center. (2023, September 14). Many don't know key facts about U.S. constitution, Annenberg civics study finds. https://penntoday.upenn.edu/news/many-dont-know-key-facts-about-us-constitution-annenberg-civics-study-finds

Antonovics, K., Black, S. E., Cullen, J. B., & Meiselman, A. Y. (2023, August). *Patterns, determinants, and consequences of ability tracking: Evidence from Texas public schools*. (NBER Working Paper No. 30370).

Arpino, B., & Mealli, F. (2011). The specification of the propensity score in multilevel observational studies. *Computational Statistics & Data Analysis, 55*(4), 1770–1780.

Arthur, J., Davies, I., Kerr, D., & Wrenn, A. (2001). *Citizenship through secondary history*. RoutledgeFalmer.

Attewell, P., & Domina, T. (2008). Raising the bar: Curricular intensity and academic performance. *Educational Evaluation and Policy Analysis, 30*(1), 51–71.

Au, W. (2009). Social studies, social justice: W(h)ither the social studies in high-stakes testing? *Teacher Education Quarterly, 36*(1), 43–58.

Austin, P. C. (2011). An introduction to propensity score methods for reducing the effects of confounding in observational studies. *Multivariate Behavioral Research, 46*(3), 399–424.

Austin, P. C., & Stuart, E. A. (2015). Moving towards best practice when using inverse probability of treatment weighting (IPTW) using the propensity score to estimate causal treatment effects in observational studies. *Statistics in Medicine, 34*(28), 3661–3679.

Bachner, J. M. (2010). From classroom to voting booth: The effect of high school civic education on turnout. *Political Science, Education*.

Barker, B. (1985). Curricular offerings in small and large high schools: How broad is the disparity. *Research in Rural Education, 3*(1), 35–38.

Barroso, A., & Minkin, R. (2020, June 24). Recent protest attendees are more racially and ethnically diverse, younger than Americans overall. *Pew Research Center*. https://www.pewresearch.org/short-reads/2020/06/24/recent-protest-attendees-are-more-racially-and-ethnically-diverse-younger-than-americans-overall/

Beaver, J. K., & Weinbaum, E. H. (2013). State test data and school improvement efforts. *Educational Policy, 29*(3), 478–503.

Berliner, D. C., & Biddle, B. J. (1995). *The manufactured crisis: Myths, fraud, and the attack on America's public schools*. Addison-Wesley Publishing Company.

Bia, M., & Mattei, A. (2008). A stata package for the estimation of the dose-response function through adjustment for the generalized propensity score. *The Stata Journal, 8*(3), 354–373.

Black, S. E., Cortes, K. E., & Lincove, J. A. (2015). Academic undermatching of high-achieving minority students: Evidence from race-neutral and holistic admissions policies. *American Economics Review, 105*(5), 604–610.

Bohrnstedt, G. W., Ogut, B., Yee, D., & Bai, Y. (2023). AP calculus and science coursetaking: Their relationships with choosing a STEM major and expecting to be in a STEM occupation. *AERA Open, 9*.

Boxell, L., Gentzkow, M., & Shapiro, J. M. (2021, November). *Cross-country trends in affective polarization*. (NBER Working Paper No. 26669).

Brennan Center. (2015, July 10). Fact sheet: Voter registration for the 21st century. https://www.brennancenter.org/our-work/research-reports/fact-sheet-voter-registration-21st-century

Brookings. (2020, July 20). Lift every voice: The urgency of universal civic voting. https://www.brookings.edu/articles/lift-every-voice-the-urgency-of-universal-civic-duty-voting/

Brettell, C. B. (2020). *The political and civic engagement of immigrants*. American Academy of Arts & Sciences. https://www.amacad.org/sites/default/files/publication/downloads/Democratic-Citizenship_Immigrants-Civic-Political-Engagement.pdf

Brians, C. L., & Grofman, B. (2001). Election day registration's effect on U.S. voter turnout. *Social Science Quarterly, 82*(1), 170–183.

Brown, J., Dalton, B., Laird, J., & Ifill, N. (2018). *Paths through mathematics and science: Patterns and relationships in high school coursetaking* (NCES 2018-118). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

Buddin, R., & Croft, M. (2014, March). *Do stricter high school graduation requirements improve college readiness?* (ACT Working Paper No. WP-2014-1).

Bureau of Labor Statistics (2016, February 25). *Volunteering in the United States, 2015* [Press release]. https://www.bls.gov/news.release/volun.nr0.htm

California Department of Education. (2016). *History social science framework for California public schools kindergarten through grade twelve.* https://www.cde.ca.gov/ci/hs/cf/documents/hssframeworkwhole.pdf

Campbell, D. E. (2009). Civic engagement and education: An empirical test of the sorting model. *American Journal of Political Science, 53*(4), 771–786.

Card, D., & Giuliano, L. (2016). Universal screening increases the representation of low-income and minority students in gifted education. *Proceedings of the National Academy of Sciences*, *113*(48), 13678–13683.

Carlson, D., & Planty, M. (2012). The ineffectiveness of high school graduation credit requirement reforms: A story of implementation and enforcement? *Educational Policy, 26*(4), 592–626.

Carmichael, S. B., Martino, G., Porter-Magee, K., & Wilson, W. S. (2010). *The state of state standards—and the common core—in 2010*. The Thomas B. Fordham Institute.

Cartwright, W. H. (1960). The role of history teaching citizenship education. *The High School Journal, 44*(3), 112–117.

Center for Civic Engagement. (n.d.). *Types of civic engagement*. https://civicengagement.illinoisstate.edu/faculty-staff/engagement-types/

Center for Information and Research on Civic Learning and Engagement. (n.d.). *Dispelling myths about youth voting*. https://circle.tufts.edu/understanding-youth-civic-engagement/dispelling-myths-about-youth-voting

Center for Information and Research on Civic Learning and Engagement. (2023a). *Young voters by race/ethnicity: Data on asian, black, latino, and white youth from the CIRCLE 2022 post-election survey.* https://circle.tufts.edu/sites/default/files/2023-10/young_voters_race_ethnicity.pdf

Center for Information and Research on Civic Learning and Engagement. (2023b, September 15). State policies and statues that support growing voters. https://circle.tufts.edu/latest-research/state-statutes-support-growing-voters

Chaney, B., Burgdorf, K., & Atash, N. (1997). Influencing achievement through high school graduation requirements. *Educational Evaluation and Policy Analysis, 19*(3), 229–244.

Chang, T., & Stuart, E. A. (2022). Propensity score methods for observational studies with clustered data: A review. *Statistics in Medicine, 41*(18), 3612–3626.

Chatterji, R., Campbell, N., & Quirk, A. (2021). *Closing advanced coursework equity gaps for all students*. Center for American Progress.

Chattin, G. S., & Hackmann, D. G. (2013). *National Trends in High School Graduation Requirements and Diploma Options: Considerations for Policy and Practice in Illinois.* The Office of Community College Research and Leadership (OCCRL) at the University of Illinois at Urbana-Champaign.

Chesnaye, N. C., Stel, V. S., Tripepi, G., Dekker, F. W., Fu, E. L., Zoccali, C., & Jager, K. J. (2022). An introduction to inverse probability of treatment weighting in observational research. *Clinical Kidney Journal, 15*(1), 14–20.

Clune, W. H., & White, P. A. (1992). Education reform in the trenches: Increased academic course taking in high schools with lower achieving students in states with higher graduation requirements. *Educational Evaluation and Policy Analysis, 14*(1), 2–20.

Coe, T. (2020, December 17). What's wrong with tracking students by math ability? *NWEA*. https://www.nwea.org/blog/2020/whats-wrong-with-tracking-students-by-math-ability/

Cohen, A. K., & Chaffee, B. W. (2013). The relationship between adolescents' civic knowledge, civic attitude, and civic behavior and their self-reported future likelihood of voting. *Education, Citizenship, and Social Justice, 8*(1), 43–57.

Coleman, V. (2021). What is (or are) social studies? *Research Matters: A Cambridge University Press & Assessment Publication, 32*, 6–21.

College Board. (n.d.). *State funding for AP*. https://reports.collegeboard.org/ap-program-results/state-funding

Conger, D., Long, M. C., & Iatarola, P. (2009). Explaining race, poverty, and gender disparities in advanced coursetaking. *Journal of Policy Analysis and Management, 28*(4), 555–576.

Coons, C. (2022, June 4). *Senators Coons, Cornyn introduce bipartisan bill to invest $1 billion annually in civics education* [Press release]. https://www.coons.senate.gov/news/press-releases/senators-coons-cornyn-introduce-bipartisan-bill-to-invest-1-billion-annually-in-civics-education

Crowley, R. M., & Swan, K. (2018). What kind of economic citizenship?: An analysis of civic outcomes in the U.S. economics curriculum and instructional materials. *Education Sciences, 8*(95), 1–18.

Davies, B., Abrams, D., Horsham, Z., & Lalot, F. (2024). The causal relationship between volunteering and social cohesion: A large scale analysis of secondary longitudinal data. *Social Indicators Research, 171*, 809–825.

de Brey, C., Musu, L., McFarland, J., Wilkinson-Flicker, S., Diliberti, M., Zhang, A., Branstetter, C., & Wang, X. (2019). *Status and trends in the education of racial and ethnic groups 2018* (NCES 2019-038). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

Delany, B. (1991). Allocation, choice, and stratification within high schools: How the sorting machine copes. *American Journal of Education, 99*(2), 181–207.

Desilver, D. (2022, November 1). Turnout in U.S. has soared in recent elections but by some measures still trails that of many other countries. *Pew Research Center*. https://www.pewresearch.org/short-reads/2022/11/01/turnout-in-u-s-has-soared-in-recent-elections-but-by-some-measures-still-trails-that-of-many-other-countries/

Dewey, J. (1916). *Democracy and education*. The Free Press.

Diliberti, M. K., & Kaufman, J. H. (2022). How are U.S. public school teachers approaching civic and citizenship education? *RAND*. https://www.rand.org/pubs/research_reports/RRA112-23.html

Diliberti, M. K., & Wrabel, S. (2024, March 12). Many high schools across the United States offer limited civics-focused extracurricular activities. *Brookings Brown Center Chalkboard*. https://www.brookings.edu/articles/many-high-schools-across-the-united-states-offer-limited-civics-focused-extracurricular-activities/

Diliberti, M. K., Woo, A., & Kaufman, J. H. (2023). *The missing infrastructure for elementary (K–5) social studies: Findings from the 2022 American instructional resources survey*. RAND.

Dillon, E. W., & Smith, J. A. (2017). Determinants of the match between student ability and college quality. *Journal of Labor Economics, 35*(1), 45–66.

Dionne Jr., E. J., & Rapoport, M. (2020). *Lift every voice: The urgency of universal civic duty voting*. The Brookings Institution and The Ash Center for Democratic Governance and Innovation, Harvard Kennedy School.

Dittmar, K. (2018). *The gender gap in voting: Setting the record straight*. Center for American Women and Politics. https://cawp.rutgers.edu/blog/gender-gap-voting-setting-record-straight

Domina, T., Hanselman, P., Hwang, N., & McEachin, A. (2016). Detracking and tracking up: Mathematics course placements in California middle schools, 2003–2013. *American Educational Research Journal, 53*(4), 1229–1266.

Domina, T., & Saldana, J. (2012). Does raising the bar level the playing field? Mathematics curricular intensification and inequality in American high schools, 1982–2004. *American Educational Research Journal, 49*(4), 685–708.

Dougherty, S. M., Goodman, J. S., Hill, D. V., Litke, E. G., & Page, L. C. (2017). Objective course placement and college readiness: Evidence from targeted middle school math acceleration. *Economics of Education Review, 58*, 141–161.

Dounay, J. (2006). *Alignment of High School Graduation Requirements and State-Set College Admissions Requirements*. Education Commission of the States. https://www.ecs.org/clearinghouse/68/60/6860.pdf

DuGoff, E. H., Schuler, M., & Stuart, E. A. (2014). Generalizing observational study results: Applying propensity score methods to complex surveys. *Health Services Research, 49*(1), 284–303.

Duprey, M. A., Pratt, D. J., Jewell, D. M., Cominole, M. B., Fritch, L. B., Ritchie, E. A., Rogers, J. E., Wescott, J. D., & Wilson, D. H. (2018). *High school longitudinal study of 2009 (HSLS:09) Base-year to second follow-up: Data file documentation* (NCES 2018-140). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

Educating for American Democracy. (2021). *Our vision*. https://www.educatingforamericandemocracy.org

Educating for American Democracy. (2021). *Roadmap to educating for American democracy*. https://www.educatingforamericandemocracy.org/wp-content/uploads/2021/02/Roadmap-to-Educating-for-American-Democracy.pdf

Education Commission of the States. (2007). *High school graduation requirements: Social studies.*

Education Commission of the States. (2018, April). *State summative assessments 2018: Social studies assessment grades (if any).* https://reports.ecs.org/comparisons/state-summative-assessments-2018-04

Education Commission of the States. (2021, December). *States' school accountability systems 2021: Indicators and weights.* https://reports.ecs.org/comparisons/states-school-accountability-systems-2021-03

Education Commission of the States. (2022, May). *Statewide admission policies 2022: Does the state have a common statewide or systemwide admissions policy?* https://reports.ecs.org/comparisons/statewide-admissions-policies-2022-01

Education Commission of the States. (2023, May). *High school graduation requirements 2023: What are the state's course requirements for a standard diploma?* https://reports.ecs.org/comparisons/high-school-graduation-requirements-2023-04

Ekman, J., & Amnå, E. (2012). Political participation and civic engagement: Towards a new typology. *Human Affairs, 22*(3), 283–300.

Enchautegui, M. E. (2014). *Immigrant youth outcomes: Patterns by generation and race and ethnicity*. The Urban Institute.

Fabina, J., & Scherer, Z. (2022). *Voting and registration in the election of November 2022: Current population reports*. https://www.census.gov/content/dam/Census/library/publications/2022/demo/p20-585.pdf

Fan, L., Zaslavsky, A. M., & Landrum, M. B. (2013). Propensity score weighting with multilevel data. *Statistics in Medicine, 32*(19), 3373–3387.

Farkas, S., & Duffett, A. M. (2010). *High schools, civics, and citizenship: What social studies teachers think and do*. American Enterprise Institute.

Federman, M. (2007). State graduation requirements, high school course taking, and choosing a technical college major. *The B.E. Journal of Economic Analysis & Policy*, *7*(1), 1–34.

Fensterwald, J. (2021, October 8). California becomes the first state to require ethnic studies in high school. *EdSource*.

Fitchett, P. G., & Heafner, T. L. (2010). A national perspective on the effects of high-stakes testing and standardization of elementary social studies marginalization. *Theory and Research in Social Education, 38*(1), 114–130.

Fitchett, P. G., Heafner, T. L., & Lambert, R. G. (2014). Examining elementary social studies marginalization: A multilevel model. *Educational Policy, 28*(1), 40–68.

Flannery, M. E. (2020, June 9). Ethnic studies classes growing in popularity. *NEA News, NEAToday*. https://www.nea.org/nea-today/all-news-articles/ethnic-studies-classes-growing-popularity

Foster-Bey, J. (2008, December). *Do race, ethnicity, citizenship and socio-economic status determine civic-Engagement?* (CIRCLE Working Paper No. 62). The Center for Information and Research on Civic Learning & Engagement.

Friedberg, S., Barone, D., Belding, J., Chen, A., Dixon, L., Fennel, F., Fisher, D., Frey, N., Howe, R., & Shanahan, T. (2018). *The state of state standards post-common core*. Thomas B. Fordham Institute.

Fullmer, E. B. (2014). The site gap: Racial inequalities in early voting access. *American Politics Research, 43*(2), 283–303.

Gaby, S. (2016). The civic engagement gap(s): Youth participation and inequality from 1976 to 2009. *Youth & Society, 49*(7), 923–946.

Galchen, R. (2022, September 8). California students are struggling in math. Will reforms make the problem worse? *The New Yorker*.

Gamoran, A. (1992). The variable effects of high school tracking. *American Sociological Review, 57*(6), 812–828.

Gao, N., & Adan, S. (2016). *Math placement in California's public schools*. Public Policy Institute of California.

Gardner, D. P. (1983). *A nation at risk: The imperative for educational reform. An open letter to the American people. A report to the nation and the Secretary of Education*. National Commission on Excellence in Education. https://files.eric.ed.gov/fulltext/ED226006.pdf

Godsay, S., Henderson, W., Levine, P., & Littenberg-Tobias, J. (2012). *State civic education requirements*. Center for Information and Research on Civic Learning & Engagement.

Goldstein, D. (2023, November 2023). For republican governors, civics is the latest education battleground. *The New York Times*.

Goodman, J. (2012). *The labor of division: Returns to compulsory math coursework*. (Faculty Research Working Paper Series No. RWP12-032). Harvard Kennedy School.

Gottfried, M. A., & Bozick, R. (2016). Supporting the STEM Pipeline: Linking applied STEM course-taking in high school to declaring a STEM major in college. *Education Finance and Policy, 11*(2), 177–202.

Gould, J. (2011). *Guardian of democracy: The civic mission of schools. Campaign for the civic mission of schools in partnership with the Leonore Annenberg Institute for Civics of the*

Annenberg Public Policy Center at the University of Pennsylvania. The National Conference on Citizenship, the Center for Information and Research on Civic Learning and Engagement at Tufts University, and the American Bar Association Division for Public Education.

Grant, S. G. (2007). High-stakes testing: How are social studies teachers responding? *Social Education, 71*(5), 250–254.

Greifer, N., & Stuart, E. A. (2021). Choosing the causal estimand for propensity score analysis of observational studies. https://arxiv.org/abs/2106.10577

Grissom, J. A., Kabourek, S. E., & Kramer, J. W. (2020). Exposure to same-race or same-ethnicity teachers and advanced math course-taking in high school: Evidence from a diverse urban district. *Teachers College Record, 122*(7), 1–46.

Grissom, J. A., & Redding, C. (2016). Discretion and disproportionality: Explaining the underrepresentation of high-achieving students of color in gifted programs. *AERA Open, 2*(1), 1–25.

Guardabascio, B., & Ventura, M. (2014). Estimating the dose-response function through a generalized linear model approach. *The Stata Journal, 14*(1), 141–158.

Guilfoile, L., Delander, B., & Kreck, C. (2016). *Guidebook: Six proven practices for effective civic learning*. Education Commission of the States. http://www.ecs.org/clearinghouse/01/10/48/11048.pdf

Hallinan, M. T. (1994). Tracking: From theory to practice. *Sociology of Education, 67*(2), 79–84.

Hamilton, L. S., Kaufman, J. H., & Hu, L. (2020a). *Preparing children and youth for civic life in the era of truth decay: Insights from the American teacher panel*. RAND.

Hamilton, L. S., Kaufman, J. H., & Hu, L. (2020b). *Social studies teachers' perspectives on key civic outcomes in 2010 and 2019: Civic development in the era of truth decay*. RAND.

Hamilton, L. S., Olivera-Aguilar, M., & Rikoon, S. H. (2024). *Cultivating civic learning and engagement in U.S. schools.* American Institutes for Research. https://www.air.org/sites/default/files/2024-04/cultivating-civic-learning-engagement-US-schools.pdf

Han, S. W., Kang, C., & Dominguez, R. (2023). On track or off track? Identifying a typology of math course-taking sequences in U.S. high schools. *Socius: Sociological Research for a Dynamic World, 9*.

Hansen, M., Mann Levesque, E., Valant, J., & Quintero, D. (2018). *2018 Brown Center Report on American education: An inventory of state civics requirements*. Brookings Institution.

Hart, D., Donnelly, T. M., Youniss, J., & Atkins, R. (2007). High school community service as a predictor of adult voting and volunteering. *American Educational Research Journal, 44*(1), 197–219.

Heafner, T. L., & Fitchett, P. G. (2012). Tipping the scales: National trends of declining social studies instructional time in elementary schools. *Journal of Social Studies Research, 36*(2), 190–215.

Heller, R. (2023, October 4). What should our high school students study? How high school graduation requirements have evolved from a nation at risk to the present. *New America*. https://www.newamerica.org/education-policy/briefs/what-should-our-high-school-students-study/

Helms, S. E. (2013). Involuntary volunteering: The impact of mandated service in public schools. *Economics of Education Review, 36*, 295–310.

Hess, F., & Rice, M. (2024). Where the left and the right agree on civics education, and where they don't. *Education Next, 24*(2).

Highton, B. (1997). Easy registration and voter turnout. *The Journal of Politics, 59*(2).

Holstead, M. S., Spradlin, T. E., McGillivray, M. E., & Burroughs, N. (2010). *The Impact of Advanced Placement Incentive Programs*. Center for Evaluation & Education Policy.

Hong, J. E. (2018). Critical citizenship education through geography. *International Journal of Geospatial and Environmental Research*, *5*(3).

Hope, E. C. (2022, February 16). Rethinking civic engagement. *Brennan Center for Justice*. https://www.brennancenter.org/our-work/research-reports/rethinking-civic-engagement

Hoxby, C. M., & Avery, C. (2012). *The missing "one-offs": The hidden supply of high-achieving, low-income students*. (NBER Working Paper No. 18586).

Hoyer, K. M., & Sparks, D. (2017). *Instructional time for third- and eighth-graders in public and private schools: School year 2011–2012.* (NCES 2017-076). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

Huffaker, E., Novicoff, S., & Dee, T. S. (2023, March). *Ahead of the game? Course-taking patterns under a math pathways reform* (EdWorkingPaper No. 23-734). Annenberg Institute, Brown University.

Iatarola, P., Conger, D., & Long, M. C. (1992). Determinants of high schools' advanced course offerings. *Educational Evaluation and Policy Analysis, 33*(3), 340–359.

iCivics. (n.d.). *Survey of likely general election voters nationwide conducted September 15–26, 2022*. https://civxnow.org/wp-content/uploads/2022/10/National-poll-measuring-support-for-civics-among-likely-2022-Election-voters.pdf

Ingels, S. J., Pratt, D. J., Herget, D. R., Bryan, M., Fritch, L. B., Ottem, R., Rogers, J. E., Wilson, D., & Christopher, E. M. (2015). *High school longitudinal study of 2009 (HSLS:09) 2013 update and high school transcript: Data file documentation* (NCES 2015-036). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

Ingels, S. J., Pratt, D. J., Herget, D. R., Burns, L. J., Dever, J. A., Ottem, R., Rogers, J. E., Jin, Y., Leinwand, S., & LoGerfo, L. (2011). *High school longitudinal study of 2009 (HSLS:09) 2013 update and high school transcript: Base-year data file documentation* (NCES 2011-328). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

Ingersoll, R. M., Hoxby, C. M., & Scrupski, A. F. (2004). Why some schools have more underqualified teachers than others. *Brookings Papers on Education Policy*, (7), 45-88.

Irizarry, Y. (2021). On track or detailed? Race, advanced math, and the transition to high school. *Socius: Sociological Research for a Dynamic World, 7*, 1–21.

Ishizawa, H. (2014). Civic participation through volunteerism among youth across immigrant generations. *Sociological Perspectives, 58*(2), 264–285.

Jacobsen, R., & Wilder Linkow, T. (2012, February). *The engaged citizen index: Examining the racial and ethnic civic and political engagement gaps of young adults*. (CIRCLE Working Paper No. 74).

Jenkins, K. (2005, June). *Gender and civic engagement: Secondary analysis of survey data*. (CIRCLE Working Paper No. 41).

Jewett, E. C., & Chen, R. (2022). Examining the relationship between AP STEM course-taking and college major selection: Gender and racial differences. *The Research Journal for Engineering Education, 111*(3), 512–530.

Jimenez, L., & Sargrad, S. (2018, April 2). Are high school diplomas really a ticket to college and work? An audit of state high school graduation requirements. *The Center for American Progress*. https://www.americanprogress.org/article/high-school-diplomas/

Johnson, H. (2018, November 15). Gender differences in higher education start early. *Public Policy Institute of California*.

Journell, W. (2015). We still need you! An update on the status of k-12 civics education in the united states. *PS: Political Science & Politics, 48*(4), 630–634.

Jung, J., & Gopalan, M. (2023). The stubborn unresponsiveness of youth voter turnout to civic education: Quasi-experimental evidence from state-mandated civics tests. *Educational Evaluation and Policy Analysis.*

Kahne, J. E., & Sporte, S. E. (2008). Developing citizens: The impact of civic learning opportunities on students' commitment to civic participation. *American Educational Research Journal, 45*(3), 738–766.

Kalogrides, D., & Loeb, S. (2013). Different Teachers, Different Peers: The Magnitude of Student Sorting Within Schools. *Educational Researcher, 42*(6), 304–316.

Kalogrides, D., Loeb, S., & Béteille, T. (2013). Systematic sorting: Teacher characteristics and class assignments. *Sociology of Education, 86*(2), 103–123.

Kane, T., & Reardon, S. (2023, May 11). Parents don't understand how far behind their kids are in school. *The New York Times*.

Kaufman, J. H., Covelli, L., & Holmes, P. (2024). *Elementary and middle school opportunity structures that factor into students' math learning: Findings from the American mathematics educator study*. RAND.

Kaufman, J. H., Diliberti, M. K., Yeung, D., & Kavanagh, J. (2022). *Defining and measuring civic infrastructure* (RR-A112-24). RAND.

Kavanagh, J., & Rich, M. D. (2018). *Truth decay: An initial exploration of the diminishing role of facts and analysis in American public life* (RR-2314-RC). RAND.

Kawashima-Ginsberg, K., & Thomas, N. (2013). *Civic engagement and political leadership among women – A call for solutions*. Center for Information and Research on Civic Learning & Engagement. https://circle.tufts.edu/sites/default/files/2019-12/civic_engagement_political_leadership_women_2013.pdf

Keeter, S., Zukin, C., Andolina, M., & Jenkins, K. (2002). *The civic and political health of the nation: A generational portrait*. Center for Information and Research on Civic Learning and Engagement.

Khazzaka, J. (1997). Comparing the merits of a seven-period school day to those of a four-period school day. *The High School Journal, 81*(2), 87–97.

Kilgore, S. B. (1991). The organizational context of tracking in schools. *American Sociological Review, 56*(2), 189–203.

Kim-Christian, P., & McDermott, L. (2022). *Disparities in advanced placement course enrollment and test taking: National and state-level perspectives*. Learning Curve Essay Series, The Urban Institute.

Kirlin, M. (2003, June). *The role of civic skills in fostering civic engagement.* (CIRCLE Working Paper No. 63).

Klopfenstein, K. (2004). Advanced placement: Do minorities have equal opportunity? *Economics of Education Review, 23*(2), 115–131.

Koon, S., & Davis, M. (2019). *Math course sequences in grades 6–11 and math achievement in Mississippi*. Institute of Education Sciences, U.S. Department of Education.

Kornfield, M. (2021, October 9). California becomes the first state to require ethnic studies for high school graduation. *The Washington Post.*

Kozman, E., & Sanders, M. (2019). Examining the potential for nudges to tackle 'undermatch' in higher education: Existing evidence and implications for scaling. *Journal of Behavioral Economics for Policy, 3*(S), 13–15.

Langworthy, B., Wu, Y., & Wang, M. (2023). An overview of propensity score matching methods for clustering data. *Statistical Methods in Medical Research, 32*(4), 641–655.

Lee, V. E., Smerdon, B. A., Alfeld-Liro, C., & Brown, S. L. (2000). Inside large and small high schools: Curriculum and social relations. *Educational Evaluation and Policy Analysis, 22*(2), 147–171.

Leithwood, K., & Jantzi, D. (2009). A review of empirical evidence about school size effects: A policy perspective. *Review of Educational Research, 79*(1), 464–490.

Leung, M., Cardichon, J., Scott, C., & Darling-Hammond, L. (2021). *Inequitable opportunity to learn: Access to advanced mathematics and science courses*. Learning Policy Institute.

Levine, P., & Kawashima-Ginsberg, K. (2017). *The republic is (still) at risk—and civics is part of the solution*. Jonathan M. Tisch College of Civic Life, Tufts University.

Levinson, M. (2010). *The civic empowerment gap: Defining the problem and locating solutions. In Handbook of Research on Civic Engagement, ed. Lonnie Sherrod, Judith Torney-Purta, and Constance A. Flanagan*. Hoboken, NJ: John Wiley & Sons. http://nrs.harvard.edu/urn-3:HUL.InstRepos:8454069

Levitsky, S., & Ziblatt, D. (2018). *How democracies die.* Penguin Random House.

Lewis, K., & Kuhfeld, M. (2023*). Education's long COVID: 2022-23 Achievement data reveal stalled progress toward pandemic recovery.* NWEA.

Long, M. C., Conger, D., & Iatarola, P. (2012). Effects of high school course-taking on secondary and postsecondary success. *American Educational Research Journal, 49*(2), 285–322.

Loveless, T. (2013). *How well are American students learning? With sections on the latest international tests, tracking and ability grouping, and advanced math in 8th grade*. The Brookings Institution. https://www.brookings.edu/wp-content/uploads/2016/06/2013-brown-center-report-web.pdf

Loveless, T. (2016). *How well are American students learning? With sections on reading and math in the common core era, tracking and advanced placement (AP), and principals as instructional leaders.* The Brookings Institution. https://www.brookings.edu/wp-content/uploads/2016/03/Brown-Center-Report-2016.pdf

Loveless, T. (2021, October 4). Does detracking promote educational equity? *Brookings Brown Center Chalkboard*. https://www.brookings.edu/articles/does-detracking-promote-educational-equity/

Lucas, S. R., & Berends, M. (2002). Sociodemographic diversity, correlated achievement, and de facto tracking. *Sociology of Education, 75*(4), 328–348.

Maiello, C., Oser, F., & Biedermann, H. (2003). Civic knowledge, civic skills, and civic engagement. *European Educational Research Journal, 2*(3), 384–395.

Makles, A. (2012). Stata tip 110: How to get the optimal k-means cluster solution. *Stata Journal 12*(2), 347–51.

Massachusetts Department of Elementary and Secondary Education. (2018). *History and social science framework, grade pre-kindergarten to 12*. https://www.doe.mass.edu/frameworks/hss/2018-12.pdf

McClure, C., & Zadrozny, J. (2015). *Social studies and geography survey for middle and high schools.* The Gilbert M. Grosvenor Center for Geographic Education.

McEachin, A., Domina, T., & Penner, A. (2020). Heterogeneous effects of early algebra across California middle schools. *Journal of Policy Analysis and Management, 39*(3), 772–800.

Means, B., Padilla, C., & Gallagher, L. (2010). *Use of Education Data at the Local Level: From Accountability to Instructional Improvement*. U.S. Department of Education, Office of Planning, Evaluation, and Policy Development. https://files.eric.ed.gov/fulltext/ED511656.pdf

Medina, A., Hilton, K., & Suzuki, S. (2023, August 7). Gen Z voted at a higher rate in 2022 than previous generations in their first midterm election. *Center for Information and Research on Civic Learning and Engagement*. https://circle.tufts.edu/latest-research/gen-z-voted-higher-rate-2022-previous-generations-their-first-midterm-election

Miller, C. M., Hutchison, B., & Riccardo, R. (2019). *The effects of high school students' STEM course-taking patterns on their postsecondary trajectories and the factors that influence the*

availability of high-quality STEM education in PA schools. Pennsylvania Department of Education.

Miller, S. L. (1988). *Economic education for citizenship*. Publications Manager, Social Studies Development Center, Indiana University. https://eric.ed.gov/?id=ED296947

Montgomery, N., Allensworth, E. M., & Correa, M. (2010). *Passing through science: The effects of raising graduation requirements in science on course-taking and academic achievement in Chicago.* Consortium on Chicago School Research at the University of Chicago Urban Education Institute.

Morgan, J. C., & Banaszak, R. A. (1988). *The relationship between economics and civics in economic textbooks and civics curriculum guides*. Foundation for Teaching Economics. https://eric.ed.gov/?id=ED298066

Morgan, T. L., Zakhem, D., & Cooper, W. L. (2018). From high school access to postsecondary success: An exploratory study of the impact of high-rigor coursework. *Education Sciences, 8*(191), 1–20.

Morton, K., & Riegle-Crumb, C. (2019). Who gets in? Examining inequality in eighth-grade algebra. *Journal for Research in Mathematics Education*, *50*(5), 529–554.

Muetterties, C. C. (2021). What kind of global citizen? A framework for best practices in world history civic education? *Education, Citizenship and Social Justice, 17*(2), 103–121.

National Center for Education Statistics. (n.d.-a). *2019 NAEP high school transcript student (HSTS) results.* U.S. Department of Education, Institute of Education Sciences. https://www.nationsreportcard.gov/hstsreport/#coursetaking

National Center for Education Statistics. (n.d.-b). *U.S. History score continues decline begun in 2014.* U.S. Department of Education, Institute of Education Sciences. https://www.nationsreportcard.gov/highlights/ushistory/2022/

National Center for Education Statistics. (n.d.-c). *Civics score declines for the first time; score unchanged compared to 1998.* U.S. Department of Education, Institute of Education Sciences. https://www.nationsreportcard.gov/highlights/civics/2022/

National Center for Education Statistics. (n.d.-d). Table J9. Percentage of 2009 high school freshmen students who took courses in social studies, by course subject: 2013 (HSLS:09). In U.S. Department of Education, National Center for Education Statistics (Ed.), *High School Longitudinal Study of 2009 Table Library*. https://nces.ed.gov/surveys/hsls09/tables/high_school_coursetaking_j9.asp

National Center for Education Statistics. (n.d.-e). *Largest score declines in NAEP mathematics at grades 4 and 8 since initial assessments in 1990.* U.S. Department of Education, Institute of Education Sciences. https://www.nationsreportcard.gov/highlights/mathematics/2022/

National Center for Education Statistics. (n.d.-f). Table J13. Coursetaking in family and consumer sciences by 2009 9th-graders who graduated on time in 2013, nationally and in states with public school state-representative data: 2013 (HSLS:09). In U.S. Department of Education, National Center for Education Statistics (Ed.), *High School Longitudinal Study of 2009 Table Library*. https://nces.ed.gov/surveys/hsls09/tables/high_school_coursetaking_j13.asp

National Center for Education Statistics. (n.d.-g). *National Assessment of Educational Progress*. [Data tool].

National Center for Education Statistics. (2010). Table 176. Credit requirements and exit exam requirements for a standard high school diploma and the use of other high school completion credentials, by state: 2008 and 2010. In U.S. Department of Education, National Center for Education Statistics (Ed.), *Digest of Education Statistics* (2010 ed.). https://nces.ed.gov/programs/digest/d10/tables/dt10_176.asp

National Center for Education Statistics. (2011). Table 177. Credit requirements and exit exam requirements for a standard high school diploma and the use of other high school completion credentials, by state: 2008 and 2011. In U.S. Department of Education, National Center for Education Statistics (Ed.), *Digest of Education Statistics* (2011 ed.). https://nces.ed.gov/programs/digest/d11/tables/dt11_177.asp

National Center for Education Statistics. (2012). Table 199. Credit requirements and exit exam requirements for a standard high school diploma and the use of other high school completion credentials, by state: 2011 and 2012. In U.S. Department of Education, National Center for Education Statistics (Ed.), *Digest of Education Statistics* (2012 ed.). https://nces.ed.gov/programs/digest/d12/tables/dt12_199.asp

National Center for Education Statistics. (2014). Table 234.30. Course credit requirements and exit exam requirements for a standard high school diploma and the use of other high school completion credentials, by state: 2013. In U.S. Department of Education, National Center for Education Statistics (Ed.), Digest of Education Statistics (2014 ed.). https://nces.ed.gov/programs/digest/d14/tables/dt14_234.30.asp

National Center for Education Statistics. (2015). Table 2.17. State adoption of mathematics and english/language arts common core state standards initiative, by state: 2015. In U.S. Department of Education, National Center for Education Statistics (Ed.), *State Education Practices*. https://nces.ed.gov/programs/statereform/tab2_17.asp

National Center for Education Statistics. (2018). Table 3.3. State course credit requirements for high school graduation, by state: 2018. In U.S. Department of Education, National Center for Education Statistics (Ed.), *State Education Practices*. https://nces.ed.gov/programs/statereform/tab3_3-2020.asp

National Center for Education Statistics. (2019). Table 225.30. Percentage of public and private high school graduates taking selected mathematics and science courses in high school, by sex and race/ethnicity: Selected years, 1982 through 2009. In U.S. Department of Education, National Center for Education Statistics (Ed.), *Digest of Education Statistics* (2019 ed.). https://nces.ed.gov/programs/digest/d19/tables/dt19_225.30.asp

National Center for Education Statistics. (2021). Table 225.10. Average number of Carnegie units earned by public high school graduates in various subject fields, by sex and race/ethnicity: Selected years, 1990 through 2019. In U.S. Department of Education, National Center for Education Statistics (Ed.), *Digest of Education Statistics* (2021 ed.). https://nces.ed.gov/programs/digest/d21/tables/dt21_225.10.asp?current=yes

National Center for Education Statistics. (2022a). Table 203.70. Percentage distribution of enrollment in public elementary and secondary schools, by race/ethnicity and state or jurisdiction: Fall 2010, fall 2020, and fall 2021. In U.S. Department of Education, National Center for Education Statistics (Ed.), *Digest of Education Statistics* (2022 ed.). https://nces.ed.gov/programs/digest/d22/tables/dt22_203.70.asp

National Center for Education Statistics (2022b). Table 216.40. Number and percentage distribution of public elementary and secondary schools and enrollment, by level, type, and enrollment size of school: School years 2019–20 through 2021–22. In U.S. Department of Education, National Center for Education Statistics (Ed.), *Digest of Education Statistics* (2022 ed.). https://nces.ed.gov/programs/digest/d22/tables/dt22_216.40.asp

National Center for Education Statistics (2022c). Table 216.75 Average enrollment of public elementary and secondary schools, by school level and state or jurisdiction: School year 2021–22. In U.S. Department of Education, National Center for Education Statistics (Ed.), *Digest of Education Statistics* (2022 ed.). https://nces.ed.gov/programs/digest/d22/tables/dt22_216.75.asp

National Conference of State Legislatures. (2023, June 13). *Early in-person voting*. https://www.ncsl.org/elections-and-campaigns/early-in-person-voting

National Council for Economic Education. (2010). *Voluntary national content standards in economics. 2nd edition*. https://www.councilforeconed.org/wp-content/uploads/2012/03/voluntary-national-content-standards-2010.pdf

National Council for the Social Studies. (n.d.). *About us*. https://www.socialstudies.org/about

National Council for the Social Studies. (2013). *College, career, and civic life framework for social studies standards*.

National Council for the Social Studies. (2023, November 8). *New definition of social studies approved* [Press release]. https://www.socialstudies.org/media-information/definition-social-studies-nov2023

National Civic League. (n.d.). *How safe would a community be if people didn't know their neighbors or trust the police enough to report crime? How healthy would a community be if we relied only on professionals, rather than improving behavior and the environment?* https://www.nationalcivicleague.org/civic-engagement-matters/

National Forum on Education Statistics. (n.d.). *School courses for the exchange of data* (Version 2.0) [Data set].

Nickodem, K. (2020). *Use of aggregated covariates in propensity score analysis of clustered data* [Doctoral dissertation, University of Minnesota]. ProQuest Dissertations Publishing.

Niemi, R. G., & Junn, J. (1993). *Civics courses and the political knowledge of high school seniors*. Paper presented at the Annual Meeting of the American Political Science Association.

Niemi, R. G. & Junn, J. (1998). *Civic education: What makes students learn*. Yale University Press.

Niemi, R. G., & Smith, J. (2001). Enrollments in high school government classes: Are we short-changing both citizenship and political science training? *PS: Political Science & Politics, 34*(2), 281–287.

O'Connor, K. A., Heafner, T., & Groce, E. (2007). Advocating for social studies: Documenting the decline and doing something about it. *Social Education, 71*(5), 255–260.

Oakes, J. (1987). *Tracking in secondary schools: A contextual perspective* (RAND/P-7342). RAND.

Oakes, J. (1990). *Multiplying inequalities: The effects of race, social class, and tracking on opportunities to learn mathematics and science* (R-3928-NSF). RAND.

Oakes, J., & Guiton, G. (1995). Matchmaking: The dynamics of high school tracking decisions. *American Education Research Journal, 32*(1), 3–33.

Oakes, J., Wells, A. S., Jones, M., & Datnow, A. (1997). Detracking: The social construction of ability, cultural politics, and resistance to reform. *Teachers College Record*, *98*(3), 482–510.

OECD. (2020). "Sorting and selecting students between and within schools", in *PISA 2018 Results (Volume V): Effective Policies, Successful Schools*, OECD Publishing, Paris, https://doi.org/10.1787/5d9b15a4-en.

OECD. (2024). *Education GPS*. https://gpseducation.oecd.org/CountryProfile?primaryCountry=USA

Ogut, B., & Circi, R. (2023). Diving into students' transcripts: High school course-taking sequences and postsecondary enrollment. *Educational Measurement: Issues and Practice, 42*(2), 21–31.

Pew Research Center. (2018, April 26). *9. The responsibilities of citizenship*. https://www.pewresearch.org/politics/2018/04/26/9-the-responsibilities-of-citizenship/

Pittman, R. (2022). *Implications for educational equity due to master scheduling decisions made by site administrators* [Doctoral dissertation, Claremont Graduate University]. CGU Theses & Dissertations.

Polikoff, M., Silver, D., Rapaport, A., Saavedra, A., & Garland, M. (2022). *A house divided? What Americans really think about controversial topics in schools*. University of Southern California. https://www.ednc.org/wp-content/uploads/2022/10/House_Divided.pdf

Puaca, L. (2004, April 1). *"Traditional history" vs. "revisionist history": A summary of the debate over history's role in teaching citizenship and patriotism.* Organization of American Historians. https://www.oah.org/2003/04/01/history-democracy-and-citizenship-the-debate-over-historys-role-in-teaching-citizenship-and-patriotism/

Qi, D., & Gonzalez, S. (2021). Immigrant status, race, and voter turnout in the American mass public. *Social Science Quarterly, 103*(1), 225–240.

Railey, H. & Brennan, J. (2016). *Education trends companion report—50-state comparison: civic education*. Education Commission of the States.

Ready, D. D., Lee, V. E., & Welner, K. G. (2004). Educational equity and school structure: School size, overcrowding, and schools-within-schools. *Teachers' College Record, 106*(10), 1989–2014.

Repucci, S. (2021). *From crisis to reform: A call to strengthen America's battered democracy*. Freedom House.

Riegle-Crumb, C. (2006). The path through math: Course sequences and academic performance at the intersection of race-ethnicity and gender. *American Journal of Education, 113*(1), 101–122.

Riegle-Crumb, C., & Grodsky, E. (2010). Racial-ethnic differences at the intersection of math coursetaking and achievement. *American Sociological Association, 83*(3), 248–270.

Riehl, C., Pallas, A. M., & Natriello, G. (1999). Rites and wrongs: Institutional explanations for the student course-scheduling process in urban high schools. *American Journal of Education, 107*(2), 116–154.

Rodriguez, A., & McGuire, K. M. (2019). More classes, more access? Understanding the effects of course offerings on black-white gaps in advanced placement course-taking. *The Review of Higher Education, 42*(2), 641–679.

Rogers, J., Kahne, J., Ishimoto, M., Kwako, A., Stern, S. C., Bingener, C., Raphael, L., Alkam, S., & Conde, Y. (2022). *Educating for a diverse democracy: The chilling role of political conflict in blue, purple, and red communities*. Institute for Democracy, Education, and Access.

Ronco, E. (2024, March 11). Civic learning week aims to engage young Americans in democracy. National Conference of State Legislatures. https://www.ncsl.org/state-legislatures-news/details/civic-learning-week-aims-to-engage-young-americans-in-democracy#:~:text=%E2%80%9CCivics%20can%20be%20a%20unifying,for%20engaging%20productively%20across%20differences.%E2%80%9D

Roof, H., & Chimuma, L. (2022). The relationship among reading, math and science achievement: Exploring the growth trajectories over three time points. *Educational Research: Theory and Practice, 33*(2), 32–49.

Rosenstone, S. J., & Wolfinger, R. E. (1978). The effect of registration laws on voter turnout. *American Political Science Review, 72*(1), 22–45.

Rubin, B. C. (2006). Tracking and detracking: Debates, evidence, and best practices for a heterogeneous world. *Theory into Practice*, *45*(1), 4–14.

Saad, L. (2023, July 6). Historically low faith in U.S. institutions continues. *Gallup*. https://news.gallup.com/poll/508169/historically-low-faith-institutions-continues.aspx

Saavedra, A., Polikoff, M., Silver, D., Rapaport, A., Garland, M., & Scollan-Rowley, J. (2024). *Searching for common ground: Widespread support for public schools but substantial partisan divides about teaching contested topics*. Center for Applied Research in Education, University of Southern California.

Sailor, A., Burke, L., Segal, A., & Kissel, A. (2021, June 14). *Civics studies: Why they matter, what parents and teachers think, and how they can reclaim truth*. The Heritage Foundation. https://www.heritage.org/sites/default/files/2021-06/BG3626_0.pdf

Schiller, K. S., & Muller, C. (2003). Raising the bar and equity? Effects of state high school graduation requirements and accountability policies on students' mathematics course taking. *Educational Evaluation and Policy Analysis, 25*(3), 299–318.

Schwartz, S. (2023a, May 3). History achievement falls to 1990s levels on NAEP; civics scores take first-ever dive. *Education Week*. https://www.edweek.org/leadership/history-achievement-falls-to-1990s-levels-on-naep-civics-scores-take-first-ever-dive/2023/05

Schwartz, S. (2023b, July 12). California adopts controversial new math framework. Here's what's in it. *Education Week*. https://www.edweek.org/teaching-learning/california-adopts-controversial-new-math-framework-heres-whats-in-it/2023/07

Schwartz, S. (2023c, July 31). What's the purpose of standards in education? An explainer. *Education Week*. https://www.edweek.org/teaching-learning/whats-the-purpose-of-standards-in-education-an-explainer/2023/07

Schug, M. C. (1985). *Economics in the school curriculum* (1828-1). Joint Council on Economic Education.

Schug, M., Todd, R., & Beery, R. (1982). *Why kids don't like social studies*. Paper presented at the Annual Meeting of the National Council for the Social Studies. https://files.eric.ed.gov/fulltext/ED224765.pdf

Shapiro, S., & Brown, C. (2018, February 21). *The state of civics education*. Center for American Progress. https://www.americanprogress.org/article/state-civics-education/

Siegel-Stechler, K. (2019). Is civics enough? High school civics education and young adult voter turnout. *The Journal of Social Studies Research, 43*(3), 241–253.

Singer, V., & Strasser, K. (2017). The association between arithmetic and reading performance in school: A meta-analytic study. *School Psychology Quarterly, 32*(4), 435–448.

Smith, J., & Niemi, R. G. (2001). Learning history in school: The impact of course work and instructional practices on achievement. *Theory & Research in Social Education, 29*(1).

Standing, K., & Lewis, L. (2021). *Pre-COVID ability grouping in U.S. public school classrooms*. National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

Stein, M. K., Kaufman, J. H., Sherman, M., & Hillen, A. F. (2011). Algebra: A challenge at the crossroads of policy and practice. *Review of Educational Research, 81*(4), 453–492.

Steiner, E. D., Morales, S., & Mulhern, C. (2024). *Access to mathematics learning and postsecondary preparation opportunities in high school: Findings from the 2023 American mathematics educator study*. RAND.

Stepler, R., & Ishizawa, H. (2018). Immigrant voices: How do patterns of expressive forms of civic engagement differ across immigrant generation? *Societies Without Borders, 12*(2).

Stern, J. A., Brody, A. E., Gregory, J. A., Griffith, S., & Pulvers, J. (2021). *The state of state standards for civics and U.S. history in 2021*. Thomas B. Fordham Institute.

Stoltman, J. P. (1990). *Geography education for citizenship*. Social Studies Development Center, Indiana University.

Syvertsen, A. K., Wray-Lake, L., Flanagan, C. A., Wayne Osgood, D., & Briddell, L. (2011). Thirty-year trends in US adolescents' civic engagement: A story of changing participation and educational differences. *Journal of Research on Adolescence*, *21*(3), 586–594.

Teitelbaum, P. (2003). The influence of high school graduation requirement policies in mathematics and science. *Educational Evaluation and Policy Analysis, 25*(1), 31–57.

Thoemmes, F. J., & Kim, E. S. (2011). A systematic review of propensity score methods in the social sciences. *Multivariate Behavioral Research, 46*(1), 90–118.

Thompson, C. (2023). *State support for civic engagement*. Learning Policy Institute.

Thornton, S. J. (2018). Geography as a social study: Its significance for civic competence. In *Spatial Citizenship Education* (pp. 10-21). Routledge.

Thornton, S. J., & Barton, K. C. (2010). Can history stand alone? Drawbacks and blind spots of a "disciplinary" curriculum. *Teachers College Record, 112*(9), 2471–2495.

Torney-Purta, J. (2002). The school's role in developing civic engagement: A study of adolescents in twenty-eight countries. *Applied Developmental Science, 6*(4), 203–212.

Torney-Purta, J., Lehmann, R., Oswald, H., & Schulz, W. (2001). *Citizenship and education in twenty-eight countries: Civic knowledge and engagement at age fourteen*. The International Association for the Evaluation of Educational Achievement.

Trusty, J. (2002). Effects of high school coursetaking and other variables on choice of science and mathematics college majors. *Journal of Counseling & Development, 80*(4), 464–474.

Tyner, A., & Kabourek, S. (2020). *Social studies instruction and reading comprehension: Evidence from the early childhood longitudinal study*. Thomas B. Fordham Institute.

Ünal, Z. E., Greene, N. R., Lin, X., & Geary, D. C. (2023). What is the source of the correlation between reading and mathematics achievement? Two meta-analytic studies. *Educational Psychology Review*, *35*(1), 4.

U.S. Census Bureau. (2016). *Age and sex composition in the united states: 2016* [Data set].

U.S. Census Bureau. (2017a, May 10). *Voting and registration in the election of November 2016* [Press release]. https://www.census.gov/data/tables/time-series/demo/voting-and-registration/p20-580.html

U.S. Census Bureau. (2017b, May 10). *Voting rates by age* [Infographic]. https://www.census.gov/library/visualizations/2017/comm/voting-rates-age.html

U.S. Census Bureau. (2023). *Voting and registration in the election of November 2022* [Data set].

U.S. Department of Education. (2016, February 5). *Elementary and secondary education act of 1965*. https://www2.ed.gov/documents/essa-act-of-1965.pdf

U.S. Department of Education, Office for Civil Rights. (2023). *A first look: Students' access to educational opportunities in U.S. public schools.* https://www2.ed.gov/about/offices/list/ocr/docs/crdc-educational-opportunities-report.pdf

U.S. Elections Project. (n.d.). *National general election VEP turnout rates, 1789-Present* [Data set].

U.S. Government Accountability Office. (2015). *Most eighth grade students are not proficient in geography* (GAO-16-7).

U.S. Government Accountability Office. (2018). *Public high schools with more students in poverty and smaller schools provide fewer academic offerings to prepare for college* (GAO-19-8).

Useem, E. L. (1992). Middle schools and math groups: Parents' involvement in children's placement. *Sociology of education, 65*(4), 263–279.

Vinnakota, R. (2019). *From civic education to a civic learning ecosystem: A landscape analysis and case for collaboration*. Red & Blue Work.

Vote.org. (n.d.). *Voter registration rules*. https://www.vote.org/voter-registration-rules/

Walstad, W. B. (2001). Economics education in U.S. high schools. *Journal of Economic Perspectives, 15*(3), 195–210.

Walstad, W. B., & Rebeck, K. (2012). Economics course enrollments in U.S. high schools. *The Journal of Economic Education, 43*(3), 339–347.

Weinschenk, A. C., & Dawes, C. T. (2022). Civic education in high school and voter turnout in adulthood. *British Journal of Political Science, 52(2)*, 934–948.

Westheimer, J., & Kahne, J. (2004). What kind of citizen? The politics of educating for democracy. *American Educational Research Journal, 41*(2), 237–269.

What Works Clearinghouse. (2015). *Baseline equivalence brief*. https://ies.ed.gov/ncee/wwc/Docs/referenceresources/wwc_brief_baseline_080715.pdf

Wilson, J. J., Sadler, J., Cohen-Vogel, N., & Willis, C. (2019). An examination of changes to state civic education requirements, 2004–2016. *Peabody Journal of Education, 94*(1), 48–62.

Winograd, M., Hais, M., & Ross, D. (2023, February 27). How younger voters will impact elections: Younger voters are poised to upend American politics. *Brookings Brown Center Chalkboard*. https://www.brookings.edu/articles/younger-voters-are-poised-to-upend-american-politics/

Winthrop, R. (2020, June 4). *The need for civic education in 21st-century schools.* Brookings Institution. https://www.brookings.edu/policy2020/bigideas/the-need-for-civic-education-in-21st-century-schools/

Wrabel, S. L., Wenger, J. W., Diliberti, M. K., Doss, C. J. & Kramer, J. W. (2024). *Understanding the impact of department of defense youth programs on bridging the civilian-military divide* (RR-A2697-1). RAND.

Zadrozny, J. (2017). *Social studies and geography survey for middle and high schools*. The Gilbert M. Grosvenor Center for Geographic Education.

Zadrozny, J. (2020). *Social studies and geography survey for middle and high schools*. The Gilbert M. Grosvenor Center for Geographic Education.

Appendix A. Landscape of social studies coursetaking

In this Appendix, I present results from additional descriptive analyses I conducted to document the national landscape of social studies coursetaking. These analyses are intended to supplement what is already known about social studies coursetaking from existing literature. Many of the data points and patterns I discuss in this section are readily available for math and science, but not for social studies. Therefore, I include these data points here in this Appendix to fill in this data gap and so these data points become available for others to reference in their own research.

To generate these national estimates, I use data from the High School Longitudinal Study of 2009 (HSLS:2009). I focus first on *course access*, or whether students' home high schools offered specific social studies courses. I determine course access using schools' course catalogs, which schools typically provided during the 2011–2012 school year. I first present student-level estimates to examine what share of students nationally had access to specific courses at their high school. I then present school-level estimates to examine how many and what types of high schools offer specific social studies courses.

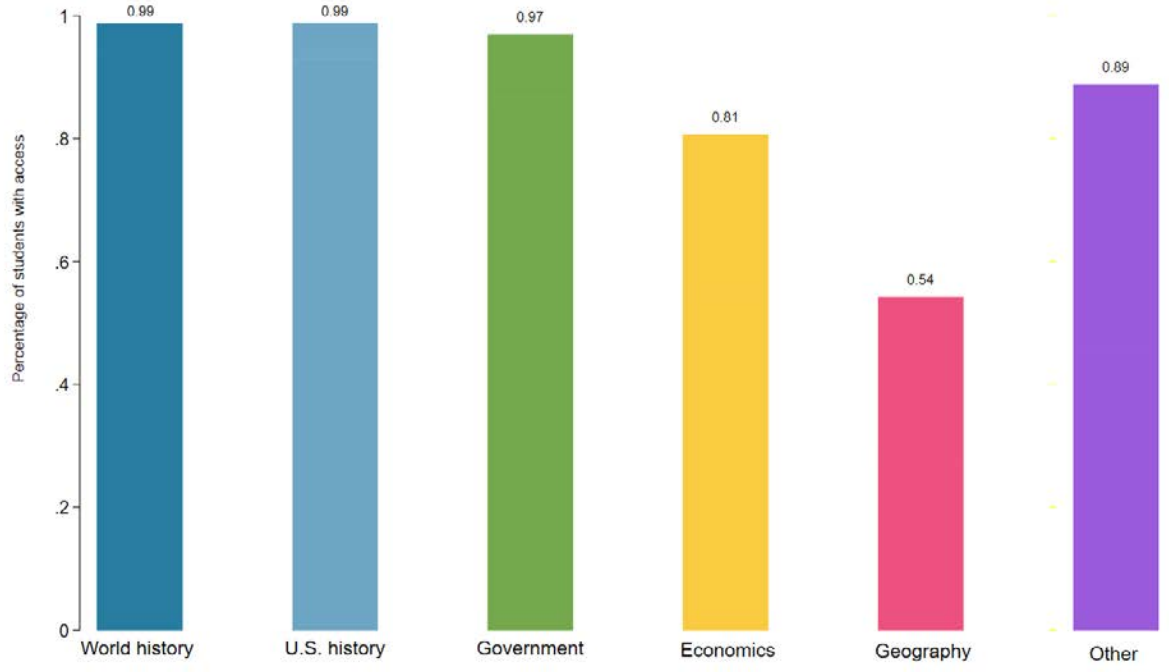
I then present data on social studies *course enrollments*, or whether students actually took specific social studies courses while they were in high school. I determine course enrollments using students' high school transcripts which were collected after students graduated high school in the spring of 2013. I present national enrollment rates in specific types of social studies courses (including AP courses), by grade, and by student subgroup (sex, race/ethnicity, family socioeconomic status).

These analyses are not intended to be exhaustive, only to provide additional context to understand some of the patterns discussed elsewhere in this dissertation.

Social studies course access

Perhaps the most obvious factor that predicts students' social studies course enrollments is their access to specific social studies courses. Presumably students' likelihood of enrolling in a social studies course is higher if their school offers that course. Figure A.1 displays how many students nationally have access to courses across social studies disciplines. As shown in Figure A.1, students' access to history courses and government courses at their high school is essentially universal: 97 percent of students or more had access to history and government courses at their home high school. Students' access to economics courses and courses in the "other" social studies disciplines is high too, though not universal: about eight in ten students nationally have access to these courses at their high school. Geography courses are perhaps the anomaly. Only about half of students nationally have access to a geography course at their high school.

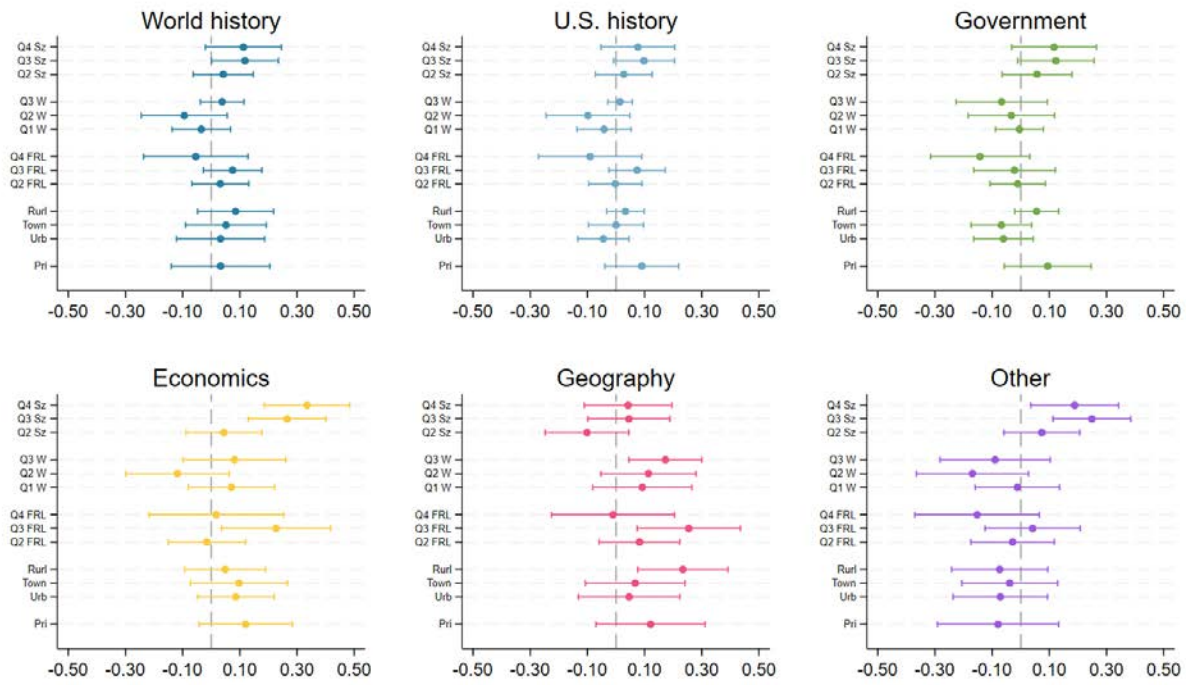
Figure A.1 Students' access to social studies courses, by discipline



NOTES: N = 14,890. Includes only students with complete transcript and who graduated on-time. Excludes students in schools that did not provide course catalogs since course access for these students cannot be determined.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Importantly, however, some types of high schools are more likely to offer a diverse array of social studies courses than others. Figure A.2 plots the difference in schools' likelihood of offering at least one social studies course in a discipline by school demographics. A positive value means that a high school of that type is more likely to offer a course while a negative value indicates that a high school of that type is less likely to do so. As shown in the top row of Figure A.2, all types of high schools are roughly equally likely to offer history and government courses. This is unsurprising since these are essentially universal offerings in U.S. high schools. However, there is one notable difference in the types of high schools that tend to offer additional social studies courses: the high schools with the largest enrollment sizes (i.e., those that serve more than 1,500 students, shown as Q4 in Figure A.2) were more likely than their smallest counterparts to offer at least one economics course and at least one course in an "other" social studies discipline. Overall, however, there are not substantively large differences in schools' social studies course offerings across different types of high schools—at least not for courses offered at any level.

Figure A.2 Schools' likelihood of offering various social studies courses, by school demographic characteristics



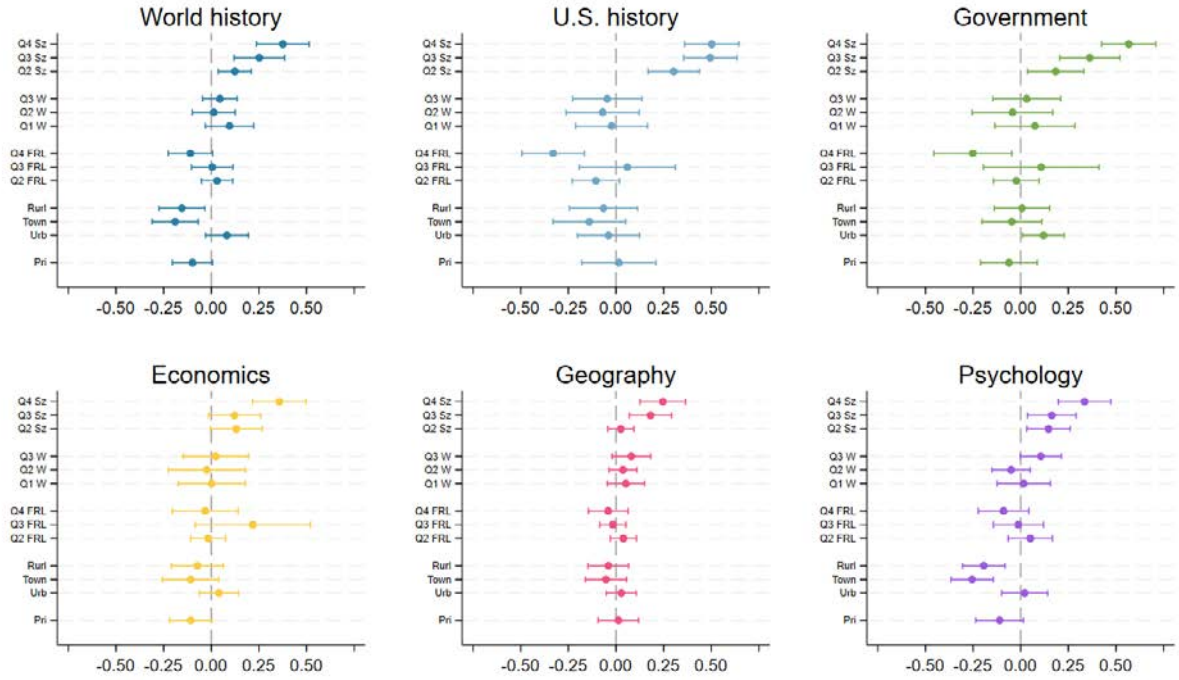
NOTES: N = 880. Includes only those schools that provided course catalogs and for which school demographic information is available. Figure plots coefficients from a linear regression model regressing a binary indicator of course offering on an array of school demographic variables (i.e., control, locale, share of students who are eligible for free or reduced-price lunch, share of students who are white, and school enrollment size).
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Zooming in to focus only on Advanced Placement (AP) course offerings, the story looks very different. The largest high schools (i.e., those serving 1,500 students or more) are significantly more likely to offer a wide array of AP social studies courses. These high schools are more likely to offer AP world history courses, AP U.S. history courses, AP government courses, AP economics courses, AP geography courses, and AP psychology courses. The highest poverty schools (i.e., those who serve student populations where at least 75 percent are eligible for free or reduced-price meals) are significantly less likely to offer AP history courses (both world and U.S.) and AP government courses. Even after controlling for enrollment size, high schools located in towns and rural areas are also less likely to offer AP world history courses and AP psychology courses.

Overall, these findings that larger schools and those with better resources are more likely to offer a diversity of social studies courses—especially those at the AP level—broadly align with findings from other studies (e.g., Barker, 1985; Leung, 2021) and findings from a recent analysis conducted by the U.S. Government Accountability Office (GAO). This GAO analysis identified the same patterns of lesser course offerings in math and science in smaller schools and in higher-poverty schools (GAO, 2018).

The net result of these differential course offerings across school types is likely that some student subgroups have much greater access to a diverse selection of course offerings, including those at the AP level. This is consistent with prior work, which has consistently identified significant access gaps to AP courses by student race and income (e.g., Chatterji et al., 2021; Conger et al., 2009; Klopfenstein, 2004; Theokas & Saaris, 2013).

Figure A.3 Schools' likelihood of offering various AP social studies courses, by school demographic characteristics

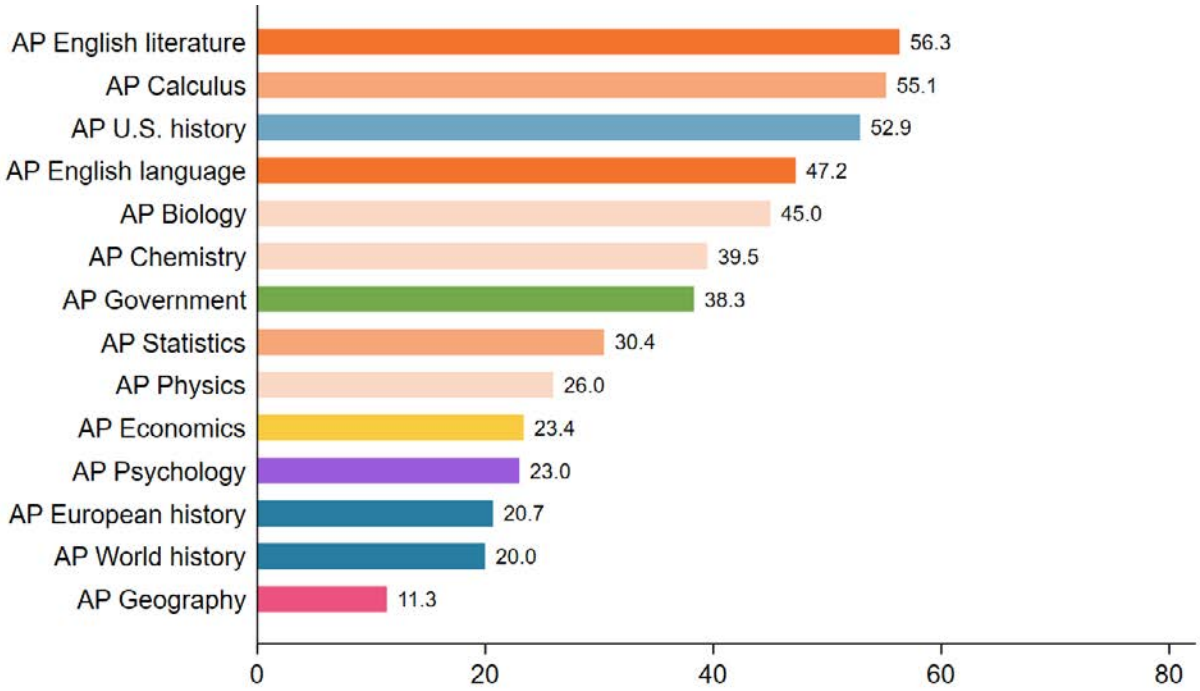


NOTES: N = 880. Includes only those schools that provided course catalogs and for which school demographic information is available. Figure plots coefficients from a linear regression model regressing a binary indicator of AP course offering on an array of school demographic variables (i.e., control, locale, share of students who are eligible for free or reduced-price lunch, share of students who are white, and school enrollment size).
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

To provide a reference point, Figure A.4 presents the share of U.S. high schools who offer various AP courses in both social studies and in other academic subject areas. As shown in Figure A.4, AP U.S. history is the AP social studies course most commonly offered in U.S. high schools. About half of U.S. high schools offer this course to their students, and this is roughly on par with the percentage of high schools that offer AP English literature, AP English language, and AP calculus—the most common AP courses taken in ELA and math. Meanwhile, about four in ten U.S. high schools offer an AP government course. Other AP social studies course offerings are among the rarest of those in the core academic subjects. For example, only one in ten U.S. high schools offers AP geography and only two in ten offer AP world history. However, this

could be, at least in part, because schools make a choice to offer either AP world history or AP European history, but not both.

Figure A.4 Percentage of U.S. high schools that offer various AP courses in social studies versus in other core academic subjects



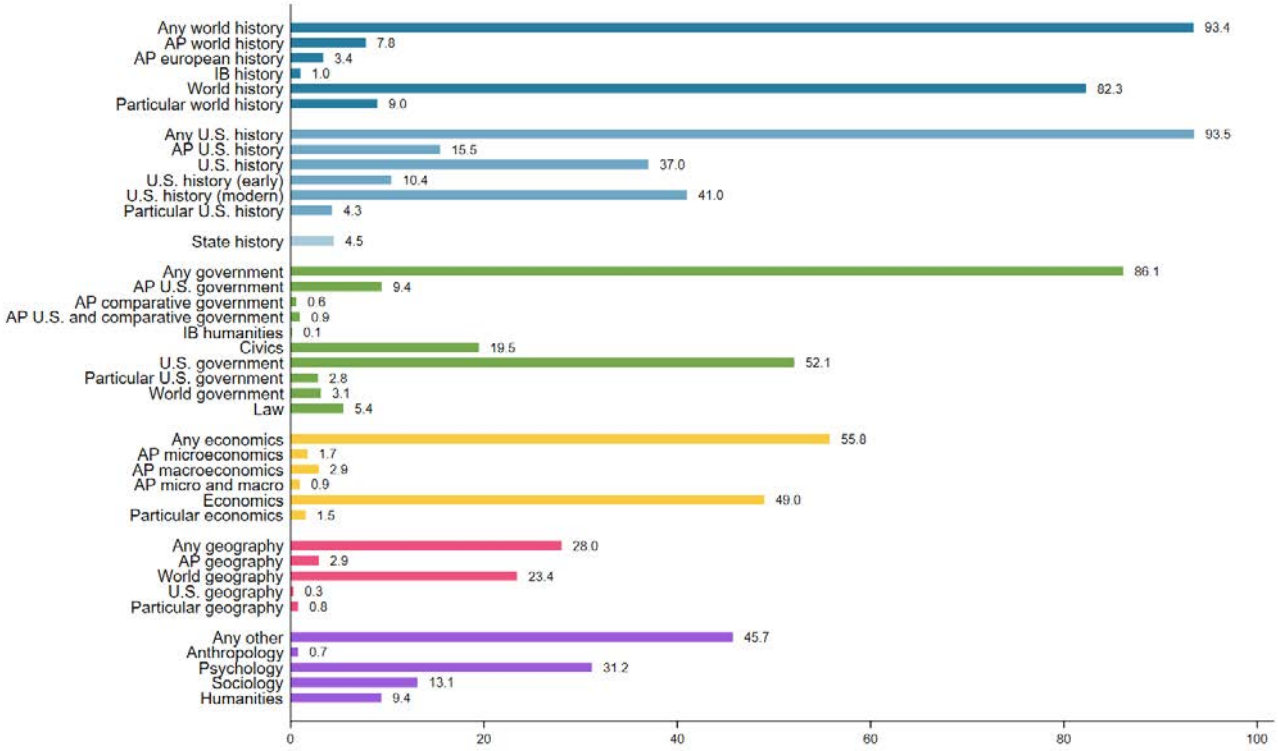
NOTES: N = 890. Includes only those schools that provided course catalogs.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Social studies course enrollments

As shown in Figure 1.2, prior research tells us that enrollment rates across social studies disciplines differs. But even within social studies disciplines, the specific courses that students take differ, as shown in Figure A.5. For example, about 94 percent of students nationally take a U.S. history course. But the content focus of these U.S. history courses can differ. About four in ten students nationally take a "comprehensive" U.S. history course, meaning one that includes both early and modern U.S. history. Another four in ten students take "modern" U.S. history courses, meaning ones that pick up after the Civil War. In contrast, a small minority of students (about one in ten) take U.S. history courses focused on "early" American history only. Furthermore, simply because two courses are both categorized as "early U.S. history" does not mean the instruction in them was equivalent. Social studies teachers experience a particularly high degree of autonomy over their instruction (e.g., Diliberti et al., 2023) and, therefore, content coverage may differ wildly even within two social studies courses that are similarly categorized. In sum, while collapsing students' coursetaking into disciplines is useful to facilitate analyses, it

is important to keep in mind that this categorization is an oversimplification of the complexity of students' coursetaking.

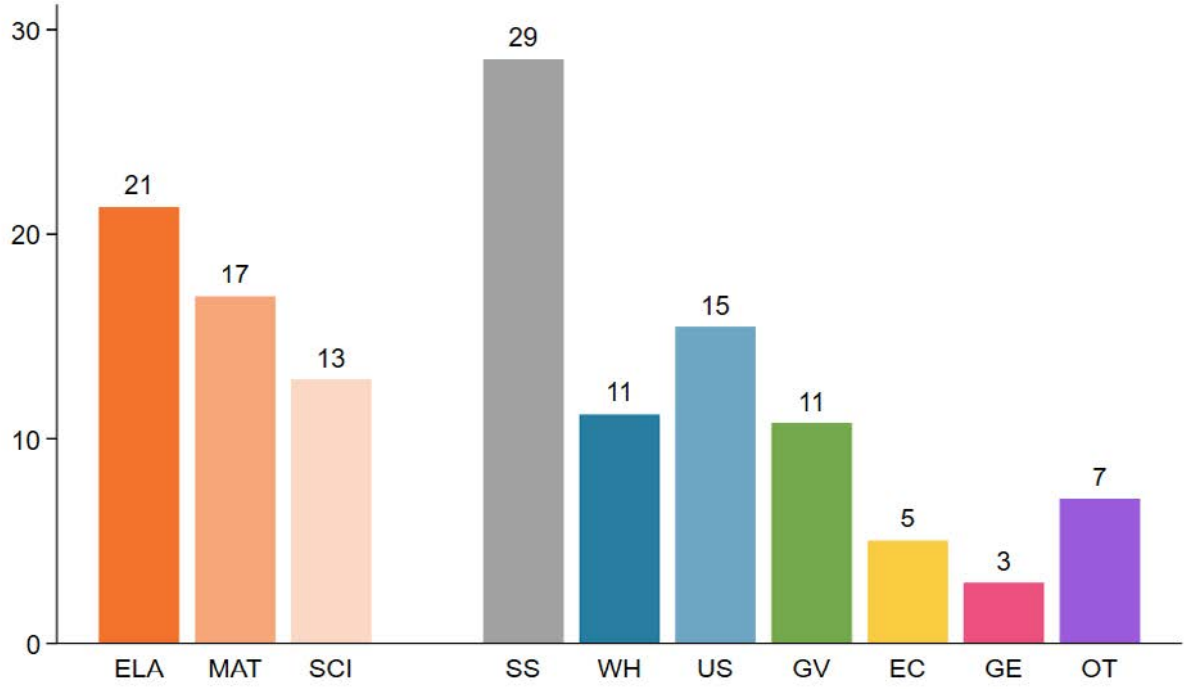
Figure A.5 Percentage of students who ever enrolled in specific social studies courses, by discipline



NOTES: N = 17,480. Includes only students with complete transcript and who graduated on-time
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Figure A.6 focuses solely on student enrollment in AP social studies courses. As shown in Figure A.6, about 29 percent of 2013 high school graduates enrolled in at least one AP social studies course. In comparison, 17 percent enrolled in an AP mathematics course, 13 enrolled in an AP science course, and 21 enrolled in an AP course in English language arts (ELA). Nevertheless, not all AP social studies courses are equally popular. Of the AP social studies courses, enrollment rates are highest in AP U.S. history courses, although enrollment rates in AP world history and AP government courses are not far behind.

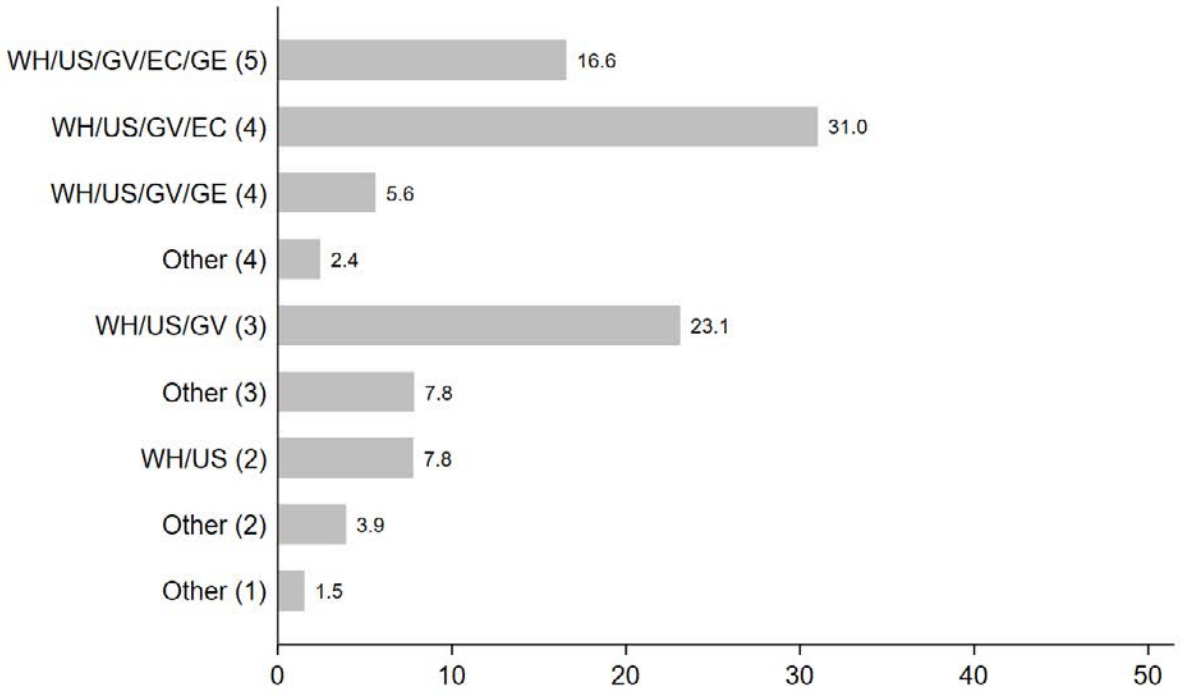
Figure A.6 Percentage of students who ever enrolled in AP courses, by subject and discipline



NOTES: N = 17,480. Includes a small number of students enrolled in International Baccalaureate (IB) courses.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009). Any English language arts = ELA, Any mathematics = MAT, Any science = SCI, Any social studies = SS, World history = WH, U.S. history = US, Government = GV, Economics = EC, Geography = GE, Other = OT

Of course, as mentioned above, students do not only take one social studies course while they are in high school—they take multiple courses spanning different disciplines. Figure A.7 captures the most common combinations of social studies courses that students nationally take while they are in high school. A plurality of students take courses that span four different disciplines. The most common combination of social studies courses taken nationally is world history, U.S. history, government, and economics. Only a small share of students (about one-sixth) take a geography course in addition. Meanwhile, about a quarter of students nationally take only history and government courses while in high school. Figure A.7 illustrates that there is no single combination of courses that all students take while in high school.

Figure A.7 Percentage of students who ever enrolled in various social studies course combinations

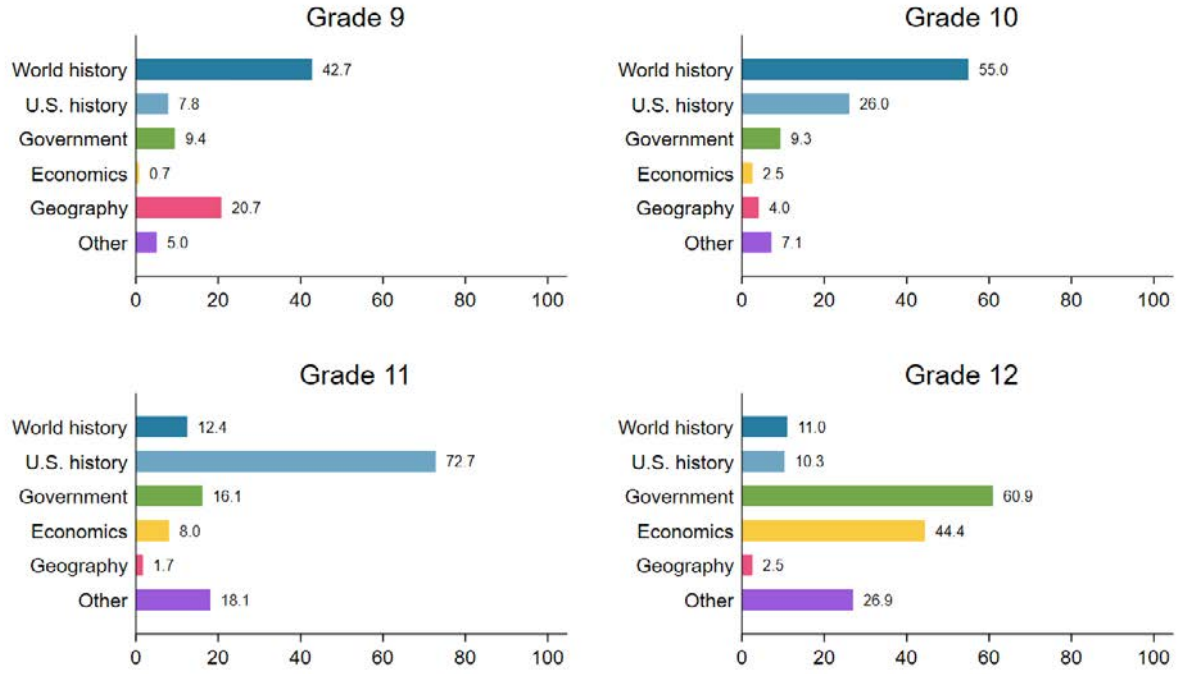


NOTES: N = 17,480. Includes only students with complete transcript and who graduated on-time. Does not include social studies courses taken in "other" social studies disciplines. Total number of courses taken shown in parentheses. World history = WH, U.S. history = US, Government = GV, Economics = EC, Geography = GE, Other = OT

SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Just as there is no one combination of social studies courses that students take while in high school, there is no single order or pathway that students progress through their social studies courses. As shown in Figure A.8, enrollment rates in social studies courses vary by discipline and grade. Some social studies courses are more common in some grades than others. For example, about three-quarters of 11th graders nationally enroll in U.S. history courses. And about six in ten 12th graders enroll in government courses. In the rare cases where students take a geography course, they tend to take it in grade 9. Courses in world history also tend to be taken earlier in students' high school careers, while courses in the "other" social studies disciplines tend to be taken later. Despite some commonalities, however, these are by no means universal rules, as shown in Figure A.8. Grade 10 is perhaps the grade in which there is the greatest diversity in which courses students are enrolled in. In grade 10, a slight majority of students (about 55 percent) enroll in world history courses. But a quarter enroll in U.S. history courses and one in ten enroll in government courses.

Figure A.8 Percentage of students who enrolled in social studies courses, by discipline and grade

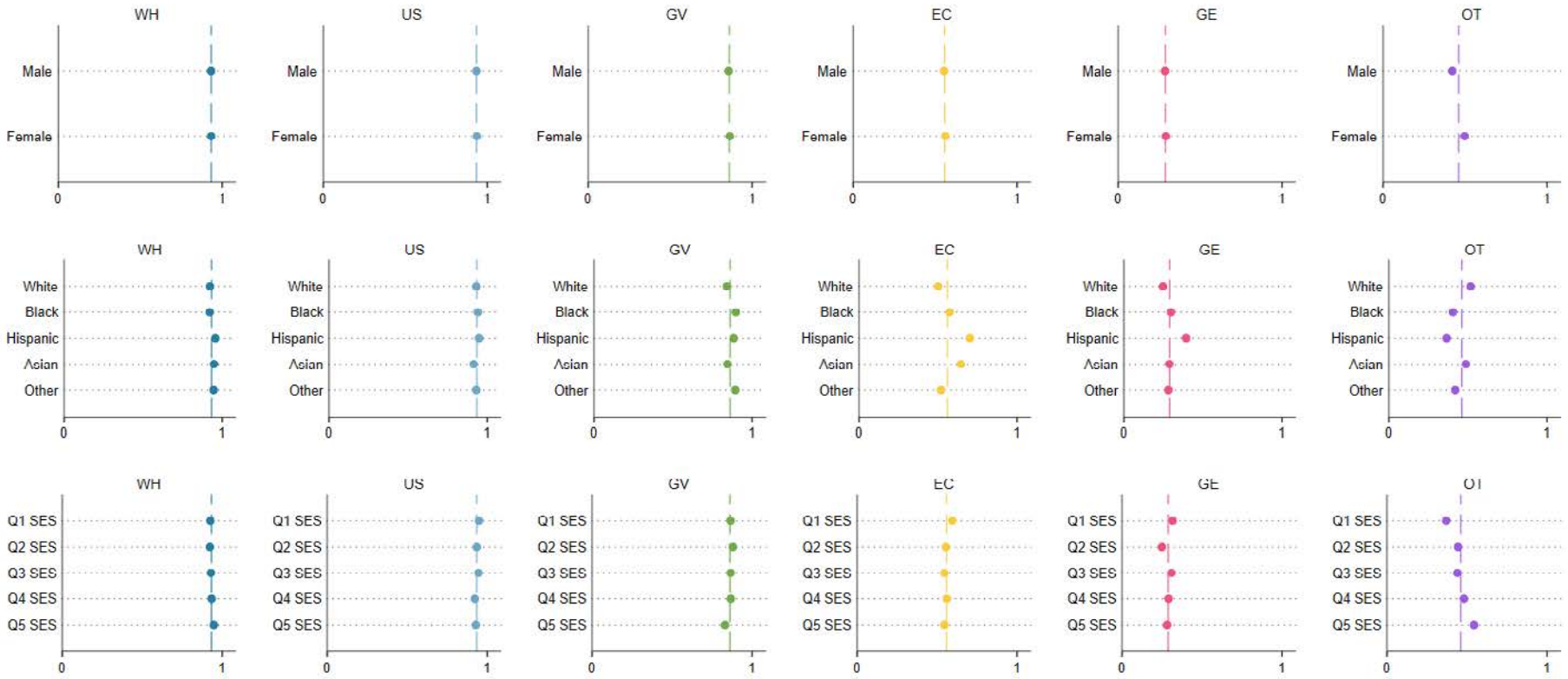


NOTES: N = 17,480. Includes only students with complete transcript and who graduated on-time.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Finally, I examine to what extent social studies course enrollments vary by student subgroup (sex, race/ethnicity, and family socioeconomic status). Looking at Figure A.9 (which shows courses at any level) there is roughly parity across student subgroups in history course enrollments. In non-history courses, however, there are some notable differences in course enrollments by student race/ethnicity. For example, Hispanic students are especially likely to enroll in economics and geography courses and are especially unlikely to enroll in "other" social studies courses like psychology and sociology. Asian students are also somewhat more likely to enroll in economics courses. White students are perhaps slightly less likely to enroll in economics and geography courses but more likely to enroll in courses in the "other" social studies disciplines.

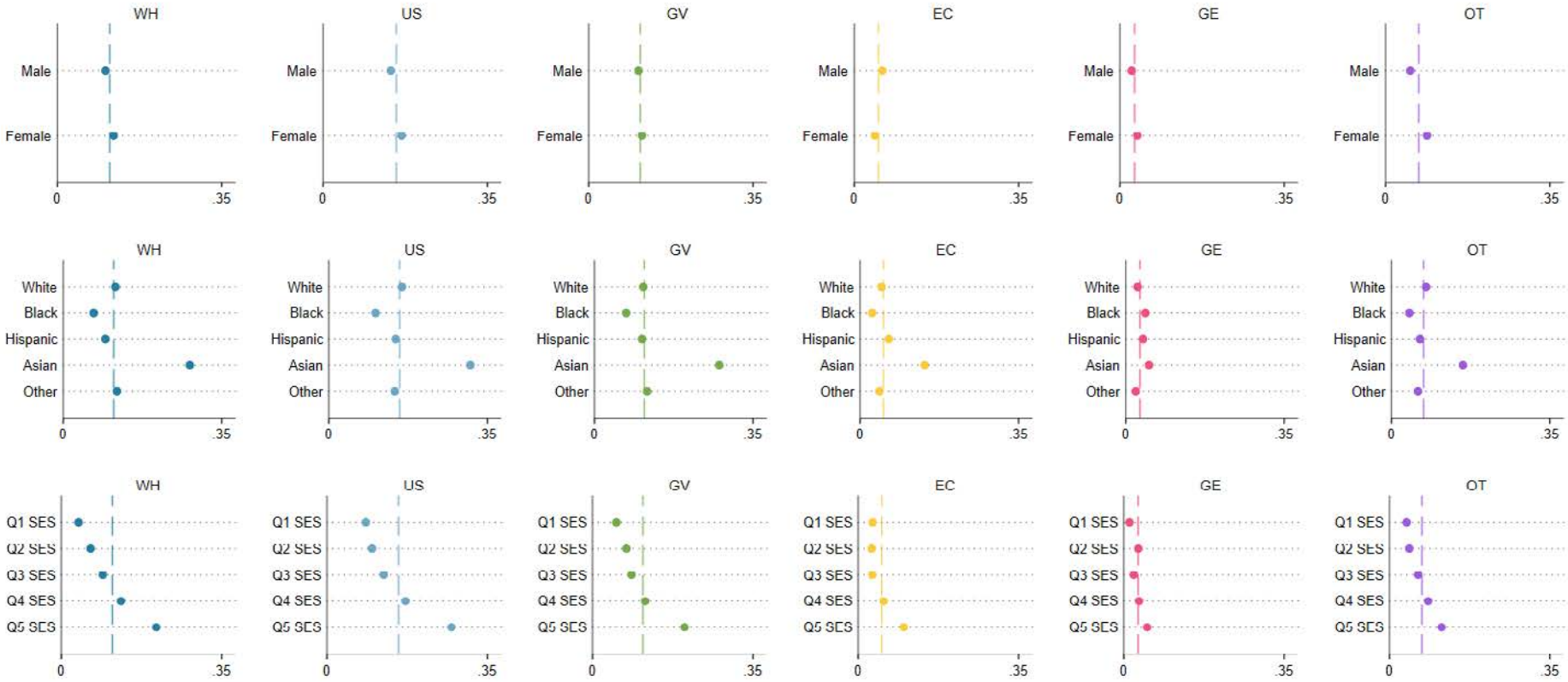
A slightly different story emerges when examining enrollments in the most rigorous courses (see Figure A.10). Asian students are especially likely to enroll in AP social studies courses, while Black students are especially unlikely to do so. Furthermore, there are large differences in AP course enrollments by family socioeconomic status. Although this is true across all social studies disciplines, enrollment disparities are largest for AP world history, AP U.S. history, and AP government courses. Meanwhile, female students were slightly overrepresented in AP U.S. history courses, but slightly underrepresented in AP economics courses, although these gaps were small compared to the gaps observed by race/ethnicity and family socioeconomic status.

Figure A.9 Percentage of students who ever enrolled in social studies courses, by discipline and student subgroup



NOTES: N = 17,480. Includes only students with complete transcript and who graduated on-time. Dashed vertical lines represent national averages. World history = WH, U.S. history = US, Government = GV, Economics = EC, Geography = GE, Other = OT
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Figure A.10 Percentage of students who ever enrolled in AP social studies courses, by discipline and student subgroup



NOTES: N = 17,480. Includes only students with complete transcript and who graduated on-time. Dashed vertical lines represent national averages. Includes a small number of students enrolled in IB courses. World history = WH, U.S. history = US, Government = GV, Economics = EC, Geography = GE, Other = OT
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Appendix B. Do states chart the course?

Table B.1 States' minimum graduation requirements in social studies for class of 2013, by state

State	Local require-ments only	Number of credits required		Discipline-specific credit requirements						
				Credits by discipline						
				Number of credits specified	History			Government	Economics	Geography
		Total	Social studies		World	U.S.	State			
AK	No	21	3	0.5	No	No	0.5	No	No	No
AL	No	24	4	4	1	2	No	0.5	0.5	No
AR	No	22	3	3	1	1	No	0.5	0.5	No
AZ	No	22	3	3	1	1	No	0.5	0.5	No
CA	No	13	3	3	1	1	No	0.5	0.5	No
CO	Yes	0.5	0.5	0.5	---	---	---	0.5	---	---
CT	No	20	3	0.5	No	No	No	0.5	No	No
DC	No	24	4	4	2	1	0.5	0.5	No	No
DE	No	22	3	0	No	No	No	No	No	No
FL	No	24	3	3	1	1	No	0.5	0.5	No
GA	No	23	3	3	1	1	No	0.5	0.5	No
HI	No	24	4	1	No	No	0.5	0.5	No	No
IA	No	14	3	1.5	No	1	No	0.5	No	No
ID	No	23	2.5	2.5	No	1	No	1	0.5	No
IL	No	16.75	2	1	No	1	No	No	No	No
IN	No	20	3	3	1	1	No	0.5	0.5	No
KS	No	21	3	0	No	No	No	No	No	No
KY	No	22	3	0	No	No	No	No	No	No
LA	No	24	3	1.5	No	1	No	0.5	No	No
MA	Yes	---	---	---	---	---	---	---	---	---
MD	No	21	3	3	1	1	No	1	No	No
ME	No	11	2	1	No	1	No	No	No	No
MI	No	16	3	3	1	1	No	0.5	0.5	No
MN	No	21.5	3.5	3.5	1	1	No	0.5	0.5	0.5
MO	No	24	3	1.5	No	1	No	0.5	No	No
MS	No	24	4	4	1	1	0.5	0.5	0.5	0.5
MT	No	20	2	0	No	No	No	No	No	No
NC	No	21	3	3	1	1	No	0.5	0.5	No
ND	No	22	3	1.5	No	1	No	0.5	No	No

NE[1]	Yes	---	---	---	---	---	---	---	---	---
NH	No	20	2.5	2	No	1	No	0.5	0.5	No
NJ	No	24	3	2	1	1	No	No	No	No
NM	No	24	3.5	3.5	1	1	0.5	0.5	0.5	No
NV	No	22.5	2	2	No	1	No	1	No	No
NY	No	22	4	4	2	1	No	0.5	0.5	No
OH	No	20	3	1	No	0.5	No	0.5	No	No
OK	No	23	3	2	No	1	0.5	0.5	No	No
OR	No	24	3	0	No	No	No	No	No	No
PA	Yes	---	---	---	---	---	---	---	---	---
RI	No	20	3	0	No	No	No	No	No	No
SC	No	24	3	2	No	1	No	0.5	0.5	No
SD	No	22	3	2.5	0.5	1	No	0.5	No	0.5
TN	No	22	3	3	1	1	No	0.5	0.5	No
TX	No	26	4	4	1	1	No	0.5	0.5	1
UT	No	24	3	2.5	0.5	1	No	0.5	No	0.5
VA	No	22	3	2	No	1	No	1	No	No
VT	No	20	3	0	No	No	No	No	No	No
WA	No	20	2.5	2.5	1	1	0.5	No	No	No
WI	No	12.5	3	0	No	No	No	No	No	No
WV	No	24	4	3	1	1	No	1	No	No
WY	No	13	3	0	No	No	No	No	No	No

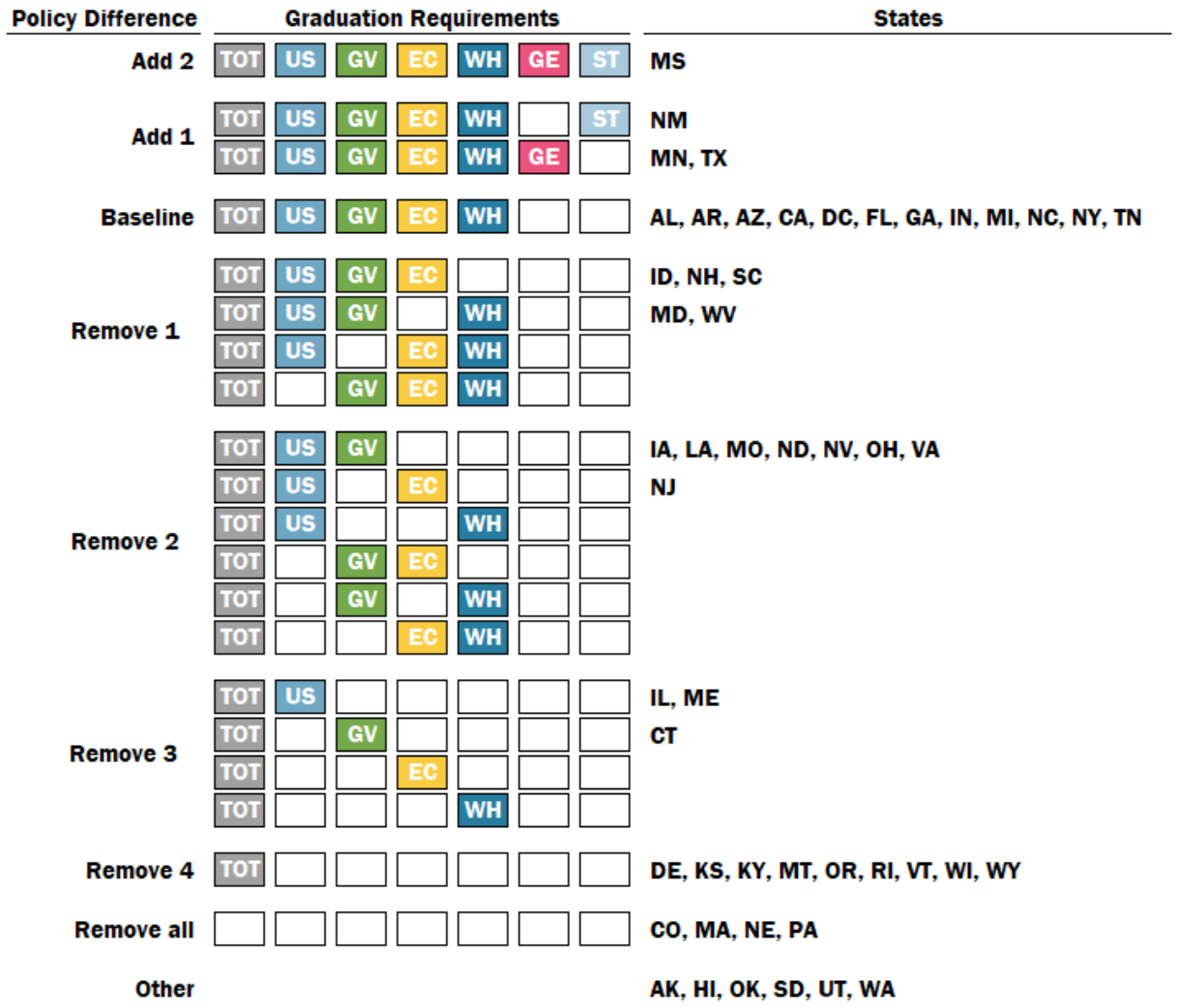
[1] Unlike other states, Nebraska does not define graduation requirements based on credits, but instead based on the number of hours of instruction.
SOURCES: Data on state requirements for the class of 2013 are from various sources (i.e., Achieve, 2015a; Chattin & Hackmann, 2013; Godsay et al., 2012; Dounay, 2006; Education Commission of the States, 2007; McClure & Zadrozny, 2015; NCES, 2010, 2011, 2012, 2014, 2018; Zadrozny, 2017) and state department of education websites.

Table B.2 Distribution of students across states' social studies graduation requirements

	Percentage of students nationally subject to the state graduation requirement		
	Analytic sample		National population of students
Social studies graduation requirement	Unweighted N = 13,450	Weighted N = 13,450	N = 55,440,300
Locally defined requirements only (no state)	10.1	10.2	7.9
Number of social studies credits required			
0–0.5 credits	10.1	10.2	7.9
2–2.5 credits	9.4	6.9	8.8
3–3.5 credits	66.7	64.9	64.1
4 credits	13.9	18.0	19.2
Discipline-specific requirements			
History			
U.S. history	82.1	79.4	83.8
State history	6.2	4.1	5.9
World history	61.2	61.4	63.9
Government	73.4	75.6	77.4
Economics	54.2	57.2	57.4
Geography	9.2	11.7	14.0

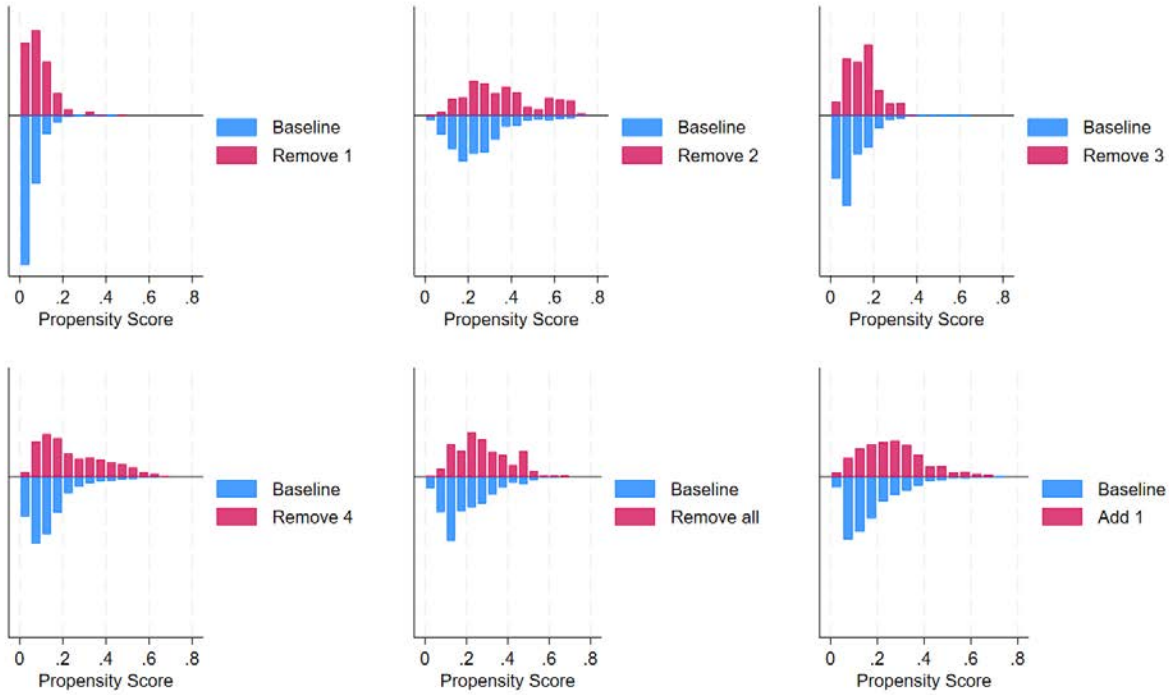
NOTES: Includes only students with complete transcript and demographic data who graduated on-time and who remained in the same state and school for the entirety of their high school career.
SOURCES: Analytic sample data are from the High School Longitudinal Study of 2009 (HSLS:2009). Data for the national population of students fall 2013 enrollment counts obtained from the *Digest of Education Statistics*, tables 203.25, 203.30, and 205.80.

Figure B.1 Hypothesized list of state policy conditions and identification of states in each policy condition



SOURCES: Data on state requirements for the class of 2013 are from various sources (e.g., Achieve, 2015a; Chattin & Hackmann, 2013; Godsay et al., 2012; Dounay, 2006; Education Commission of the States, 2007; McClure & Zadrozny, 2015; NCES, 2010, 2011, 2012, 2014, 2018; Zadrozny, 2017) and state department of education websites.

Figure B.2 Area of common support during estimation of propensity scores



NOTES: N = 11,170. Displayed predicted propensity scores estimated from logistic regression models, where the outcome is a dummy indicator of treatment (assignment to a particular policy condition) and the predictors are vectors of student- and school-level covariates.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Table B.3 Sample demographics, by policy condition before weighting

	Remove 1		Remove 2		Remove 3		Remove 4		Remove all		Add 1	
Characteristic	SMD	Sig?	SMD	Sig?	SMD	Sig?	SMD	Sig?	SMD	Sig?	SMD	Sig?
Female	0.04		0.01		0.06		0.01		0.03		-0.02	
White	0.37	***	0.10	***	-0.16	***	0.34	***	0.14	***	-0.27	***
Black	-0.07		0.09	**	0.04		-0.21	***	-0.09	**	-0.05	
Hispanic	-0.29	***	-0.23	***	0.23	***	-0.18	***	-0.05		0.32	***
Asian	-0.15	**	0.03		0.08		-0.12	***	-0.04		0.18	***
Other	-0.07		-0.02		-0.14	***	-0.05		-0.05		-0.09	**
Q1 SES	-0.12	*	-0.12	***	0.01		-0.11	***	-0.09	**	0.00	
Q2 SES	-0.11	*	-0.06	*	-0.05		-0.02		-0.07	*	-0.09	**
Q3 SES	-0.03		-0.07	**	0.00		-0.01		-0.02		0.02	
Q4 SES	0.10		0.01		0.02		0.03		0.05		0.02	
Q5 SES	0.13		0.19	***	0.02		0.09	*	0.10	**	0.04	
Achievement	0.07		0.06	*	-0.04		-0.13	***	0.06	*	0.12	***
Private	0.23	**	0.50	***	0.07		0.44	***	0.12	***	0.15	***
City	0.12		-0.01		0.06		0.17	***	-0.18	***	0.18	***
Suburb	-0.17	**	0.01		0.09	*	-0.18	***	0.17	***	-0.34	***
Town	0.32	***	0.00		0.07		0.45	***	0.07	*	0.15	***
Rural	-0.17	**	0.00		-0.21	***	-0.32	***	-0.06	*	0.07	*
Q1 FRPL	0.07		0.38	***	0.28	***	0.26	***	0.33	***	-0.13	***
Q2 FRPL	-0.04		-0.11	***	-0.20	***	-0.06		-0.23	***	0.03	
Q3 FRPL	-0.16	**	-0.32	***	-0.32	***	-0.19	***	-0.19	***	-0.03	
Q4 FRPL	0.24	**	-0.10	***	0.39	***	-0.17	***	0.06		0.28	***
0–499	0.20	**	0.54	***	0.33	***	0.42	***	0.36	***	0.45	***
500–599	-0.30	***	-0.05	*	-0.25	***	0.15	***	0.08	**	-0.04	
1000–1499	0.41	***	-0.01		-0.26	***	-0.19	***	0.06		-0.30	***
1500+	-0.23	***	-0.39	***	0.18	***	-0.28	***	-0.39	***	-0.06	
N	5,230		6,900		5,550		5,860		6,320		6,160	

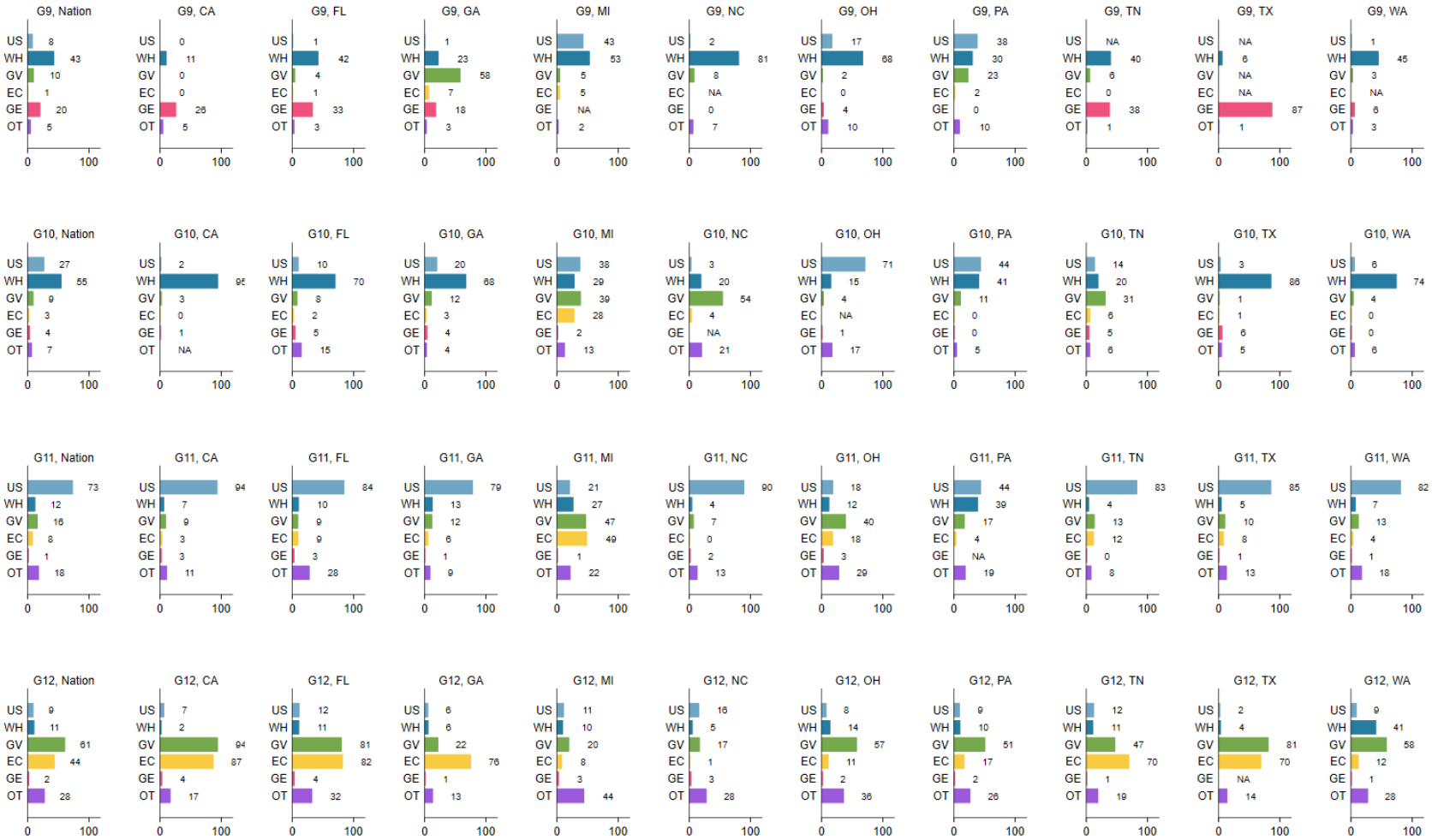
NOTES: SMD = standardized mean difference (difference in means between students in the policy condition and students in the baseline condition divided by the standard deviation). * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Significance testing is from a simple linear regression model regressing the covariate on a dummy indicator for the state policy condition. Includes only students with complete transcript and demographic data who graduated from high school on-time and remained in the same state and school for the entirety of their high school career.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Table B.4 Interclass correlations from unconditional multilevel linear regression models

	Students nested in states	Students nested in schools	Students nested in schools in states	
Outcome	State	School	State	School | State
World history				
Any level	0.26	0.58	0.11	0.58
AP/IB	0.03	0.26	0.02	0.26
U.S. history				
Any level	0.09	0.58	0.06	0.57
AP/IB	0.03	0.18	0.02	0.18
State history	0.77	0.80	0.74	0.91
Government				
Any level	0.25	0.67	0.21	0.68
AP/IB	0.03	0.24	0.02	0.24
Economics				
Any level	0.39	0.76	0.36	0.74
AP/IB	0.03	0.22	0.02	0.22
Geography				
Any level	0.33	0.71	0.28	0.70
AP/IB	0.03	0.28	0.03	0.27
Number social studies credits	0.13	0.40	0.09	0.40
Number AP social studies credits	0.05	0.28	0.03	0.28

NOTES: N = 13,450. Results are interclass correlations (ICCs) from unconditional multilevel linear regression models where the outcome is course enrollment. Includes only students with complete transcript and demographic data who graduated on-time and who remained in the same state and school for the entirety of their high school career.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Figure B.3 Enrollment rates in social studies courses, by discipline, grade, and HSLS:2009 oversampled state



NA = Not available because there were too few students in the cell to meet reporting thresholds.

NOTES: N = 13,450. Descriptive statistics are weighted using W3HSTRANS. Includes only students with complete transcript and demographic data who graduated on-time and who remained in the same state and school for the entirety of their high school career. U.S. history = US, World history = WH, Government = GV, Economics = EC, Geography = GE, Other = OT

SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Figure B.4 Enrollment rates in social studies courses, by discipline, course level, and HSLS:2009 oversampled state



NA = Not available because there were too few students in the cell to meet reporting thresholds.

NOTES: N = 13,450. Descriptive statistics are weighted using W3HSTRANS. Includes only students with complete transcript and demographic data who graduated on-time and who remained in the same state and school for the entirety of their high school career. Includes courses taken in any grade. Dashed line represents the national average.

SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

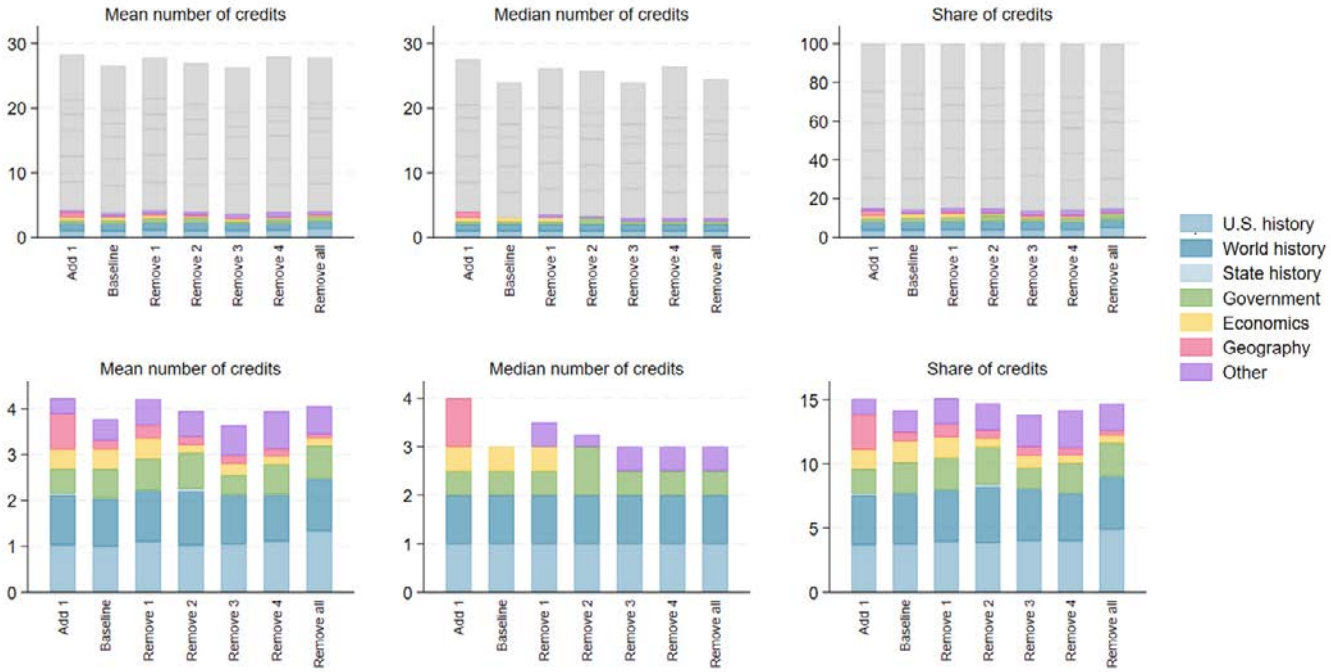
Table B.5 Social studies coursetaking treatment effects, by policy condition

	Remove					Add
	1 course	2 courses	3 courses	4 courses		1 course
	WH	WH, EC	WH, EC, GV	WH, EC, GV, US	All state	GE
Total number of credits earned						
All social studies	0.16	0.13	-0.12	0.11	0.06	0.42
	(0.31)	(0.13)	(0.21)	(0.15)	(0.24)	(0.13) **
AP/IB social studies	-0.11	-0.09	-0.02	-0.18	-0.13	0.00
	(0.13)	(0.06)	(0.08)	(0.11)	(0.08)	(0.08)
Ever enrollment						
World history (any level)	-0.24	-0.09	-0.18	-0.11	-0.05	0.05
	(0.16)	(0.05)	(0.10)	(0.05) *	(0.04)	(0.04)
World history (AP/IB)	0.03	-0.03	-0.04	-0.04	-0.04	0.06
	(0.03)	(0.02)	(0.02) **	(0.02)	(0.01) *	(0.04)
U.S. history (any level)	0.04	0.00	-0.04	0.02	-0.01	0.03
	(0.02) *	(0.04)	(0.01) ***	(0.03)	(0.02)	(0.02)
U.S. history (AP/IB)	-0.02	-0.01	0.01	-0.05	-0.05	0.01
	(0.04)	(0.03)	(0.02)	(0.03)	(0.03)	(0.03)
State history (any level)	-0.02	0.11	0.01	0.01	-0.01	0.22
	(0.02)	(0.10)	(0.02)	(0.04)	(0.02)	(0.20)
Government (any level)	-0.09	0.01	-0.09	-0.15	-0.13	0.02
	(0.07)	(0.02)	(0.03) ***	(0.07) *	(0.09)	(0.03)
Government (AP/IB)	-0.03	-0.02	0.03	-0.04	-0.03	0.01
	(0.03)	(0.03)	(0.02)	(0.03)	(0.02)	(0.03)
Economics (any level)	-0.07	-0.38	-0.36	-0.38	-0.43	0.10
	(0.11)	(0.08) ***	(0.08) ***	(0.09) ***	(0.07) ***	(0.08)
Economics (AP/IB)	-0.02	-0.02	0.01	-0.04	-0.01	0.05
	(0.04)	(0.01)	(0.01)	(0.01) **	(0.01)	(0.02) *
Geography (any level)	0.10	0.02	0.00	-0.02	0.11	0.50
	(0.04) *	(0.07)	(0.06)	(0.04)	(0.12)	(0.09) ***
Geography (AP/IB)	-0.02	-0.01	0.00	-0.02	-0.01	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
Other (any level)	0.07	0.05	0.14	0.22	0.09	0.05
	(0.12)	(0.07)	(0.06) *	(0.08) **	(0.05)	(0.10)
Other (AP/IB)	-0.06	-0.01	-0.03	-0.04	0.00	0.00
	(0.02) **	(0.02)	(0.03)	(0.03)	(0.02)	(0.04)
Share of total credits						
All social studies	0.19	0.31	-0.48	-0.17	0.19	1.18
	(0.91)	(0.44)	(0.66)	(0.49)	(0.48)	(0.52) *

World history	-0.90	-0.04	-0.35	-0.51	-0.26	0.03
	(0.90)	(0.37)	(0.41)	(0.20)	(0.23)	(0.25)
				**		
U.S. history	0.36	0.21	0.39	0.36	1.01	0.30
	(0.47)	(0.20)	(0.13)	(0.27)	(0.58)	(0.31)
			**			
State history	-0.09	0.19	-0.04	-0.04	-0.01	0.33
	(0.07)	(0.19)	(0.07)	(0.10)	(0.07)	(0.35)
Government	0.04	0.47	-0.71	-0.05	0.02	-0.44
	(0.48)	(0.26)	(0.23)	(0.23)	(0.29)	(0.17)
			**			*
Economics	-0.17	-0.73	-0.75	-0.84	-0.88	-0.03
	(0.31)	(0.18)	(0.15)	(0.18)	(0.16)	(0.17)
		***	***	***	***	
Geography	0.21	0.11	0.26	-0.12	0.12	1.46
	(0.19)	(0.27)	(0.41)	(0.14)	(0.26)	(0.47)
						**
Other	0.26	0.12	0.75	0.97	0.20	-0.21
	(0.38)	(0.33)	(0.52)	(0.53)	(0.21)	(0.34)
N	5,110	6,740	5,420	5,740	6,200	5,970

NOTES: Coefficients are from multilevel linear regression models regressing coursetaking on an indicator of the state policy condition and a variety controls. Regression models include inverse probability weights. Includes only students with complete transcript and demographic data who graduated on-time and who remained in the same state and school for the entirety of their high school career. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Figure B.5 Number and distribution of social studies credits earned, by policy condition



NOTES: N = 11,220. Includes courses taken at any level. Includes only students with complete transcript and demographic data who graduated on-time and who remained in the same state and school for the entirety of their high school career. Grey boxes represent coursetaking in other academic and nonacademic subjects.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

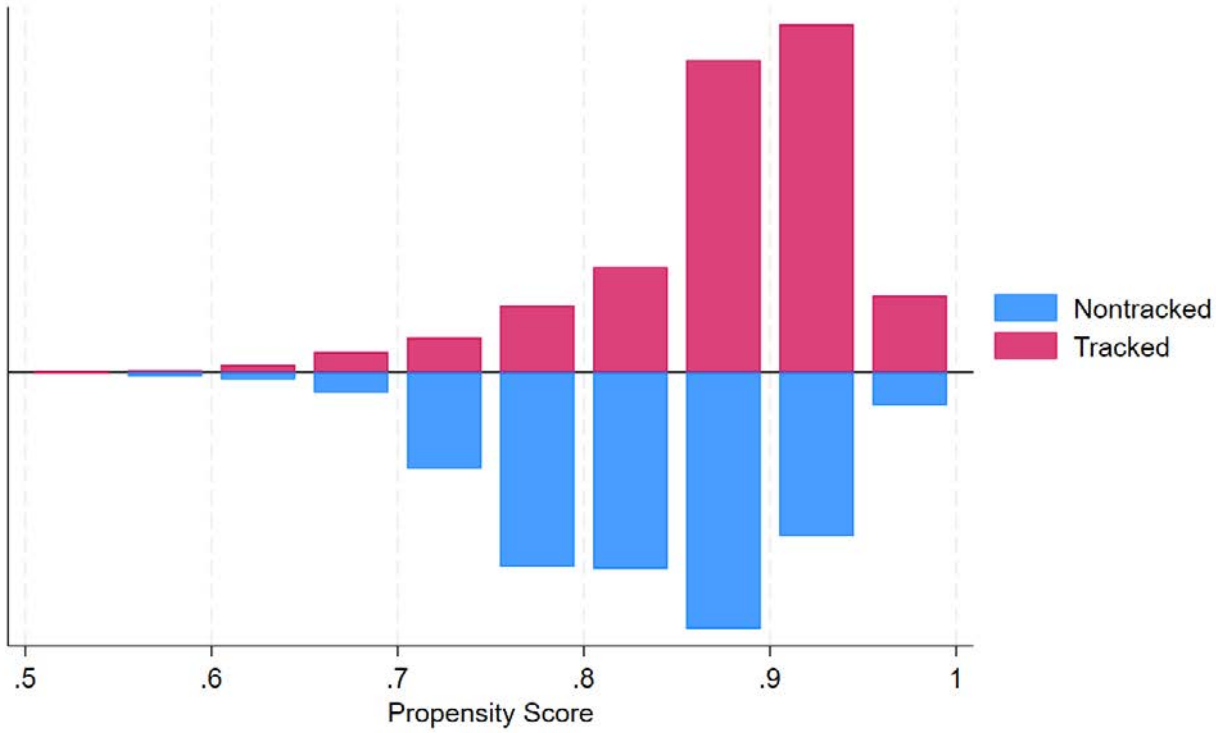
Table B.6 States' social studies assessment requirements for the class of 2013

	Type of assessment	Required for graduation?	Social studies disciplines covered					
			General	U.S. history	World history	Government	Economics	Geography
Alabama	Exit exam	Yes		X		X		
Florida	End of course	Yes		X				
Georgia	End of course	Yes		X				
Louisiana	End of course	Yes	X					
Maryland	End of course	Yes				X		
Mississippi	End of course	Yes		X				
Missouri	End of course	Yes		X[2]		X		
New Mexico	Exit exam	Yes	X					
New York	Exit exam	Yes		X	X	X		X
Ohio	End of course	Yes		X		X		
Oklahoma	End of course	Yes[1]		X				
South Carolina	End of course	No		X		X		
Texas	End of course	Yes		X	X			X
Virginia	Exit exam	Yes		X	X			

[1] Assessment was optional. Students had to take assessments in two of five subjects.
[2] Assessment was optional.
SOURCE: State department of education websites.

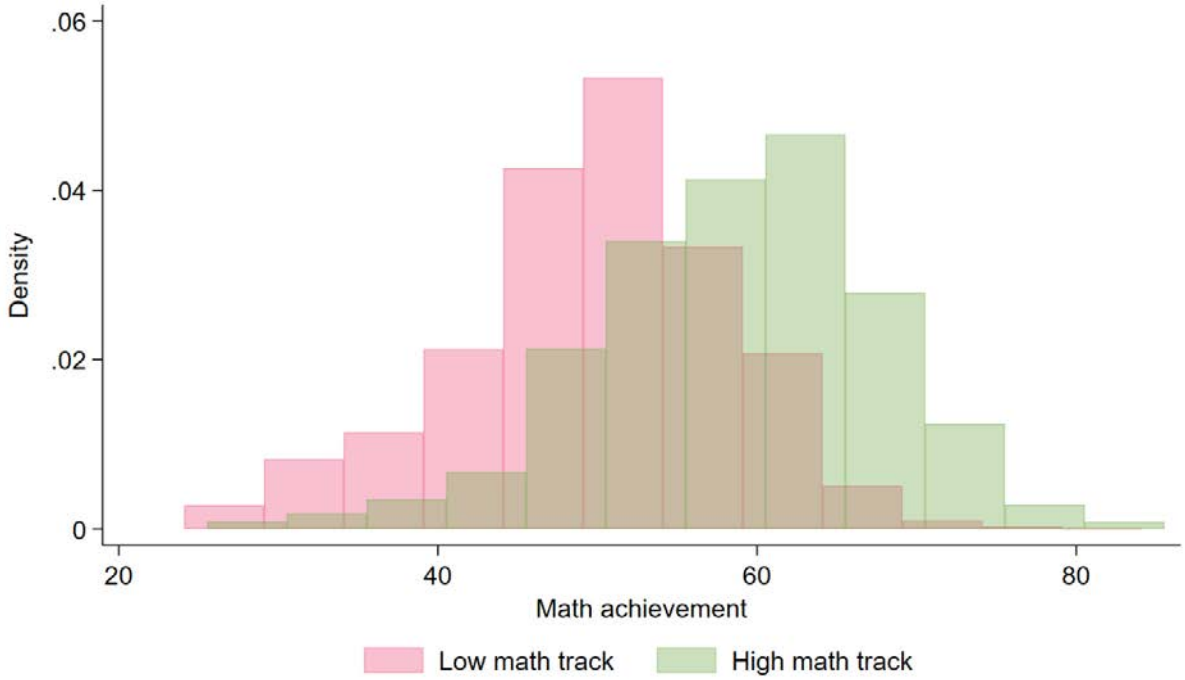
Appendix C. When math sorts, does social studies distort?

Figure C.1 Area of common support during estimation of propensity scores for tracked versus nontracked schools



NOTES: N = 11,220. Displayed predicted propensity scores estimated from logistic regression models, where the outcome is a dummy indicator of treatment (whether the student was in a school that used math tracking) and the predictors are vectors of student- and school-level covariates.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Figure C.2 Distribution of students' math achievement, by math track assignment



NOTES: N = 9,510 students. SOURCE: High School Longitudinal Study of 2009.

Table C.1 Regression results for schools' use of math tracking

	AP World history			AP U.S. history			AP Government			AP Economics		
Use of tracking	0.00		(0.02)	-0.02		(0.02)	0.01		(0.01)	0.00		(0.01)
Course access												
AP World history	0.09	***	(0.02)									
AP European history	0.07	***	(0.01)									
AP U.S. history				0.16	***	(0.01)						
AP Government							0.15	***	(0.01)			
AP Economics										0.11	***	(0.01)
State graduation require												
World history	0.04	***	(0.01)									
U.S. history				0.06	***	(0.01)						
Government							0.02		(0.01)			
Economics										0.01		(0.01)
Female	0.01		(0.01)	0.04	***	(0.01)	0.00		(0.01)	-0.02	***	(0.01)
White	-0.06	**	(0.02)	-0.12	***	(0.03)	-0.04	*	(0.02)	-0.08	***	(0.02)
Black	-0.07	***	(0.02)	-0.13	***	(0.03)	-0.05	*	(0.02)	-0.09	***	(0.03)
Hispanic	-0.05	*	(0.02)	-0.11	***	(0.03)	-0.03		(0.03)	-0.08	***	(0.02)
Other	-0.04	*	(0.02)	-0.10	**	(0.03)	-0.04		(0.02)	-0.05	*	(0.02)
SES Q1	-0.05	***	(0.01)	-0.04	*	(0.02)	-0.03		(0.02)	-0.02	**	(0.01)
SES Q2	-0.06	***	(0.01)	-0.02		(0.02)	-0.03		(0.02)	-0.02	**	(0.01)
SES Q3	-0.04	**	(0.01)	-0.05	*	(0.02)	-0.04	**	(0.01)	-0.02	*	(0.01)
SES Q4	-0.03	*	(0.01)	-0.04	*	(0.02)	-0.02		(0.02)	-0.02		(0.01)
Private	-0.04		(0.02)	-0.02		(0.02)	-0.01		(0.02)	-0.02		(0.01)
City	0.03		(0.02)	0.01		(0.02)	0.00		(0.02)	0.02		(0.01)
Town	-0.02		(0.01)	-0.03		(0.02)	0.00		(0.02)	-0.01		(0.01)
Rural	-0.02		(0.02)	-0.01		(0.02)	-0.01		(0.01)	0.01		(0.01)
25–50% FRPL	0.02		(0.02)	0.01		(0.01)	-0.01		(0.01)	0.00		(0.01)
50–75% FRPL	0.00		(0.02)	-0.01		(0.02)	-0.03		(0.02)	-0.01		(0.01)
75–100% FRPL	-0.02		(0.03)	0.04		(0.03)	-0.02		(0.02)	-0.01		(0.02)
0–25% W	0.06	**	(0.02)	0.05	*	(0.02)	0.05	**	(0.02)	0.03	*	(0.01)
25–50% W	0.03		(0.02)	0.05	*	(0.02)	0.06	**	(0.02)	0.03	*	(0.01)
50–75% W	0.00		(0.02)	0.00		(0.02)	-0.01		(0.01)	0.00		(0.01)
0–499	0.01		(0.02)	0.01		(0.02)	0.01		(0.02)	-0.03	*	(0.01)
500–999	-0.01		(0.02)	-0.01		(0.02)	0.00		(0.02)	-0.03		(0.01)
1,000–1,499	-0.01		(0.02)	-0.02		(0.02)	0.01		(0.02)	-0.03	**	(0.01)
Social studies favorite	0.04	**	(0.01)	0.07	***	(0.02)	0.03		(0.02)	0.01		(0.01)
Math favorite	-0.03	**	(0.01)	-0.02		(0.01)	0.00		(0.01)	-0.01		(0.01)
Math achievement	0.00	***	(0.00)	0.01	***	(0.00)	0.00	***	(0.00)	0.00	***	(0.00)
G9 social studies GPA	0.04	***	(0.01)	0.08	***	(0.01)	0.04	***	(0.01)	0.01	***	(0.00)
Constant	-0.27	***	(0.04)	-0.46	***	(0.05)	-0.29	***	(0.05)	-0.03		(0.03)
School variance	0.02			0.02			0.02			0.01		
Residual variance	0.06			0.10			0.07			0.03		

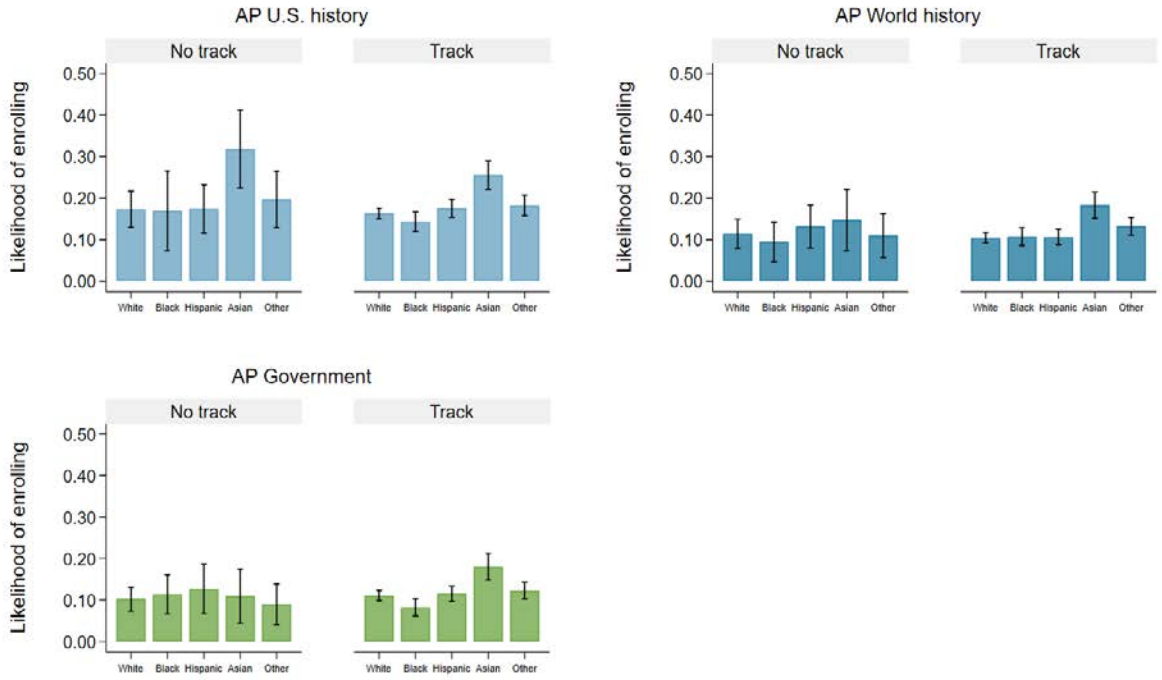
NOTES: N = 11,220. Regression models include inverse probability weights. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Table C.2 Regression results for schools' use of math tracking, subgroup analysis

	AP World history		AP U.S. history		AP Government		AP Economics	
Track	0.02	(0.05)	-0.01	(0.06)	0.09 *	(0.04)	0.02	(0.06)
Female	0.01	(0.01)	0.06 **	(0.02)	0.00	(0.02)	-0.02	(0.01)
Track x Female	0.00	(0.01)	-0.04	(0.02)	0.00	(0.02)	0.00	(0.01)
White	-0.03	(0.04)	-0.14 **	(0.05)	-0.01	(0.03)	---	
Black	-0.05	(0.04)	-0.15 *	(0.07)	0.00	(0.04)	---	
Hispanic	-0.02	(0.04)	-0.14 **	(0.05)	0.02	(0.05)	---	
Other	-0.04	(0.04)	-0.12 *	(0.06)	-0.02	(0.04)	---	
Track x White	-0.05	(0.04)	0.05	(0.05)	-0.06	(0.03)	---	
Track x Black	-0.02	(0.04)	0.04	(0.07)	-0.10 *	(0.04)	---	
Track x Hispanic	-0.06	(0.04)	0.06	(0.05)	-0.08	(0.05)	---	
Track x Other	-0.01	(0.04)	0.05	(0.06)	-0.04	(0.04)	---	
Q1 SES	-0.07 *	(0.03)	-0.03	(0.04)	-0.02	(0.04)	-0.01	(0.01)
Q2 SES	-0.08 **	(0.03)	0.03	(0.04)	0.00	(0.03)	-0.01	(0.01)
Q3 SES	-0.04	(0.03)	-0.03	(0.04)	-0.02	(0.03)	0.00	(0.02)
Q4 SES	-0.03	(0.03)	-0.03	(0.04)	-0.01	(0.03)	-0.01	(0.02)
Track x Q1 SES	0.02	(0.03)	-0.03	(0.04)	-0.02	(0.04)	-0.02	(0.02)
Track x Q2 SES	0.04	(0.03)	-0.10 *	(0.04)	-0.05	(0.03)	-0.02	(0.02)
Track x Q3 SES	0.00	(0.03)	-0.04	(0.04)	-0.03	(0.03)	-0.04	(0.02)
Track x Q4 SES	0.01	(0.03)	-0.01	(0.04)	-0.02	(0.03)	-0.02	(0.02)

NOTES: N = 11,220. Regression models include inverse probability weights. Regressions include the full set of controls but are omitted for space reasons.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. --- indicates that samples were too small to meet reporting thresholds.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Figure C.3 Students' likelihood of enrolling in AP social studies courses, by discipline, schools' use of math tracking, and student race/ethnicity



NOTES: N = 11,220. Results are predicted margins from multilevel linear regression models regressing AP course enrollment on an indicator of whether the student was in a high school that used math tracking interacted with student demographic characteristics and a variety of controls. Regression models include inverse probability weights. Results for AP economics courses are excluded because sample sizes are too small to meet reporting thresholds.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Table C.3 Regression results for students' math track placements

	AP World history			AP U.S. history			AP Government			AP Economics		
High math track	0.04	***	(0.01)	0.09	***	(0.01)	0.05	***	(0.01)	0.04	***	(0.01)
Course access												
AP World history	0.10	***	(0.02)									
AP European history	0.06	***	(0.02)									
AP U.S. history				0.18	***	(0.02)						
AP Government							0.16	***	(0.01)			
AP Economics										0.11	***	(0.01)
State graduation require												
World history	0.03	*	(0.01)									
U.S. history				0.06	***	(0.01)						
Government							0.02		(0.01)			
Economics										0.01		(0.01)
Female	0.01	*	(0.01)	0.02	*	(0.01)	0.00		(0.01)	-0.02	***	(0.01)
White	-0.07	***	(0.02)	-0.07	***	(0.02)	-0.05	*	(0.02)	-0.06	***	(0.02)
Black	-0.06	**	(0.02)	-0.11	***	(0.02)	-0.07	***	(0.02)	-0.08	***	(0.02)
Hispanic	-0.07	***	(0.02)	-0.06	**	(0.02)	-0.04	*	(0.02)	-0.07	***	(0.02)
Other	-0.05	*	(0.02)	-0.06	*	(0.02)	-0.03		(0.02)	-0.06	**	(0.02)
SES Q1	-0.05	***	(0.01)	-0.05	***	(0.02)	-0.03	*	(0.01)	-0.03	**	(0.01)
SES Q2	-0.03	**	(0.01)	-0.06	***	(0.01)	-0.05	***	(0.01)	-0.03	**	(0.01)
SES Q3	-0.04	***	(0.01)	-0.06	***	(0.01)	-0.04	***	(0.01)	-0.04	***	(0.01)
SES Q4	-0.02		(0.01)	-0.03	*	(0.01)	-0.02		(0.01)	-0.02	**	(0.01)
Private	-0.05	*	(0.02)	-0.03		(0.03)	-0.03		(0.02)	-0.03	*	(0.01)
City	0.03		(0.02)	0.01		(0.02)	0.00		(0.02)	0.02		(0.01)
Town	-0.02		(0.02)	-0.03		(0.02)	0.00		(0.02)	0.00		(0.01)
Rural	-0.03		(0.02)	-0.01		(0.02)	-0.02		(0.02)	0.00		(0.01)
25–50% FRPL	0.02		(0.02)	0.01		(0.02)	-0.01		(0.01)	0.00		(0.01)
50–75% FRPL	0.00		(0.02)	-0.02		(0.02)	-0.02		(0.02)	0.00		(0.02)
75–100% FRPL	-0.01		(0.03)	0.00		(0.03)	-0.03		(0.03)	-0.01		(0.02)
0–25% W	0.05	*	(0.02)	0.06	*	(0.02)	0.07	**	(0.02)	0.04	**	(0.02)
25–50% W	0.04		(0.03)	0.08	**	(0.03)	0.07	**	(0.02)	0.03		(0.02)
50–75% W	0.01		(0.02)	0.01		(0.02)	0.00		(0.02)	0.00		(0.01)
0–499	0.00		(0.02)	0.02		(0.03)	0.01		(0.02)	-0.02		(0.02)
500–999	-0.01		(0.02)	0.00		(0.02)	0.00		(0.02)	-0.02		(0.02)
1,000–1,499	-0.01		(0.02)	-0.02		(0.02)	-0.01		(0.02)	-0.03	*	(0.01)
Social studies favorite	0.04	**	(0.01)	0.07	***	(0.01)	0.02		(0.01)	-0.01		(0.01)
Math favorite	-0.02	**	(0.01)	-0.03	**	(0.01)	-0.02	*	(0.01)	0.00		(0.01)
Math achievement	0.00	***	(0.00)	0.01	***	(0.00)	0.00	***	(0.00)	0.00	***	(0.00)
G9 social studies GPA	0.04	***	(0.00)	0.07	***	(0.01)	0.04	***	(0.00)	0.02	***	(0.00)
Constant	-0.22	***	(0.04)	-0.49	***	(0.05)	-0.24	***	(0.04)	-0.05		(0.03)
School variance	0.02			0.02			0.02			0.01		
Residual variance	0.06			0.09			0.07			0.04		

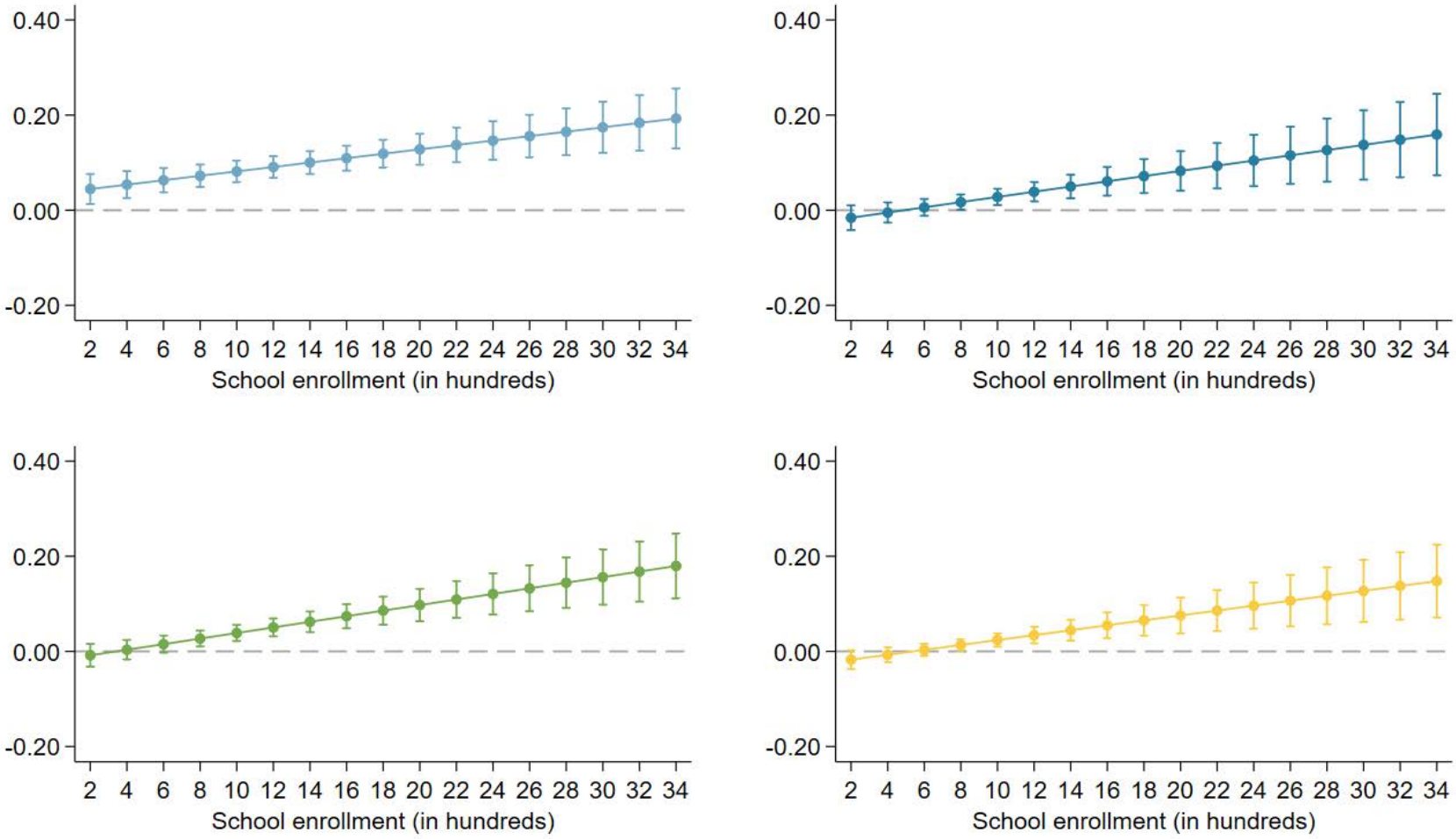
NOTES: N = 9,760. Regression models include inverse probability weights. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Table C.4 Moderation analysis with aspects of school structure

	World history						Government					
Track	-0.03		(0.02)	0.02	(0.08)	0.04 ***	(0.01)	-0.02	(0.01)	0.11	(0.08)	0.04 ** (0.01)
Enrollment	0.00		(0.00)					0.00	(0.00)			
Track x Enrollment	0.01	**	(0.00)					0.01 ***	(0.00)			
Course periods				0.00	(0.01)					0.00	(0.01)	
Track x Course periods				0.00	(0.01)					-0.01	(0.01)	
Course periods						-0.01	(0.01)					-0.04 ** (0.01)
Track x Block schedule						-0.01	(0.02)					0.03 (0.02)
N	9,760			5,440		8,930		9,760		5,440		8,930
	U.S. history						Economics					
Track	0.04	*	(0.02)	0.15	(0.10)	0.08 ***	(0.01)	-0.03 *	(0.01)	0.17 **	(0.06)	0.04 *** (0.01)
Enrollment	0.00		(0.00)					0.00	(0.00)			
Track x Enrollment	0.00	***	(0.00)					0.01 ***	(0.00)			
Course periods				-0.01	(0.01)					0.01	(0.01)	
Track x Course periods				-0.01	(0.02)					-0.02 *	(0.01)	
Course periods						0.01	(0.01)					-0.01 (0.01)
Track x Block schedule						0.03	(0.02)					-0.01 (0.02)
N	9,760			5,440		8,930		9,760		5,440		8,930

NOTES: Regression models include inverse probability weights. Regressions include the full set of controls but are omitted for space reasons.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Figure C.4 Average marginal effects of math track placement on AP social studies enrollment, by school enrollment size



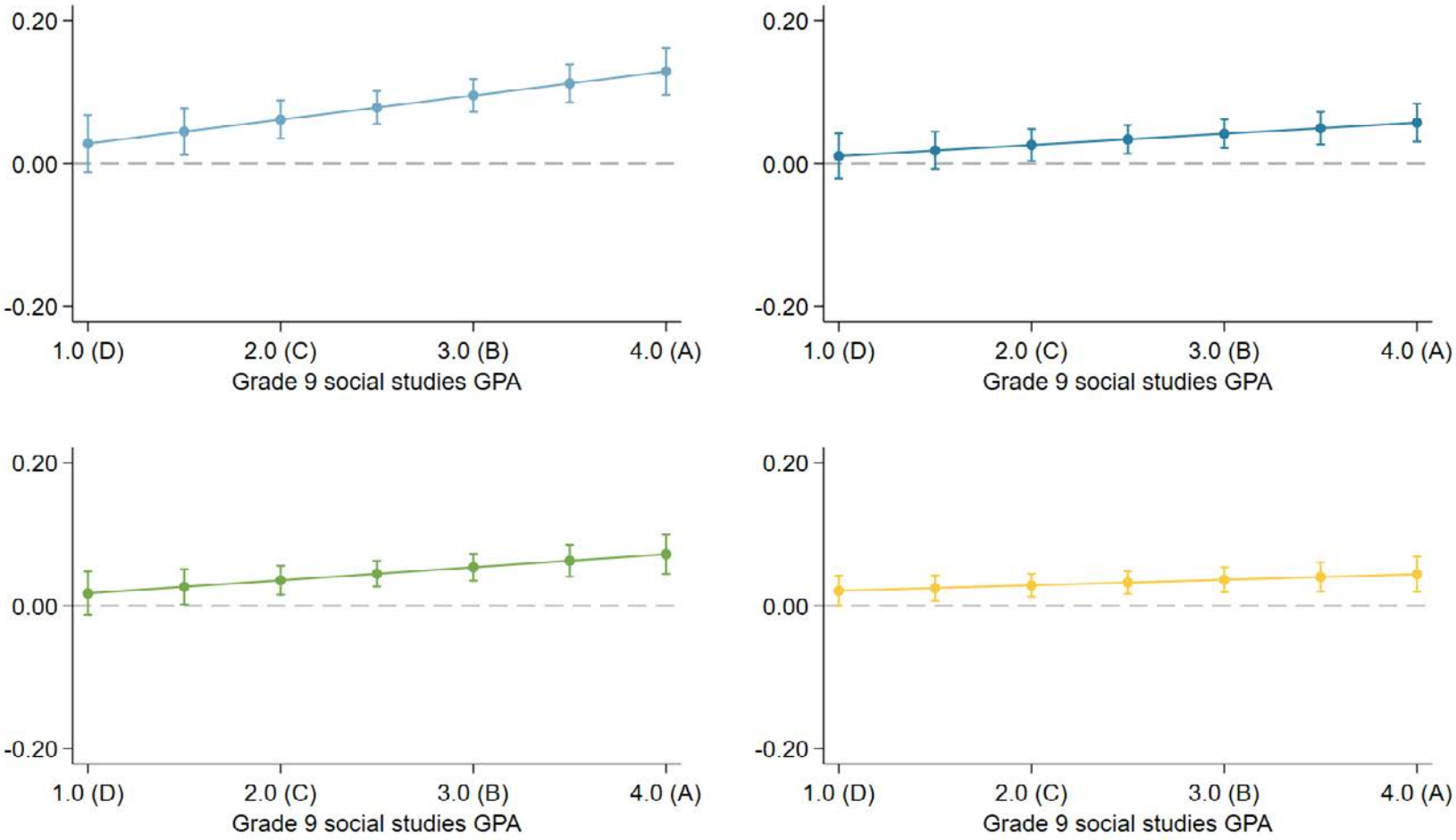
N = 9,760. Figure displays the average marginal effects of being placed on the high versus low math track on AP social studies course enrollments for students in schools with different enrollment sizes. Bars represent 95 percent confidence intervals.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Table C.5 Moderation analysis with grade 9 social studies GPA

	AP World history			AP U.S. history			AP Government			AP Economics		
Track	-0.01		(0.02)	-0.01		(0.03)	0.00		(0.02)	0.01		(0.02)
Grade 9 social studies GPA	0.03	***	(0.00)	0.05	***	(0.01)	0.04	***	(0.00)	0.01	*	(0.00)
Track x Grade 9 social studies GPA	0.02	*	(0.01)	0.03	***	(0.01)	0.02	*	(0.01)	0.01		(0.01)

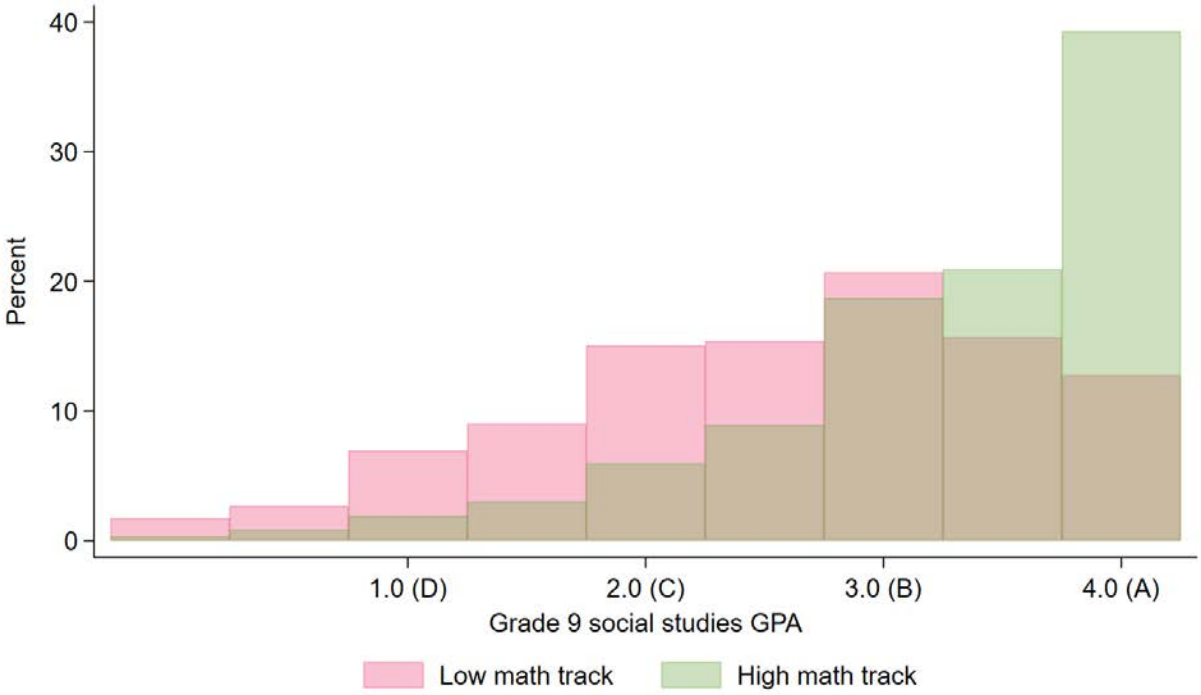
NOTES: N = 9,760. Regression models include inverse probability weights. Regressions include the full set of controls but are omitted for space reasons.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Figure C.5 Average marginal effects of math track placement on AP social studies enrollment, by GPA in grade 9 social studies course



N = 9,760. Figure displays the average marginal effects of being placed on the high versus low math track on AP social studies course enrollments for students who earned different GPAs in the grade 9 social studies courses. Bars represent 95 percent confidence intervals.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Figure C.6 Percentage distribution of students' grade 9 social studies grade point averages, by math track assignment



NOTES: N = 9,840 students.
SOURCE: High School Longitudinal Study of 2009.

Table C.6 Regression results for math track placements, subgroup analysis

	AP World history			AP U.S. history			AP Government			AP Economics		
Track	0.13	***	(0.04)	0.22	***	(0.04)	0.13	***	(0.03)	0.08	*	(0.03)
Female	0.01		(0.01)	0.02		(0.01)	-0.01		(0.01)	-0.02	*	(0.01)
Track x Female	0.01		(0.01)	0.01		(0.01)	0.01		(0.01)	-0.01		(0.01)
White	-0.02		(0.03)	0.00		(0.03)	0.01		(0.02)	-0.04		(0.03)
Black	-0.01		(0.03)	-0.01		(0.03)	0.00		(0.03)	-0.06	*	(0.03)
Hispanic	-0.02		(0.03)	0.00		(0.03)	-0.02		(0.02)	-0.05		(0.03)
Other	0.01		(0.03)	-0.01		(0.03)	0.02		(0.03)	-0.04		(0.03)
Track x White	-0.09	*	(0.04)	-0.12	**	(0.04)	-0.09	**	(0.03)	-0.04		(0.03)
Track x Black	-0.09	*	(0.04)	-0.18	***	(0.04)	-0.13	***	(0.04)	-0.05		(0.03)
Track x Hispanic	-0.10	**	(0.04)	-0.10	*	(0.04)	-0.05		(0.03)	-0.02		(0.03)
Track x Other	-0.10	*	(0.04)	-0.09		(0.05)	-0.10	*	(0.04)	-0.02		(0.03)
Q1 SES	-0.02		(0.01)	-0.02		(0.02)	-0.02		(0.01)	-0.02	*	(0.01)
Q2 SES	-0.02		(0.01)	-0.05	**	(0.02)	-0.03		(0.01)	-0.02		(0.01)
Q3 SES	-0.02		(0.01)	-0.04	*	(0.02)	-0.03	*	(0.01)	-0.03	*	(0.01)
Q4 SES	-0.02		(0.01)	-0.02		(0.02)	-0.03	**	(0.01)	-0.01		(0.01)
Track x Q1 SES	-0.07	**	(0.02)	-0.06	*	(0.03)	-0.02		(0.02)	-0.01		(0.02)
Track x Q2 SES	-0.03		(0.02)	-0.03		(0.03)	-0.04		(0.02)	-0.02		(0.02)
Track x Q3 SES	-0.03		(0.02)	-0.04		(0.03)	-0.03		(0.02)	-0.02		(0.02)
Track x Q4 SES	0.01		(0.02)	-0.01		(0.02)	0.03		(0.02)	-0.01		(0.01)

NOTES: N = 9,760. Regression models include inverse probability weights. Regressions include the full set of controls but are omitted for space reasons.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. --- indicates that samples were too small to meet reporting thresholds.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Appendix D. Association between math and social studies achievement

In this supplementary analysis, I use data on students' grade point averages (GPA) obtained from the 2009 High School Longitudinal Study to give credence to the claim that students may be differentially skilled in math than they are in social studies. I caution readers that GPAs are not the ideal achievement measure to use for this analysis because GPAs are necessarily a function of students' coursetaking. An alternative measure of achievement such as students' performance on a standardized assessment would likely be a better (less biased) measure. However, given lack of data availability, I use students' GPAs as a rough proxy of their achievement.

Restricting the HSLS:2009 to include only students for whom complete transcript data are available and who graduated high school on time, I find that the correlation between students' math and social studies GPAs was 0.76 (see Table D.1). That is, I find that the correlation in GPAs across academic subjects is high but not absolute. Furthermore, the correlation between students' math and social studies GPAs was notably the lowest among all academic subjects.

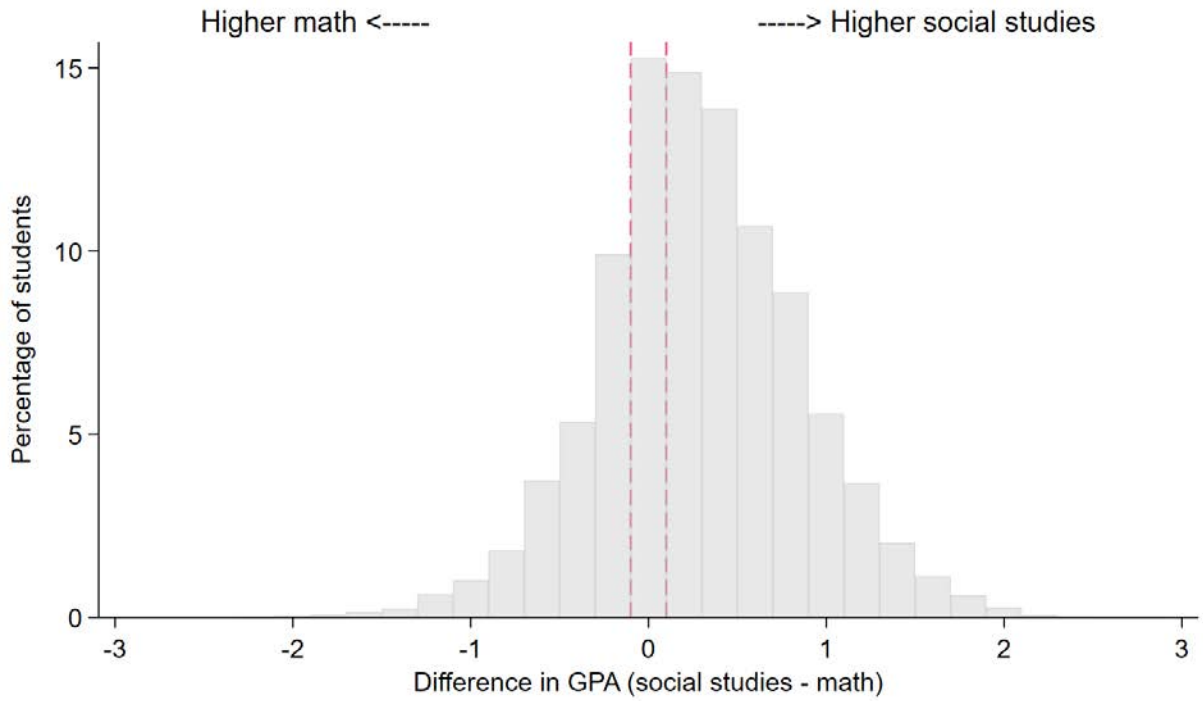
Table D.1 Correlation of students' high school GPA across academic subjects

	English	Mathematics	Science	Social studies
English	1.00			
Mathematics	0.77	1.00		
Science	0.81	0.81	1.00	
Social studies	0.83	0.76	0.82	1.00

NOTES: N = 17,420. Includes only students with complete transcript information and who graduated on-time.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Importantly, there is a bias in the difference between students' math and social studies GPAs. That is, in cases where there was a discrepancy between students' achievement in math versus in social studies, students' performance is typically higher in social studies than in math (see Figure D.1). There could be lots of reasons for this. For example, social studies courses may be easier, on average, for students than math courses, resulting in higher course grades. Or it could be that students, on average, are simply more skilled in social studies than in math.

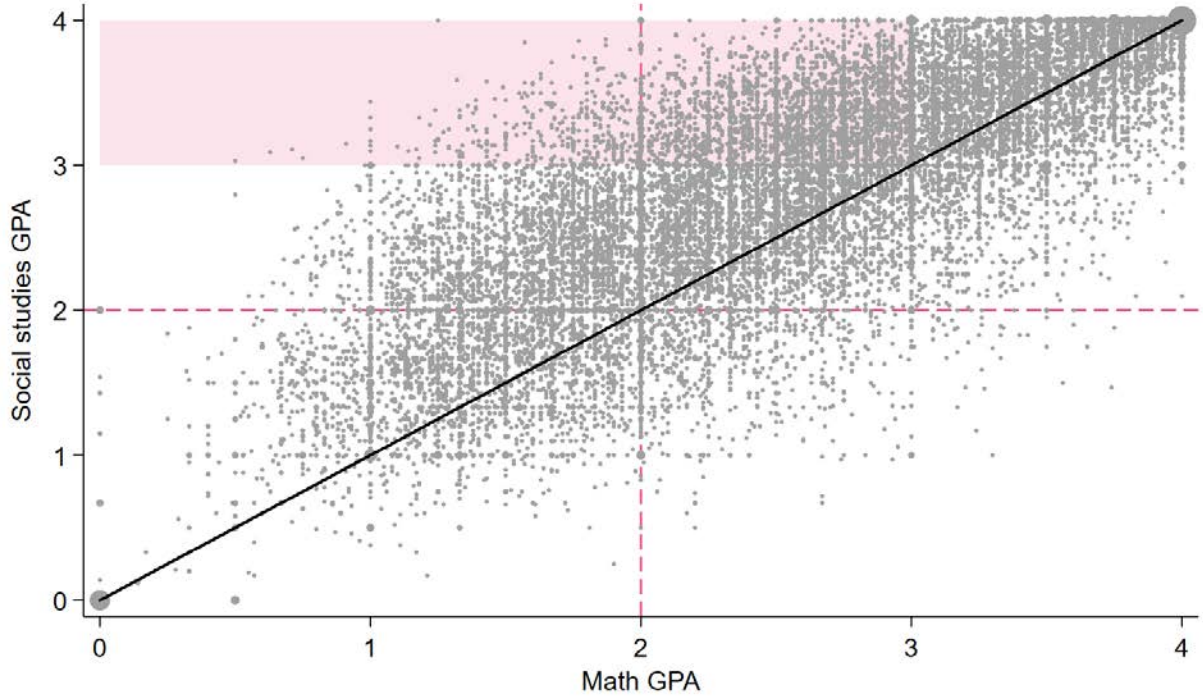
Figure D.1 Distribution of differences in students' social studies and math GPAs



NOTES: N = 17,430. Includes only students with complete transcript information and who graduated on-time.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Finally, Figure D.2 plots the math and social studies GPAs for HSLS:2009 students, weighted by the number of students with each GPA combination. As shown in the figure, students' GPAs are highly correlated, but there are exceptions. All students above the 45-degree line have social studies achievement that exceeds their math achievement and vice versa. The students in the pink box represent the population potentially of greatest interest for the analysis presented in Chapter 3. These are students who have relatively low math GPAs—likely sorted into lower math tracks—but who have among the highest social studies GPAs. These are the students for whom there is the greatest divergence in math and social studies achievement and who are likely the most disadvantaged by any policy that prioritizes that their course assignments in math. Although this is a minority share of the overall student population, it is certainly not zero.

Figure D.2 Association between students' math and social studies GPAs



NOTES: N = 17,430. Includes only students with complete transcript information and who graduated on-time.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

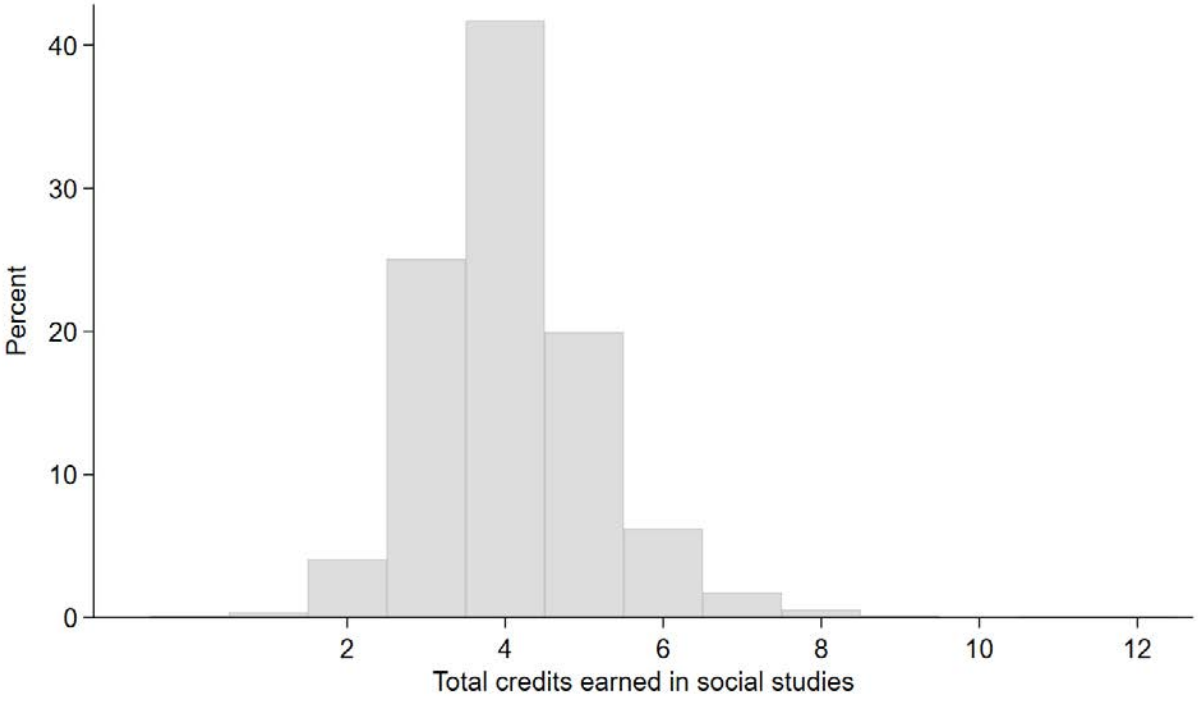
Appendix E. Which course(s) is the source?

Table E.1 Interclass correlations from unconditional multilevel linear regression models

	Nesting students in states	Nesting students in schools	Nesting students in schools in states	
	State	School	State	School | State
Vote	0.01	0.04	0.01	0.04
Volunteer	0.01	0.05	0.00	0.05

NOTES: N = 10,550. Results are interclass correlations (ICCs) from unconditional multilevel linear regression models where the outcome is civic engagement.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Figure E.1 Distribution of total number of credits earned in social studies



NOTES: N = 10,550.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

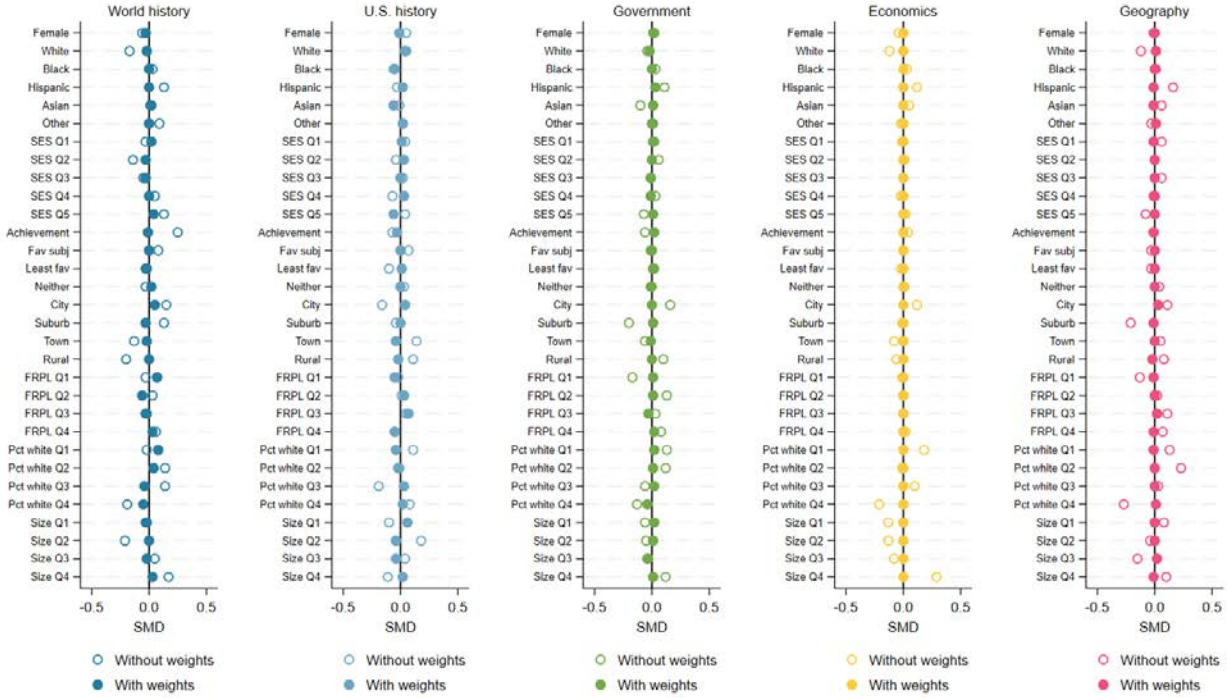
Table E.2 Covariate balance table for total number of social studies credits earned

	X <= 2.5			2.5 < X <= 3			3 < X <= 3.5			3.5 < X <= 4			4 < X <= 4.5			X > 4.5		
	Mean	SD	T-value	Mean	SD	T-value	Mean	SD	T-value	Mean	SD	T-value	Mean	SD	T-value	Mean	SD	T-value
Female	-0.02	0.02	-0.87	0.01	0.01	0.63	0.04	0.01	2.49	-0.01	0.01	-1.38	-0.01	0.02	-0.67	-0.01	0.01	-0.63
Black	-0.02	0.01	-1.61	0.02	0.01	2.97	0.00	0.01	0.62	-0.02	0.01	-3.17	-0.01	0.01	-0.83	0.01	0.01	1.82
Hispanic	0.01	0.01	0.64	0.01	0.01	0.91	-0.01	0.01	-0.75	-0.01	0.01	-0.78	-0.02	0.01	-2.03	0.03	0.01	3.00
Asian	-0.01	0.01	-0.37	0.00	0.01	-0.19	-0.01	0.01	-0.81	-0.01	0.01	-1.08	0.00	0.01	-0.32	0.00	0.01	-0.36
Other	-0.01	0.01	-0.99	0.00	0.01	0.10	0.00	0.01	-0.06	0.00	0.01	0.58	0.01	0.01	1.25	0.00	0.01	0.49
SES Q1	-0.02	0.01	-1.53	0.01	0.01	0.70	0.01	0.01	0.97	0.01	0.01	1.30	-0.01	0.01	-0.92	0.02	0.01	1.80
SES Q2	-0.01	0.02	-0.87	-0.01	0.01	-1.03	0.02	0.01	2.17	0.01	0.01	0.92	0.03	0.01	2.27	0.01	0.01	0.81
SES Q3	-0.03	0.02	-1.94	-0.01	0.01	-1.03	0.01	0.01	0.48	0.02	0.01	2.26	0.00	0.01	-0.04	-0.01	0.01	-1.23
SES Q4	0.03	0.02	1.38	0.01	0.01	0.77	-0.01	0.01	-0.74	0.00	0.01	-0.22	-0.03	0.01	-2.57	0.02	0.01	1.96
Favorite	-0.03	0.02	-1.93	0.01	0.01	1.57	0.00	0.01	-0.40	0.00	0.01	-0.39	-0.02	0.01	-1.75	-0.01	0.01	-1.74
Least	-0.02	0.02	-1.35	0.02	0.01	2.07	0.00	0.01	0.40	-0.01	0.01	-1.94	0.00	0.01	0.36	0.00	0.01	0.06
Achieve	0.99	0.41	2.40	-0.22	0.21	-1.02	-0.51	0.26	-1.94	-0.35	0.20	-1.77	-0.57	0.28	-2.01	-0.94	0.23	-4.11
City	0.01	0.02	0.58	0.02	0.01	1.82	-0.06	0.01	-4.56	0.00	0.01	-0.19	0.03	0.01	1.81	0.01	0.01	0.52
Town	0.00	0.01	-0.16	0.00	0.01	0.30	0.04	0.01	4.23	-0.02	0.01	-3.40	-0.01	0.01	-1.25	0.01	0.01	1.53
Rural	-0.05	0.02	-2.53	0.01	0.01	0.61	0.02	0.01	1.82	0.01	0.01	1.47	0.00	0.01	-0.10	0.01	0.01	0.58
FRPL Q2	-0.02	0.02	-0.95	0.01	0.01	1.18	0.03	0.01	2.48	0.00	0.01	0.13	0.01	0.01	0.47	-0.01	0.01	-0.96
FRPL Q3	-0.06	0.02	-3.98	-0.02	0.01	-1.95	0.02	0.01	1.55	0.01	0.01	1.79	0.04	0.01	3.24	-0.01	0.01	-0.56
FRPL Q4	0.00	0.01	0.01	0.00	0.00	-0.28	0.00	0.01	0.60	-0.01	0.00	-1.95	0.00	0.01	-0.55	0.01	0.01	1.62
Percent white Q1	0.01	0.02	0.58	0.00	0.01	-0.33	-0.01	0.01	-0.94	0.00	0.01	-0.22	0.01	0.01	0.47	0.02	0.01	2.39
Percent white Q2	-0.02	0.02	-1.04	0.00	0.01	0.14	0.00	0.01	0.12	-0.01	0.01	-1.17	0.01	0.01	1.23	0.00	0.01	0.03
Percent white Q3	-0.05	0.02	-2.57	0.00	0.01	0.09	-0.01	0.01	-0.67	0.00	0.01	0.56	0.01	0.01	0.62	0.01	0.01	0.67
Size Q1	0.04	0.02	2.32	0.03	0.01	2.71	-0.01	0.01	-1.04	-0.03	0.01	-3.55	-0.07	0.01	-4.99	0.03	0.01	2.98
Size Q2	-0.01	0.02	-0.67	0.00	0.01	-0.37	0.04	0.01	2.98	0.00	0.01	-0.48	0.02	0.01	1.62	-0.03	0.01	-2.33
Size Q3	0.02	0.02	1.13	-0.02	0.01	-1.95	-0.01	0.01	-0.43	0.01	0.01	0.85	0.05	0.01	3.63	-0.02	0.01	-2.24

NOTES: N = 9,490. Estimates are mean differences for pre-treatment covariates given the generalized propensity score for students in that treatment interval compared with all other students who are not in that treatment interval (Bia & Mattei, 2008). Overall, the balancing property is satisfied at a level lower than 0.01, but some differences remain. Generalized propensity scores were estimated using the covariates displayed in the table as well as state, which is omitted for space reasons.

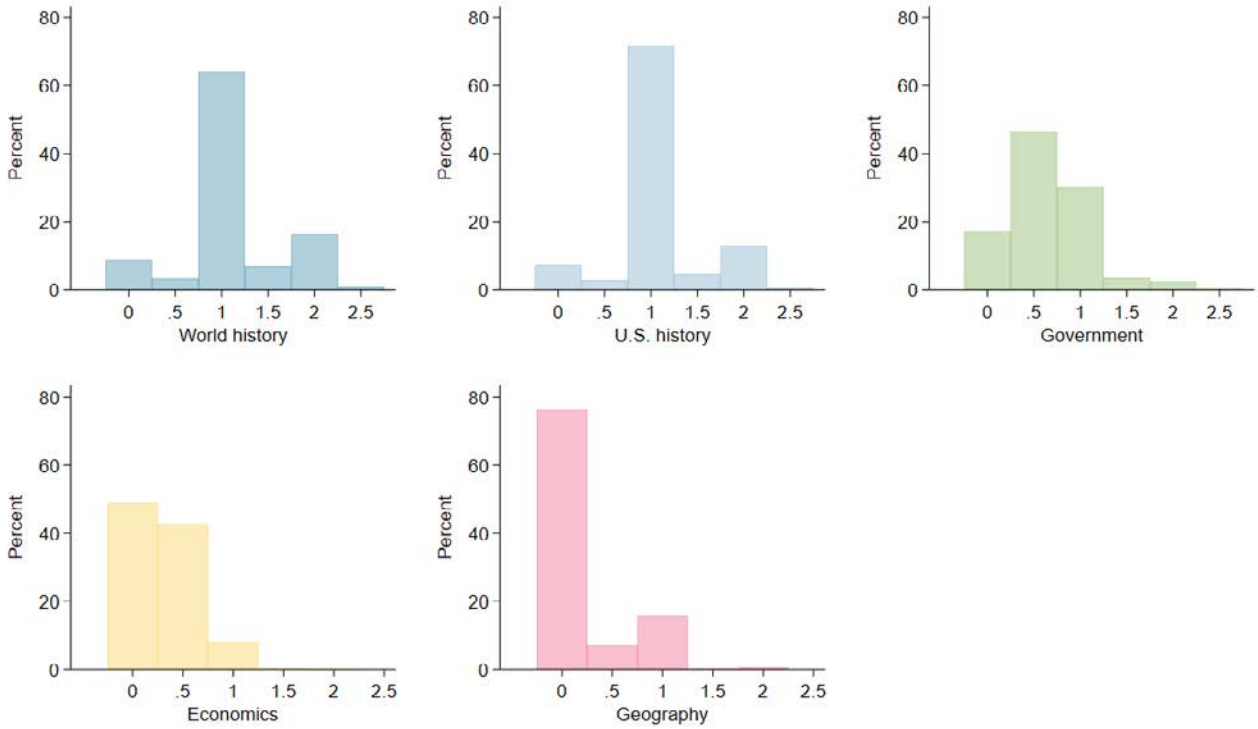
SOURCE: High School Longitudinal Study of 2009.

Figure E.2 Standardized mean differences before and after application of propensity score weights



N = 9,490. SMD = standard mean difference. Standard mean difference calculated as the difference in means between students who did and did not take courses in each discipline divided by the pooled standard deviation.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Figure E.3 Distribution of credits earned in various social studies disciplines



NOTES: N = 10,510. Excludes small numbers of students who earned Carnegie credits in atypical amounts for confidentiality purposes.
SOURCE: High School Longitudinal Study of 2009 (HSLS:2009).

Table E.3 Covariate balance table for rigor of social studies courses

	Any government				Any world history				Any U.S. history				Any economics				Any geography			
	Regular		AP/IB		Regular		AP/IB		Regular		AP/IB		Regular		AP/IB		Regular		AP/IB	
	SMD	Sig?	SMD	Sig?	SMD	Sig?	SMD	Sig?	SMD	Sig?	SMD	Sig?	SMD	Sig?	SMD	Sig?	SMD	Sig?	SMD	Sig?
	Before propensity score weights are applied																			
Male	0.00		-0.02		0.02		-0.05		0.03		-0.10	**	0.03		0.18	***	0.02		-0.07	
Female	0.00		0.02		-0.02		0.05		-0.03		0.10	**	-0.03		-0.18	***	-0.02		0.07	
White	0.02		-0.06		-0.16	***	-0.25	***	0.04		-0.03		-0.07	***	-0.23	***	-0.09	***	-0.21	***
Black	0.04		-0.19	***	0.08	**	-0.12	***	-0.02		-0.20	***	0.05	*	-0.22	***	0.01		-0.07	
Hispanic	0.06	**	0.00		0.13	***	0.01		-0.02		-0.14	***	0.11	***	-0.03		0.15	***	0.07	
Asian	-0.15	***	0.23	***	-0.03		0.36	***	-0.07	*	0.29	***	-0.06	**	0.58	***	-0.01		0.34	***
Other	-0.02		-0.01		0.08	**	0.12	**	0.04		0.02		-0.01		0.02		-0.02		-0.01	
SES Q1	-0.02		-0.27	***	0.02		-0.30	***	0.06		-0.21	***	0.01		-0.24	***	0.08	**	-0.23	***
SES Q2	0.08	**	-0.20	***	0.00		-0.21	***	0.01		-0.24	***	0.05	*	-0.21	***	0.01		-0.08	
SES Q3	-0.02		-0.20	***	-0.02		-0.19	***	0.05		-0.16	***	0.03		-0.21	***	0.08	**	-0.15	**
SES Q4	0.02		0.04		0.05		0.08	*	-0.02		-0.01		-0.02		-0.01		-0.01		0.04	
SES Q5	-0.04		0.43	***	-0.04		0.40	***	-0.08	*	0.38	***	-0.05	*	0.50	***	-0.12	***	0.30	***
Achievement	-0.09	***	0.68	***	0.05		0.83	***	-0.18	***	0.71	***	-0.08	***	0.85	***	-0.08	***	0.65	***
Favorite subject	-0.01		0.17	***	-0.05		0.15	***	0.03		0.21	***	-0.01		0.11	*	-0.07	**	0.21	**
Least favorite	-0.03		-0.06		0.01		-0.10	**	-0.03		-0.11	**	-0.03		-0.01		-0.04		-0.02	
Neither	0.03		-0.09	*	0.03		-0.04		0.00		-0.08	*	0.03		-0.07		0.08	**	-0.14	*
City	0.03		0.28	***	0.05		0.28	***	-0.09	**	0.08	*	0.09	***	0.37	***	0.12	***	0.29	***
Suburb	-0.06	*	0.02		0.06	*	0.14	***	-0.02		0.08		-0.05	*	0.02		-0.27	***	-0.13	*
Town	-0.02		-0.23	***	-0.08	**	-0.31	***	0.06		-0.14	***	-0.02		-0.34	***	0.09	***	-0.18	***
Rural	0.04		-0.15	***	-0.05	*	-0.23	***	0.07	*	-0.08	*	-0.03		-0.16	***	0.11	***	-0.02	
FRPL Q1	-0.08	***	0.17	***	-0.05		0.09	*	-0.12	***	0.05		-0.06	**	0.19	***	-0.15	***	-0.06	
FRPL Q2	0.15	***	0.04		0.01		-0.06		0.08	*	-0.01		0.03		-0.13	**	0.02		0.06	
FRPL Q3	-0.05	*	-0.21	***	0.02		-0.03		0.08	**	0.02		0.03		-0.10	*	0.15	***	0.04	
FRPL Q4	-0.04		-0.14	***	0.05	*	-0.04		-0.02		-0.14	***	0.03		-0.02		0.07	*	-0.04	
Percent white Q1	0.04		0.12	***	0.10	***	0.12	**	0.00		0.02		0.17	***	0.33	***	0.11	***	0.11	
Percent white Q2	0.10	***	0.16	***	0.16	***	0.20	***	0.03		0.12	**	-0.02		0.17	***	0.23	***	0.42	***
Percent white Q3	-0.04		0.01		0.15	***	0.22	***	-0.11	**	-0.05		0.12	***	0.24	***	-0.02		0.22	***
Percent white Q4	-0.06	*	-0.20	***	-0.29	***	-0.38	***	0.07	*	-0.06		-0.20	***	-0.53	***	-0.22	***	-0.52	***
Size Q1	0.06	**	-0.21	***	-0.19	***	-0.45	***	-0.18	***	-0.32	***	-0.04	*	-0.53	***	0.14	***	-0.33	***
Size Q2	-0.03		-0.18	***	-0.06	*	-0.24	***	0.10	**	0.00		-0.13	***	-0.27	***	0.02		-0.36	***
Size Q3	-0.11	***	-0.06		0.10	***	0.13	***	0.01		0.02		-0.09	***	-0.19	***	-0.15	***	-0.06	
Size Q4	0.06	**	0.37	***	0.13	***	0.49	***	0.05		0.25	***	0.24	***	0.88	***	0.00		0.65	***
	After propensity score weights are applied																			
Male	-0.01		-0.06		-0.01		-0.07		-0.01		0.00		0.00		0.18		-0.01		-0.05	
Female	0.01		0.06		0.01		0.07		0.01		0.00		0.00		-0.18		0.01		0.05	
White	0.04		0.01		0.05		0.04		0.04		0.04		0.04	*	0.12		0.05		0.03	
Black	-0.02		-0.08		-0.02		-0.02		-0.01		-0.05		-0.02		0.00		-0.01		-0.08	

Hispanic	-0.03		0.03		-0.03		-0.07		-0.02		-0.02		-0.03		-0.15	*	-0.04		-0.02					
Asian	-0.03		-0.01		-0.03		0.03		-0.03		-0.02		-0.03		-0.01		-0.05		0.07					
Other	0.01		0.02		0.00		-0.02		-0.01		0.01		0.01		-0.04		0.02		-0.01					
SES Q1	-0.02		-0.07		-0.02		-0.15	**	-0.01		-0.07		-0.02		-0.11		-0.03		-0.13					
SES Q2	0.00		-0.03		0.00		-0.05		0.00		-0.01		0.00		0.12		0.00		-0.03					
SES Q3	0.00		0.03		0.00		0.06		0.00		0.01		0.01		-0.02		0.01		0.07					
SES Q4	0.00		0.03		0.01		0.05		0.01		0.03		0.00		0.16		0.00		-0.03					
SES Q5	0.01		0.01		0.01		0.04		0.00		0.02		0.01		-0.17		0.01		0.08					
Achievement	0.01		0.07		0.01		0.06		0.01		0.06		0.01		-0.08		-0.01		0.29	***				
Favorite subject	0.00		0.03		0.00		0.00		0.00		0.00		0.00		0.21		0.00		-0.04					
Least favorite	0.00		0.00		0.00		-0.03		0.00		0.05		0.01		-0.08		0.01		-0.02					
Neither	0.00		-0.02		0.00		0.03		0.00		-0.04		-0.01		-0.11		-0.01		0.05					
City	-0.02		-0.06		0.00		0.14	*	-0.02		0.01		-0.01		0.00		0.05		0.08					
Suburb	0.00		0.08		-0.03		0.02		0.01		0.00		-0.01		0.19		-0.02		0.00					
Town	0.01		0.08		0.01		-0.04		-0.01		0.04		0.01		-0.23	*	0.01		-0.12					
Rural	0.01		-0.10	*	0.02		-0.14		0.02		-0.05		0.01		-0.06		-0.03		0.00					
FRPL Q1	0.00		0.03		-0.01		0.04		-0.02		-0.01		-0.01		0.17		-0.03		-0.05					
FRPL Q2	0.00		0.03		0.01		-0.02		0.02		-0.03		0.01		-0.11		0.01		0.04					
FRPL Q3	0.01		-0.03		0.00		0.01		0.00		0.06		0.00		-0.08		0.03		0.03					
FRPL Q4	-0.02		-0.08		0.01		-0.11	**	0.01		-0.01		0.00		-0.04		0.00		-0.03					
Percent white Q1	-0.02		-0.04		0.01		-0.07		0.00		0.00		-0.01		-0.09		-0.01		0.19	*				
Percent white Q2	-0.01		-0.03		-0.03		-0.04		-0.01		-0.03		0.00		0.02		0.00		0.02					
Percent white Q3	0.00		0.12	*	-0.01		0.01		0.00		0.03		0.01		-0.13		-0.01		0.19					
Percent white Q4	0.02		-0.06		0.02		0.06		0.01		-0.01		0.00		0.14		0.01		-0.32	***				
Size Q1	0.02		0.07		0.02		-0.13	*	0.03		0.04		0.02		-0.04		0.01		-0.15					
Size Q2	-0.02		-0.09		0.00		0.06		-0.02		-0.03		-0.02		-0.02		-0.01		-0.04					
Size Q3	0.00		0.00		0.00		0.04		-0.03		-0.04		0.00		0.09		0.03		-0.01					
Size Q4	-0.01		0.01		-0.02		0.04		0.01		0.01		0.00		-0.03		-0.02		0.16					
N	8,600		3,900		8,490		3,140		7,840		2,840		9,480		5,760		10,030		8,410					

NOTES: SMD = standardized mean difference. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
SOURCE: High School Longitudinal Study of 2009.

Table E.4 Typical coursetaking on social studies course pathway typologies

			Mean number of semesters							
	Percent	Avg number of disciplines	GE	EC	GV	WH	US	OT	None	AP/IB
The Bare Minimum	18.7	2.7	0.2	0.2	0.7	1.3	1.3	0.1	4.2	0.3
Heavy U.S. History	10.8	2.6	0.1	0.0	0.7	1.9	4.0	0.3	1.0	0.6
Heavy World History	11.9	2.7	0.0	0.1	1.0	4.2	1.7	0.1	0.8	2.1
The Basics	14.7	3.3	0.1	0.0	2.2	2.0	1.9	0.5	1.3	1.1
Add Economics	22.9	4.1	0.1	1.2	1.0	2.1	2.1	0.3	1.3	0.8
Add Geography	13.5	4.3	1.9	0.5	0.9	1.7	1.9	0.3	0.8	1.7
Replace With Other	7.5	3.2	0.1	0.1	0.6	1.8	1.5	2.5	1.5	1.2

N = 9,980. SOURCE: High School Longitudinal Study of 2009.

Table E.5 Covariate balance table for social studies course pathway typologies

	Heavy U.S. History		Heavy World History		The Basics		Add Economics		Add Geography		Replace With Other	
	SMD	Sig?	SMD	Sig?	SMD	Sig?	SMD	Sig?	SMD	Sig?	SMD	Sig?
	Before propensity score weights are applied											
Male	0.00		0.03		-0.05		0.03		0.04		-0.09	*
Female	0.00		-0.03		0.05		-0.03		-0.04		0.09	*
White	-0.08		0.02		0.10	**	-0.02		-0.19	***	-0.07	
Black	-0.07		-0.10	*	-0.03		0.01		-0.07		0.00	
Hispanic	0.05		-0.08	*	-0.11	**	0.01		0.21	***	-0.09	*
Asian	0.10	*	0.20	***	0.04		0.06	*	0.17	***	0.18	***
Other	0.04		-0.05		-0.05		-0.04		-0.04		0.04	
SES Q1	-0.08	*	-0.32	***	-0.17	***	-0.17	***	-0.14	***	-0.21	***
SES Q2	-0.12	**	-0.29	***	-0.12	**	-0.16	***	-0.15	***	-0.21	***
SES Q3	-0.01		-0.16	***	-0.07	*	-0.04		-0.04		-0.07	
SES Q4	0.13	**	0.11	**	0.05		0.04		0.09	*	0.10	*
SES Q5	0.06		0.49	***	0.25	***	0.25	***	0.18	***	0.31	***
Achievement	0.17	***	0.62	***	0.34	***	0.30	***	0.36	***	0.39	***
Favorite subject	0.11	*	0.25	***	0.10	**	0.11	***	0.10	*	0.13	**
Least favorite	0.00		-0.03		0.02		-0.01		0.00		-0.04	
Neither	-0.08		-0.15	***	-0.09	*	-0.07	*	-0.06		-0.06	
City	0.00		0.24	***	0.13	***	0.23	***	0.26	***	0.08	
Suburb	0.33	***	0.23	***	0.13	***	0.05		-0.07		0.15	***
Town	-0.05		-0.28	***	-0.15	***	-0.16	***	-0.12	***	-0.16	***
Rural	-0.32	***	-0.28	***	-0.14	***	-0.16	***	-0.09	*	-0.11	*
FRPL Q1	0.24	***	0.53	***	0.36	***	0.41	***	0.10	**	0.41	***
FRPL Q2	-0.14	***	-0.32	***	-0.13	***	-0.28	***	-0.06		-0.14	**
FRPL Q3	-0.17	***	-0.26	***	-0.28	***	-0.19	***	-0.11	**	-0.31	***
FRPL Q4	0.05		-0.10	**	-0.10	**	-0.05		0.10	**	-0.09	*
Percent white Q1	0.18	***	0.02		-0.13	***	0.15	***	0.21	***	0.05	
Percent white Q2	-0.06		-0.20	***	-0.09	*	-0.13	***	0.25	***	0.03	
Percent white Q3	-0.06		0.02		0.03		0.11	***	0.04		0.08	
Percent white Q4	-0.04		0.10	*	0.12	***	-0.13	***	-0.37	***	-0.11	*
Size Q1	0.11	**	0.24	***	0.16	***	0.13	***	0.07		0.16	***
Size Q2	-0.17	***	-0.20	***	-0.01		-0.22	***	-0.13	***	-0.14	**
Size Q3	-0.06		-0.01		-0.14	***	-0.15	***	-0.34	***	-0.13	**
Size Q4	0.12	**	-0.02		0.00		0.22	***	0.35	***	0.12	*
	After propensity score weights are applied											
Male	0.01		-0.06		0.01		-0.02		-0.02		-0.02	
Female	-0.01		0.06		-0.01		0.02		0.02		0.02	

White	0.01	0.03	0.01	0.04	0.06	0.10	
Black	-0.02	-0.08	-0.03	-0.05	-0.03	-0.03	
Hispanic	0.01	0.05	0.02	-0.02	-0.04	-0.10	*
Asian	-0.04	-0.02	-0.02	-0.01	-0.03	-0.04	
Other	0.03	-0.01	0.01	0.01	-0.01	0.01	
SES Q1	-0.01	-0.03	0.00	-0.01	-0.02	0.01	
SES Q2	0.03	0.03	-0.02	0.01	-0.01	-0.01	
SES Q3	0.01	0.06	0.01	0.00	-0.02	0.01	
SES Q4	0.00	-0.01	0.01	0.00	0.01	-0.01	
SES Q5	-0.03	-0.06	0.00	0.00	0.03	-0.01	
Achievement	0.00	-0.08	-0.03	0.00	-0.02	-0.05	
Favorite subject	-0.01	-0.02	-0.01	0.01	-0.01	-0.02	
Least favorite	0.03	0.06	0.00	0.01	0.04	-0.01	
Neither	-0.02	-0.04	0.01	-0.01	-0.03	0.02	
City	0.04	0.00	-0.02	0.00	0.01	-0.04	
Suburb	0.00	-0.07	-0.01	0.00	0.01	0.00	
Town	0.01	0.07	0.02	0.01	0.04	0.01	
Rural	-0.05	0.01	0.01	-0.01	-0.04	0.03	
FRPL Q1	0.05	-0.08	-0.03	-0.01	0.03	-0.04	
FRPL Q2	-0.02	0.08	0.00	0.04	0.00	0.03	
FRPL Q3	-0.02	0.02	0.05	-0.01	-0.01	0.02	
FRPL Q4	-0.02	-0.06	-0.02	-0.04	-0.07	-0.02	
Percent white Q1	0.00	-0.06	-0.04	-0.01	-0.04	-0.03	
Percent white Q2	-0.03	-0.08	-0.02	-0.05	-0.03	-0.06	
Percent white Q3	-0.01	0.07	0.03	0.04	-0.01	-0.02	
Percent white Q4	0.03	0.04	0.02	0.01	0.05	0.08	
Size Q1	0.03	-0.03	0.02	-0.01	0.02	0.03	
Size Q2	-0.02	-0.04	0.00	0.01	-0.07	-0.04	
Size Q3	0.02	0.08	-0.05	0.00	0.04	0.07	
Size Q4	-0.02	-0.01	0.02	0.00	0.02	-0.05	
N	2,840	2,930	3,180	3,940	3,090	2,540	

NOTES: SMD = standardized mean difference. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
SOURCE: High School Longitudinal Study of 2009.

Table E.6 Correlations between shares of credits earned in social studies disciplines

	World history	U.S. history	Government	Economics	Geography
World history	1.00	---	---	---	---
U.S. history	-0.21	1.00	---	---	---
Government	-0.16	-0.22	1.00	---	---
Economics	-0.11	-0.14	-0.10	1.00	---
Geography	-0.35	-0.08	-0.08	0.02	1.00

N = 10,530. SOUCRE: 2009 High School Longitudinal Study.

Table E.7 Civic outcomes, by subgroup

	Percentage of students who reported…	
	Voting	Volunteering
All	0.61	0.39
Sex		
Male	0.64	0.35
Female	0.59	0.42
Race/ethnicity		
White	0.64	0.39
Black	0.64	0.40
Hispanic	0.53	0.31
Asian	0.51	0.49
Other	0.63	0.38
Family socioeconomic status (index)		
Quintile 1 (Lowest)	0.51	0.23
Quintile 2	0.57	0.28
Quintile 3	0.59	0.32
Quintile 4	0.61	0.41
Quintile 5 (Highest)	0.68	0.53
N	10,550	10,550

SOUCRE: 2009 High School Longitudinal Study.