Published in final edited form as:
Soc Probl. 2014 November ; 61(4): 602–624. doi:10.1525/sp.2014.12255.

Family Socioeconomic Status, Peers, and The Path to College

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Abstract

Drawing on the primary/secondary effects perspective of educational inequality, this mixed methods study investigated connections between high school students' trajectories through college preparatory coursework and their relationships with parents and peers as a channel in the intergenerational transmission of socioeconomic inequality. Growth curve and multilevel analyses of national survey and transcript data revealed that having college-educated parents differentiated students' enrollment in advanced coursework at the start of high school and that this initial disparity was stably maintained over subsequent years. During this starting period of high school, exposure to school-based peer groups characterized by higher levels of parent education appeared to amplify these coursework disparities between students with and without college-educated parents. Ethnographic data from a single high school pointed to possible mechanisms for these patterns, including the tendency for students with college-educated parents to have more information about the relative weight of grades, core courses, and electives in college-going and for academically-relevant information from school peers with college-educated parents to matter most to students' coursework when it matched what was coming from their own parents.

Keywords

Academic Achievement; Education; High School; Peer Relations; Socioeconomic Inequality

Introduction

With economic returns to higher education reaching historic levels, secondary education has become a high-stakes game in which a series of academic "moves" shape long-term trajectories (Arum 2000; Fischer and Hout 2006). Consequently, the range of curricular options available in high school offers both opportunity and risk. Students must navigate this maze in order to accrue academic credentials that promote entry into four-year colleges, but not all are equally prepared to do so. Indeed, family socioeconomic status (SES), particularly parents' own educational attainment, affects access to information that helps students assess present options and develop plans for the future. This interplay of family background and curricular status in high school is a channel in the intergenerational transmission of inequality (Schneider 2007).

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Although disparities in high school education are often structural in nature, they also reflect social psychological phenomena, such as decision-making and interpersonal relations, that need to be understood (Crosnoe 2011). Primary/secondary effects (Boudon 1974) and social capital (Coleman 1988) perspective suggest that this understanding can be promoted through attention to differences in the instrumental resources that higher- and lower-SES parents bring to coursework decisions at key points of students' school careers. Such disparities in time-specific decision-making can then lead even similar-ability students into diverging destinies that reinforce socioeconomic stratification. At the same time, however, lower-SES students might be able make up some of these differences and maintain even footing when broad social networks expose them to such resources through ties to peers who themselves have higher-SES parents (see Jackson 2013).

This study, therefore, views students' pathways of college preparatory coursework in public high schools as a function of a series of academic decisions shaped by the socioeconomic positions of their parents and their classmates' parents. The goals are to explore when and why socioeconomic disparities in coursework are most pronounced and most reactive to the socioeconomic composition of school peer contexts. In this spirit, we analyze quantitative data from the National Longitudinal Study of Adolescent Health (Add Health) along with qualitative data from a large public high school. Mixing methods in this way allows us to establish broad parameters of inequality across diverse settings and groups though statistical analysis of population data and then unpack the mechanisms that potentially underlie these parameters by delving into rich information that is not typically accessible in large survey studies.

Secondary SES Effects on High School Coursework

In the U.S., high school curricula have complex requirements and prerequisites internally differentiated by topics, difficulty, and credits (Attewell and Domina 2008; Gamoran and Hannigan 2000). Students navigate these curricula towards probabilistic endpoints (e.g., high school graduation, college matriculation) that predict social mobility in an economy maximizing lifelong returns to education. Thus, coursework today forecasts differences in socioeconomic attainment tomorrow (DeLuca and Rosenbaum 2001; Goldin and Katz 2008). Importantly, it also reflects socioeconomic background. Students from higher-SES families accrue, on average, more elite credentials in core curricula. Parent education is a particularly important component of SES, tapping into the heritability of academically relevant traits and a range of structural and social advantages (Grodsky and Riegle-Crumb 2010; Lee et al. 1997; Schiller et al. 2010).

Raymond Boudon's (1974) perspective on primary and secondary effects is relevant to understanding such socioeconomic disparities in coursework. *Primary effects* concern disparities in performance at some point that are rooted in genetic influences and social experiences up to that point. For example, high-SES students score higher on achievement tests and make better grades than their low-SES peers at all levels of schooling in the U.S., largely because they have consistently had more opportunities to learn and develop their cognitive skills (Buchmann and Park 2010; Duncan and Murnane 2012; Erikson et al. 2005; Goldthorpe 2000). *Secondary effects* involve the advantages of SES that differentiate even

similar-ability students through the moves they make within a range of options presented by their ability level. For example, high school students with high-SES parents are more likely to enroll in higher education than their low-SES peers with similar grades and test scores, reflecting the greater resources they have to draw on to understand the system and meet its perceived challenges (Breen and Goldthorpe 1997; Jackson et al. 2007; Morgan, Spiller, and Todd 2013).

Most often, primary and secondary effects are studied in relation to major educational transitions. For example, in the U.K., compulsory schooling ends at 16, when students continue into advanced academic schooling, shift to vocational training, or enter the labor market. Youth from high-SES backgrounds are five times more likely to take the first option than low-SES students. About three-fourths of this effect reflects the higher levels of academic achievement among high-SES 16 year olds (primary effect), with the remainder explained by the greater tendency for high-achieving high-SES students to continue academic schooling compared to equally high-achieving low-SES students (secondary effect) (Erickson et al. 2005). We argue that this focus should be expanded beyond the transitions that occur at major branch points of the system (e.g., continuing into college or exiting the system altogether after high school). Primary and secondary effects are also likely at work at more specific transitions that occur between major branch points (e.g., continuing on a curricular sequence or shifting into a new one when changing from one grade to another within the same school level). Such transitions are examples of the “micro-events” in curricular pathways that Stephen Morgan (2002) has specified as critical points of academic decision-making in which inequalities are rooted. These between- and within-level transitions are, of course, related, as the micro-events occurring just after a major branch point transition—such as course enrollment patterns around the initial transition into high school—could set the stage for all subsequent micro-events until the next major branch point (Buchmann and Park 2010; Morgan 2005).

In terms of high school curriculum, therefore, consider a scenario in which a student with high-SES parents enrolls in an advanced course while a low-SES schoolmate does not. If this difference occurs because the former’s many years of higher-quality instruction and greater exposure to extracurricular academic support have allowed him or her to demonstrate greater academic preparedness for that course than the low-SES schoolmate, then it reflects a primary effect. That difference in enrollment reflects a secondary effect if, instead, both students had demonstrated the necessary academic preparedness but the high-SES parents were more aware of the long-term advantages that course could bring to their child’s future college chances than the low-SES parents (Buchmann and Park 2010; Catsambis 1994; Entwisle et al. 2005). Importantly, this difference in high school course coursework produced by both primary and secondary effects could eventually itself become a primary effect in the next major branch point in the educational system—if, for example, the high-SES student is more likely to be admitted to an elite college because he or she took that advanced course.

Whether primary or secondary effects are more important is a subject of debate and likely depends on the context and outcome (Morgan et al. 2013; Nash 2005). This study does not wade into that debate. Instead, it takes primary effects into account while attempting to gain

a better understanding of secondary effects—examining how, why, and under what circumstances they factor into the micro-events between major educational transitions. The motivation for this focus is two-fold. First, it sheds light on the nuanced sources of inequality inherent in an educational system steeped in the values of meritocracy, characterized by choice, and predicated on parental involvement—how parents gain advantages for students not warranted by their academic aptitude. Second, it points to the importance of continuing interventions into educational disparities well past the early childhood period that is now prioritized by policy (Crosnoe and Huston 2007; Morgan 2012). Thus, the micro-events of transitioning from one class to the next in a sequence of high school coursework are viewed as discrete points of decision-making in which family SES—specifically, parent education—can make a difference in whether a student moves forward, makes a lateral move, or drops out, regardless of prior academic standing.

Of course, many actors in a student's network can influence academic decision-making, not just parents. Indeed, ample evidence suggests that the composition of the peer group can shape academic progress, including coursework, by passively modeling (or not) and actively encouraging (or discouraging) academic behaviors. For example, through both processes, high-achieving peers support higher-level coursework (Epple and Romano 2011; Frank et al. 2008; Sacerdote 2011). We argue that high-SES peers are also a resource, regardless of whether they are high-achieving or not, as they can be "vessels" of indirect transmission of influence from their own parents to their fellow students. After all, whether and how peers passively model or actively encourage some academic behavior will be shaped by their parents' socioeconomic circumstances, and so, regardless of one's own background, having high-SES peers may encourage upward progress in coursework (Fletcher et al. 1995; Rumberger and Palardy 2005).

How might this peer phenomenon relate to secondary effects? Given the socioeconomic segregation of schools and curricula in the U.S., high-SES students are likely to have high-SES peers. Still, the link between individual SES and peer SES is not absolute, and some low-SES students will have high-SES peers. That student-peer SES disjuncture could dilute secondary effects. Within the same level of academic preparation, a high-SES student may be more likely to enroll in advanced coursework than a low-SES student due to the influences of the former's parents. When surrounded by generally socioeconomically advantaged peers, however, the influences of peers and their parents could substitute for the influence of parents that a high-SES student may have and a low-SES student may not. Consequently, the secondary SES effect in high school coursework that exists in general might be weaker in peer contexts characterized by high average levels of SES (Lauen and Gaddis 2013; Rumberger and Palardy 2005).

Integrating the consideration of parents and peers in secondary effects, the first aim of this study is to examine how socioeconomic disparities in coursework play out over time and across peer contexts. The expectation is that, net of performance histories, disparities will be larger when students are first transitioning into high school and smaller when they are exposed to higher-SES peers. Here, SES refers to parent education, coursework is tapped by credits in college-preparatory classes, grades and cognitive tests gauge performance histories, and the peer context is conceptualized as the wide band of peers in the same

general academic strata—similar coursemates who are a primary reference group and pool of potential friends (Giordano 2003). To pursue this goal, we draw on Add Health to quantify the magnitude of disparities in college preparatory coursework trajectories related to parent education and then examine the parent education level of coursemates as a potential moderator of these disparities.

Mechanisms of Secondary Effects

If secondary SES effects on high school coursework exist in the ways just hypothesized, then the next question to ask is: why? Theoretical discussions in secondary effects research typically highlight the resources that youth access through the social networks structured by their family SES, strongly connecting that literature to the social capital literature. One commonality between these literatures is an emphasis on the instrumental resources that students receive or elicit to recognize and capitalize on academic opportunities (Coleman 1988; Morgan et al. 2013). Thus, we focus on such resources when attempting to answer that "why?" question.

Beginning with parents, they can advise students about academic concerns, advocate for them at school, connect them to other advocates, and secure opportunities for them (Stanton-Salazar 2001; Steinberg, Brown, and Dornbusch 1996). These resources likely matter more when conditions are uncertain and discretion can be exercised. Because what constitutes "good" or "bad" coursework choices in high school is far less clear than high or low grades, the high school curriculum is indeed an arena of discretion within uncertainty (Plank and Jordan 2001; Sutton, Muller, and Langenkamp 2013). In such conditions, more educated parents can draw on their greater knowledge about what students need to do *now* to make college happen *later*, access to others who can fill in gaps in this knowledge, and social standing that elicits more investment from and acquiescence by school personnel (Attewell and Lavin 2007; Schneider 2007). They know the written and unwritten rules and can work the system more effectively. At any given point, then, students with more educated parents should be better equipped to make informed decisions with long-term consequences and face more family constraints on making "wrong" decisions. This competitive advantage may matter more amidst the shuffling of students and expansion of coursework differentiation that occurs at the transition into high school (Baker and Stevenson 1986; Crosnoe and Huston 2007; Karen 2002; Morgan 2005). Of course, some educated parents either do not actively manage their children's schooling or do so poorly while many less educated parents agentically navigate their children through school. Thus, instrumental resources may be linked to parent education probabilistically, not absolutely.

Turning to peers, differences in instrumental resources from parents may be magnified or evened out when school peers are alternate outlets for instrumental resources. When information passes from parent to student, it is often disseminated through ties among students—they share with each other what they get from parents (Crosnoe et al. 2008; Fletcher et al. 1995). In those cases in which students with less educated parents are exposed to school peers who have more educated parents, they will have access to the peer exchange of some of the instrumental supports that they might get less of at home (Legewie and DiPrete 2012; Rumberger and Palardy 2005; Tyson, Darity, and Castellino 2005). In other

words, the resources that they get from peers would more often be new, relative to what they get from their families, while those peer resources would be more redundant for students with more educated parents. Such a resource substitution (see Mirowsky and Ross 2003) would mean that the general disadvantage in instrumental support faced by students with less educated parents might be reduced if they can somehow make makes their way into school-based peer crowds comprised of students with more educated parents (McDonough 1997; Rumberger and Palardy 2005).

The second aim of this study, therefore, is to explore the instrumental resources that students receive and elicit from their parents and peers. The expectation is that resources providing a concrete informational basis for the assessment of coursework decisions (i.e., micro events) will link parent education—one's own parents, peers' parents, and their interplay—to coursework trajectories. To pursue this goal, we draw on local ethnographic data in a public high school that unpack the instrumental resources that are traded among students, parents, and peers. In contrast to survey data that mostly allow the *frequency* of coursework discussions to be counted, this qualitative approach enables the *substance* of these discussions to be parsed.

Methods

Data

The quantitative data source, Add Health, is a nationally representative sample of 7^{th}-12^{th} graders (www.cpc.unc.edu/projects/addhealth). Sampling began with the random selection of high schools from a stratified frame that were matched to a probabilistically selected set of feeder middle schools. During the 1994-95 school year, nearly all students in these 132 schools took the In-School Survey to create an individual-level sampling frame for later data collections. Of these 90,118 students, a subgroup selected evenly across schools participated in the In-Home Interview in 1995 (Wave I; N = 20,745). Except for high school seniors, Wave I respondents were followed up in 1996 (Wave II, N = 14,738). Next, the Wave I respondents (including seniors) were followed up in 2001 (Wave III, N = 15,197). Education data were then added to Add Health by the Adolescent Health and Academic Achievement study (AHAA), which was authorized to collect high school transcripts by 91% of the Wave III sample (www.laits.utexas.edu/ahaa/). Our analytical sample consisted of Add Health's 7,718 students attending public high schools in the data release (2002) that included transcripts. Worth noting is that Add Health had a multi-cohort design, in which students were surveyed 0-2 times in high school depending on their Wave I grade. The AHAA transcripts, however, covered all four grades for all students. For example, Wave I freshmen had all four transcript years (9^{th}-12^{th} grades) during or subsequent to their Wave I survey, but Wave I juniors had two years of transcript data (9^{th}-10^{th}) prior to their Wave I survey, one year (11^{th}) at the same time as this survey, and one year (12^{th}) after this survey.

The qualitative data were collected during 2006 in a public high school (Lamar is its pseudonym) in Texas serving 2,200+ students. Designed to complement Add Health, the purpose of this study was to understand how relationships with peers and adults support adolescents' academic experiences. In addition to 25 hours of observational ethnography during and after school, a subset of 32 freshmen, sophomores, and juniors were recruited

from two untracked, required courses for intensive activities. Adolescents filled out surveys, created "Who I Am" photo collages about their lives, provided access to their personal web pages, and sat for semi-structured interviews. These data were supplemented by teacher interviews, course catalogs, and graduation requirement documents. See Table 1 for the sociodemographic makeup of the subsample of focal youth, who mirrored the school and district in race/ethnicity. Slightly less than half (13) had parents with college or advanced degrees, but two had parents who had not graduated from high school. Although White parents had more education overall, four African-American and Latino/a youth had parents with college degrees.

As already argued, pairing the Lamar data with Add Health allows for the exploration of mechanisms potentially underlying the statistical patterns that cannot be unpacked with surveys (Axinn and Pearce 2006). Yet, this pairing also raises several issues that may qualify any conclusions to be drawn from the results. Although Add Health includes scores of schools, Lamar is a single school in one city. We recognize that our results may or may not generalize to students in schools that differ from Lamar, but we also argue that the size and diversity of Lamar maximizes our ability to observe and hear from girls and boys from multiple race/ethnicities and social classes, which is important given the practical constraints of doing qualitative work across multiple locations. At the same time, preliminary analyses of school-level variation in Add Health suggested that key parameters did not differ across school types. Furthermore, if one setting is to be chosen, Texas has advantages, in that enrollment in public colleges in Texas is guaranteed for public school students in the state graduating in the top 10% of their classes. Although this law would seem to prioritize grades over coursework, it makes more significant the role of minimal coursework requirements in gaining admission to Texas state schools for students. It also increases the importance of advanced coursework for students attempting to gain admission to private schools or out-of-state schools and for students just over 10% aiming for Texas state schools (Alon and Tienda 2007). The two data sources were also separated in time. Add Health youth were surveyed in the mid-1990s, and the youngest students' transcripts extended only to the early 2000s. The Lamar students entered high school in the mid-2000s. Both time periods came after many major curricular reforms of the late 20th Century (Attewell and Domina 2008; Lee et al. 1997), but they happened on either side of the implementation of No Child Left Behind, although the NCLB reforms did happen earlier in Texas.

Quantitative Measurement

College preparatory coursework index—The AHAA transcripts listed credits earned in all subjects in each year of high school. This information was used to create *four indicators* of whether, in any year, students took the high-level coursework needed to eventually have a curricular profile that would help them be competitive for college (especially elite) entry and avoid college remediation (Adelman 2006; Hampden-Thompson, Warkentien, and Daniel 2009).

The first indicator was math level. Research on normative course-taking patterns in the U.S. with AHAA and, before that, the National Education Longitudinal Study (Riegle-Crumb 2006; Stevenson et al. 1994) revealed a hierarchical sequence of math courses: remedial,

general, pre-algebra, algebra I, geometry, algebra II, advanced (e.g., algebra III, statistics), pre-calculus, and calculus. If students were to reach the top course in this hierarchy by the end of high school, they needed to be at certain points in the hierarchy at each stage of high school. Consequently, we created a binary marker of math college preparatory coursework (1 = on track, 0 = not on track in math) for each adolescent in each grade. The minimal threshold was algebra I in 9th grade, geometry in 10th, algebra II in 11th, and advanced math in 12th. Over 70% of the sample was on track in math in 9th grade, but only 34% were by 12th grade.

That same prior research has revealed a similar, albeit less defined, sequence for science: basic/remedial, general/Earth, biology I, chemistry I, advanced (e.g., biology II), and physics. Following the same logic, we created binary markers designating whether a student in any given grade was on track to reach the top of this hierarchy by the end of school. The thresholds were Earth science in 9th grade, biology in 10th, chemistry in 11th, and advanced science in 12th. About 75% of the sample was on track in 9th grade, falling to 33% by 12th grade.

Unlike math and science, foreign language courses are ordered by level, not by sequences of within-subject fields (Riegle-Crumb, Farkas, and Muller 2006). For example, the ordering of Spanish coursework is usually something like: Spanish I (introductory) and II (mid-level), which are required, followed by optional III (advanced) and IV (expert) courses. Students who persisted past language requirements accrued tangibly elite credentials for college. Thus, we created a binary marker for each grade. Just below 50% of the sample was in the first year of foreign language in 9th grade. Only 6% had taken four years of foreign language by 12th grade.

Finally, English does not have a sequential distribution. Instead, it is best differentiated by level within grades rather than subject or level across grades. To identify students on the college track at each grade, we created a binary marker of enrollment in an Advanced Placement, International Baccalaureate, or Honors English class. The proportion of the sample in high-level English fell from one-fifth in 9th grade to one-tenth in 12th grade. This threshold demarcating “high” and “low” students, therefore, is much higher than in other subjects. Although such a demarcation creates more imbalance between the focal levels for English (relative to other subjects), it best reflects the reality of English coursework in American schools.

For each grade, the four indicators were summed into an index (0-4) of high-level college preparatory coursework. Table 2 presents descriptive statistics for these indices.

Family SES—Wave I parent reports differentiated students who had a parent who had graduated from college (1) or not (0). Given that parent education is part of a cluster of family circumstances (McLanahan 2004), other aspects of family background were measured, including income to needs and family structure. The first was constructed by dividing Wave I parent reports of household income by the federal poverty threshold for their family size (Magnuson and Duncan 2002). The second was a binary measure, based on household rosters, differentiating students living with two biological parents from all other

family types. Table 3 includes descriptive statistics for these family factors as well as other study variables.

Coursemates—AHAA applied a clustering algorithm to the transcripts (Field et al. 2005; Frank et al. 2008), which reduced the data according to associations between pairs of courses appearing on the same transcripts. Each cluster represents a specific, non-overlapping coursework pattern. One might be defined by honors coursework, another by band membership and courses that go along with it. The former is akin to a track, but the latter is not. These clusters, therefore, represent youth who share similar space in school and are most likely to interact. In each school, an average of 15 clusters was identified by applying this algorithm to all transcripts in the year corresponding to Wave I. Students were then assigned to clusters based on the degree to which their coursework patterns fit the courses contained in the cluster (Frank et al. 2008). For the focal peer variable, we measured the proportion of each students' coursemates with a parent who had graduated from college. We also measured mean academic achievement with a four-point grade point average calculated from self-reported grades. Finally, adolescents nominated up to 10 friends on the In-School Survey (Moody and White 2003). Reports of parent education from nominated friends were used to measure the proportion of friends with a parent who had graduated from college.

Academic skills and performance—Academic and cognitive factors were central to primary SES effects, which needed to be controlled to isolate secondary effects. Thus, students' four-point grade point averages were measured with transcript data for 9th grade (to gauge entry-level status) and then cumulatively across all years of school. In Wave I, youth took an abridged version of the Peabody Picture Vocabulary Test (PVT), a standardized assessment of verbal ability. These scores were used to proxy general cognitive skills.

Sociodemographic characteristics—Control variables included gender, race/ethnicity (dummy variables for White, African-American, Hispanic-American, Asian-American, Other), and immigration status. The latter was measured by dummy variables identifying students who were foreign-born (first generation), U.S.-born with foreign-born parents (second generation), and U.S.-born with U.S.-born parents (third-plus generation).

School context—Because the In-School Survey was a census of each school, its parent education and grade point average measures could be averaged across all students in each school to create school-level summary measures. Several factors were also examined to account for variability in institutional control over course enrollment. These factors, all based on school administrator reports at Wave I, included the proportion of seniors in the college preparatory track, whether ability grouping was used in any grade in the school, and whether the school was academically specialized (e.g., math/science academy).

Quantitative Analyses

The first aim of this study—examining how socioeconomic disparities in coursework play out over time and across peer contexts—involved two sets of quantitative analyses: 1)

multilevel growth curves that captured progression through grade-specific coursework over the four years of high school, by parent education, and 2) multi-level analyses of changes in coursework between contiguous grades, by parent education and peer group composition.

First, growth curves captured over-time trends in whether students were on-track for college in a particular grade. This approach offered a different picture than examining SES differences in end-of-high school coursework outcomes (e.g., highest course reached), which could not speak to how socioeconomic disparities changed over the course of high school. It also contrasted the examination of SES differences in the accumulation of college-preparatory credits from grade to grade (i.e., the rolling number of total credits amassed), in which initial coursework patterns could mask any important shifts in coursework in later grades of school. In the growth curve model, Level 1 represented the grade-specific coursework indices, Level 2 the student, and Level 3 the school. This growth curve had an intercept (average starting point in 9^{th} grade) and slope (average rate of change through 12^{th} grade), the latter captured by a linear time predictor with values for each grade. It was also characterized by a quadratic term (the average "correction" to the rate of change from grade to grade), captured by the square of the time variable. Models were estimated in the SAS mixed procedure (Singer 1998), which accounted for Add Health's design effects and, with weights, its non-random attrition. The MI procedure imputed missing data with plausible values based on information from all other variables.

After the estimation of the initial growth curve, parent education and other covariates were added as predictors of the intercept, slope, and quadratic factors. The treatment of one covariate, g.p.a., differed from the treatment of the rest. For the intercept and slope, 9^{th} grade g.p.a. was included as a predictor, but cumulative g.p.a. was added as a predictor of the quadratic, given that this end-of-school factor was based on data subsequent to the intercept (9^{th} grade) and most of the data points making up the slope.

Second, to bring in the interplay of family and peer SES, we turned to multilevel modeling. Recall that Wave I occurred after some of the AHAA transcript years of Wave I 10^{th}-11^{th} graders and after or during all of the transcript years for Wave I 12^{th} graders. Although not a problem when Wave I parent education (which was fairly stable across adolescence) was the focal independent variable, this time-ordering between Add Health and AHAA became more problematic when the Wave I coursemate factor was the focal predictor, as a students' coursemates changed from grade to grade. Thus, the association between coursemate composition and student coursework had more significant potential for bidirectionality (i.e., coursework composition could influence student coursework just as student coursework influenced coursemate composition) than the association between parent education and student coursework (i.e., student coursework was unlikely to influence parent education, although parent education was hypothesized to influence student coursework). Consequently, we had to adopt a new methodological strategy that ensured proper time-ordering between the Wave I survey variables and the transcript outcomes.

The coursework variables from the Wave I and Wave I+1 years for each grade level were selected as independent and dependent variables in a lagged modeling strategy. This model captured changes in coursework between 9^{th}-10^{th} grades for Wave I 9^{th} graders, 10^{th}-11^{th}

grades for Wave I 10th graders, and 11-12th grades for Wave I 11th graders (with the Wave I 12th graders dropped for lack of a Wave I+1 transcript year). It was then expanded by adding Wave I parent education, the Wave I coursemate measure, and their interaction, net of the covariates. The mixed procedure partitioned variance among three data levels (1 = students, 2 = coursemate cluster, 3 = school), thereby accounting for the school-based clustering of the data. Again, sampling weights and multiple imputation were employed.

Importantly, the results of these models were robust to alternative specifications, including Poisson estimation (for the count-like coursework outcome), the separation of the coursework index into its constituent subjects, and the aforementioned exploration of other ways of capturing dynamic changes in coursework disparities. Although the results were not identical across specifications, they generally pointed to the same conclusions.

Qualitative Analyses

General guidelines following Miles and Huberman (1984) organized the analyses of the qualitative data from Lamar. All interviews were professionally transcribed, and the collages, web sites, and field notes were content-coded by personnel trained through a central coding scheme. The data were then sorted into tree codes in nVivo according to both a priori and emerging theoretical themes about academic decision-making and discussion.

Initially, we focused on 10 themes dealing directly with parents' inputs into and advice about the decisions to persist in or drop out of coursework in scenarios of differing optionality (i.e., whether required or not). These themes were cross-classified by parent education and academic achievement. The resulting matrices revealed common decision-making patterns and key parental inputs in each group. Next, the content-coded Lamar data were sorted into 8 tree-coded themes dealing with peer discussion about and influence on coursework decision-making—again in reference to real and hypothetical scenarios of differing coursework optionality—and then cross-classified by parent education and academic achievement. The resulting matrices were examined to identify key peer inputs on common decision-making patterns in each subset of the sample.

Results

Coursework Trajectories

The first aim of this study—concerning the timing of secondary SES effects on coursework and their moderation by the socioeconomic composition of school peers—began with the unconditional growth curve (i.e., including no covariates) of college preparatory coursework. This model had a positive intercept coefficient ($b = 2.10$, $p < .001$), indicating that the average student began high school with two of the four college preparatory coursework indicators in 9th grade. It also had negative coefficients for the slope ($b = -.32$, $p < .001$) and quadratic factors ($b = -.05$, $p < .001$), indicating an increasingly steep decline across grades in whether students were on-track for college according to the coursework patterns of each grade. The number of college preparatory coursework markers accrued in any one year dropped by a third as students moved from grade to grade, with a slight

acceleration each year. On average, students had two college preparatory markers in 9th grade but less than one in 12th grade.

Table 4 presents results from conditional growth curve models. In the base model (with only parent education as a predictor of the intercept, slope, and quadratic factors), students with more educated parents had significantly more college preparatory indicators in 9th grade than other students (note the significant positive coefficient for parent education in the Intercept column). They also had shallower declines in the number of grade-specific college preparatory coursework indicators from year to year (note the positive coefficient for parent education in the Slope column of smaller magnitude than the negative time coefficient), although the degree of difference in this over-time change declined each year (note the significant negative coefficient for parent education in the Quadratic column). Results from the final conditional model, which included the academic performance measures (plus all covariates), gauged secondary parent education effects. Students with higher PVT scores and initial grade point averages tended to have slower declines in college preparatory coursework (as indicated by the positive coefficients for these variables in the Slope column). Family income was mostly unrelated to coursework trajectories, but students from two-parent families tended to start high school with more college preparatory indicators than students from other family types and gain more (or, really, lose less) over time. African-American and Latino/a youth started high school with fewer indicators than Whites but made up ground over time. The addition of these covariates attenuated the parent education intercept by 33% (relative to the base model) and washed out its associations with the slope and quadratic. The academic factors accounted for most of this attenuation, teasing out primary SES effects and isolating secondary SES effects.

To estimate effect sizes in this final model, we calculated the predicted level of the coursework trajectory in each grade for students whose parents were college graduates and those whose parents were not and translated this difference into standard deviation units for each grade-specific coursework index. Doing so revealed that students with college-educated parents started high school with more college preparatory indicators for that grade (29% of a standard deviation on the 9th grade index) than other students, with some non-significant narrowing of this gap in subsequent grades (see Figure 1). Recall that these analyses captured how much students' coursework in each grade increased their chances—relative to other students in their grades—for eventual college matriculation. Because these indicators were grade-specific, the negative slope coefficient in the curve appeared to indicate a decline in college preparatory coursework as students moved from grade to grade. In reality, it indicated that they were less likely to be in college preparatory coursework for any one grade compared to previous grades, even if they were accumulating more college preparatory credits overall. For example, a student who went from two credits in 9th grade to one credit in 10th would have declined in the number of grade-specific credits earned from two to one while still increasing the overall credit number to 3. As a counterpoint to Figure 1, therefore, Figure 2 depicts the total number of college preparatory coursework indicators accumulated by each grade. For both sets of youth, the total cumulative number of indicators went up from year to year, even though the number earned in any one year declined across grades. Moreover, the socioeconomic disparity was stable across grades.

In sum, students got increasingly off track in college preparatory coursework as they moved through school. Within this general pattern, students with college-educated parents started high school ahead of those with less educated parents and then maintained this advantage. This cross-grade stability of an early parent education advantage supported our expectations that secondary parent education effects would exist (i.e., parent education would predict coursework trajectories above and beyond markers of academic performance) and that these secondary effects would be strongest at the start of high school.

Parents, Coursemates, and Coursework

Next, the first aim of this study was extended to the quantitative examination of the interplay among the educational attainment of students' parents, the educational attainment of the parents of students' coursemates, and students' coursework. We did so by estimating lagged multilevel models measuring change in coursework between adjacent grades.

In Model 1 in Table 5, the Wave II college preparatory index was regressed on parent education, the proportion of coursemates with college-educated parents, Wave I grade level, the markers of academic history, and the full set of family and sociodemographic covariates. By controlling for the Wave I coursework index, this model estimated change in coursework from year to year. In this framework, students' coursework differed by their parents' education but not by the education of their coursemates' parents (see the significant parent education coefficient and non-significant coursemates coefficient in Model 1). Model 2 added two-way interactions of parent education and coursemates' parent education with grade level in an attempt to determine whether the importance of parent education and coursemates' parent education varied by grade. The significant negative interaction for parent education indicated that parent education differences (but not coursemate-related differences) in coursework were smaller in the upper (vs. lower) grades. Parent education and coursemates' parent education did not interact.

As a final test, we added a three-way interaction (parent education × coursemates' parent education × grade level) to the model as well as all constituent two-way interactions. The three-way interaction was statistically significant. To further investigate this time-varying peer moderation of socioeconomic disparities in coursework, Figure 3 presents predicted scores on the Wave II college preparatory index—for all possible combinations of parent education (college graduate vs. not), coursemates' parent education (low = 25% of coursemates had college educated parents, high = 75%), and grade level sequence (9^{th}-10^{th}, 10^{th} -11^{th}, 11^{th}-12^{th}). Changes in coursework were primarily related to coursemate composition for students with college-educated parents transitioning from 9^{th} to 10^{th} grade. Those who had coursemates with more educated parents did better than those who had coursemates with less educated parents. This observed effect exceeded 10% of a standard deviation in the coursework variable as long as 60% or more of their coursemates had college-educated parents, but, in later grades, it only exceeded that threshold when almost all of their coursemates had college-educated parents. For students with non-college-educated parents. it never exceeded that threshold in any grade (and was often virtually 0 or negative).

Although our focus was on the parent education of coursemates, we were sensitive to the possibility that observed effects could have been confounded with other peer characteristics, and so some robustness checks were conducted. First, given evidence that observed effects of peer socioeconomic composition are driven by peer achievement and ability (Hoxby & Weingarth, 2005; Sacerdote 2011), a control for the mean g.p.a. of coursemates was added to the model. Second, because friendships often arise out of classes (Kubitschek & Hallinan, 1998), observed coursemate effects could simply reflect the more proximate influence of friends, and so we added a control for the average parent education of all friends nominated by the student. The focal three-way interaction in Model 3 was essentially the same despite these controls.

In sum, advantages of having coursemates with college-educated parents were only detected at the start of school among students with college-educated parents themselves. The combination of parent education at home and school appeared to help get students with college-educated parents onto a college preparatory pathway that then became self-fulfilling. This pattern of differential effects of coursemates' parent education ran counter to our expectation that such coursemates would matter more to youth who did not have college-educated parents.

Instrumental Support from Parents

The second aim of this study—concerning the potential mechanisms underlying secondary SES effects on coursework and their moderation by the socioeconomic composition of school peers—turned to qualitative analyses of data from Lamar. In particular, we drew on discussions with students about their coursework histories and what classes they would take in the coming year, both in general and under differing hypothetical scenarios of optionality/requirements. These data got at patterns of communication and discussion by parent education better than available survey data. When Add Health or other national sources even touch on such issues, they tend to measure frequency and type of parent-student interactions more than their substance, motivation, and meaning.

At Lamar, parent education differentiated extant and expected curricular pathways. For example, slightly more than half of the students whose parents had not attended college planned to drop out of math or science if given the option, and they also targeted regular (vs. honors) classes. No students with college-educated parents had such plans, and all but two of these students viewed taking honors classes as a default. Some of these differences likely reflected the higher average starting g.p.a. of the students with college-educated parents over the other students once in Lamar, which, in turn, likely reflected the formers' attendance at higher-rated elementary and middle schools prior to entering Lamar (all evidence of primary SES effects). Still, even when comparing students with similar current grades and course placements, these parent education patterns persisted, pointing to secondary SES effects.

Importantly, 9th grade math and science enrollment at Lamar was limited to algebra I and biology I as part of an effort to combat the kinds of coursework disparities being studied here. Thus, unlike in some schools, 10th grade was the first point at which students were able to choose from a variety of math and science classes while also having discretion about level of English. After that point, the courses they took were largely predicated on what they

had taken before. As expected, this carry-over occurred in math, the most hierarchical subject, but it also occurred in other subjects. In science, for example, two-thirds of students in the 10th grade science survey course (an alternate to chemistry I) viewed dropping out of science as the natural next step, but all students in chemistry I believed that going on in science was simply what was done. Likewise, almost all students perceived that being in honors vs. regular English was a decision made at the start of high school that could not really be changed later—once on the honors track, you had to stay on it. Thus, the coursework patterns at Lamar had a self-propagating nature that gave the first steps in the sequence added importance. Here is where parent education seemed to matter, then, in that initially critical transition from standardized 9th grade coursework to differentiated 10th grade coursework.

Echoing results of side analyses of Add Health (not shown) that aspirations of parents and adolescents did not alter the quantitative results in Tables 4-5, pro-school values were not a mechanism of these parent education patterns at Lamar. All but two students expressed a strong desire to attend college, regardless of academic standing or concerns about costs, and the majority of these students were actively formulating plans to make college happen. The commonality in these strategies was what we refer to as resumé building, which, at the start of high school, was widely viewed as a joint activity between parents and students—something young people did in consultation with their parents rather than by themselves or dictated by parents. In short, parents and students had internalized the idea that colleges were looking for well-rounded students, which became a prism through which decisions about coursework (and reactions to school assignments) were made. The key parent education distinction was *not* in whether families had working models of resumé building. Instead, it was that the working models in families headed by college-educated parents were more in line with the reality of college enrollment/persistence.

All students with non-college-educated parents perceived g.p.a. to be the critical factor on a college resumé. A majority also believed that colleges wanted students who engaged in school and community activities and had special talents. Although accurate, these perceptions were linked to more counter-productive views on coursework. For example, except for a couple of students who simply wanted an easier time in school, all students with non-college-educated parents who would downgrade their coursework level if given a choice voiced some variation of the belief that taking hard classes would hurt their college chances by lowering their grades. Indeed, their parents had counseled them in this way. Another example was the belief that diversifying schedules with special electives (e.g., arts) offered a competitive advantage, even if it meant sacrificing core classes. Explaining why she wanted to take sign language over pursuing science, one 10th grade girl said that she was following her non-college-educated mother's advice to "just pick classes that you might have a better chance of getting into college". For these students, opting for general vs. honors English or replacing advanced science with a "club" class were actions intended to promote their college-going chances via their g.p.a. and activity portfolios.

For students with college-educated parents, however, the valuing of good grades and diverse portfolios was conditional. Most would take a higher-level class even if it jeopardized their grades. "Those are the classes you go to school for", answered a 10th grade girl whose

parents had advanced degrees. If they did not recognize the importance of coupling grades and advanced coursework, their parents did. As a White 9th grade girl said about taking chemistry after hearing about peers doing badly in it, "My parents are like, 'No, no, you have to take it'…I end up going with my parents, because they pay the bills". Likewise, electives were uniformly seen as something to add after core credits were filled. Indeed, on the same day as the interview with the girl mentioned above who wanted to take sign language instead of science to boost her college chances, a 10th grade peer said that her college-educated parents told her that she could not take sign language until her senior year when she had sufficient academic credits.

This parent education pattern could be seen as a hidden component of college-related decision-making, one related to ongoing discussions about educational equity. Family-based information channels that feed students into such coursework are oblique and, in Texas, may be camouflaged by the aforementioned 10% plan. For students who earn higher grades, the 10% plan may be more equitable because it requires a less sophisticated understanding of how to gain access to college, although this understanding could leave them less prepared for college courses when they do gain access. For students who do not earn high grades and are aiming for state school admission in Texas and for those with more intermediate grades who are aiming for private school or out-of-state college admission, however, more is needed to make the information supporting decision-making accessible. Moreover, given that advanced courses (e.g., calculus, AP English) contribute more points to g.p.a. than other classes, students who drop out of advanced classes for fear of hurting their g.p.a. may actually be doing more damage to their class rankings—the crux of the 10% plan—than if they had continued to take those classes.

Instrumental Support from Peers

Just as the quantitative component of this study revealed an interaction between parents and peers in students' coursework patterns, so did the qualitative component. At Lamar, peers also factored into students' views about school. Said one White 9th grade boy when asked if students took classes based on what their peers did, "Well, *yeah*." They did so for many reasons, not just to fit in. The most common explanations were a desire for shared experience and a sense that peer patterns captured basic standards of performance. These peer forces could be opposed to or aligned with information flows related to parent education. When the information that adolescents received from parents and peers matched in support of college preparatory coursework (as it did for a majority of students with college-educated parents but a minority of other students), adolescents typically thought that persisting in such coursework was a virtual necessity. The peer information about what classes to take and why verified what parents said, which maximized its effect. In this sense, *redundant* information (e.g., hearing something from a college-educated parent and seeing it in a peer with a college-educated parent) was valuable. Two 9th graders—a Latina whose parents had advanced degrees and a boy whose Middle Eastern immigrant parents had gone to college—exemplified this reinforcement effect. Both looked at what other adolescents "like me" were doing to match their parents' counsel. Almost always, they realized that the match was strong and, therefore, that they were on track.

Other times, information from parents and peers did not match. In some cases, peers had information that contradicted less educated parents' beliefs about the centrality of good grades and electives. Generally, parents were more likely to doubt alternate information if it came from peers (vs. other adults), which was interesting given that much of the information peers had or represented came from their parents. Typically, these students followed their parents' advice. In other cases, peers provided information that contradicted more educated parents' beliefs about the centrality of core coursework. Parents' wishes and counsel most often prevailed, but there was room for variation on the margins. In other words, advanced math might not be dropped for sign language because of some peer consideration, but a third year of Spanish might.

In sum, the coupling of parent/peer information sources could maximize parent education advantages, and discrepancies between the two seemed to do more to increase the disadvantages of low parent education than chip away at the advantages of high parent education. This qualitative pattern data could explain the quantitative pattern that socioeconomic disparities in coursework were larger in peer settings characterized by more parent education. We did not see anything in Lamar to explain why this unexpected peer moderation pattern would be confined to the start of high school, but it was likely related to our aforementioned discussion of how course enrollments early in high school could be self-propagating. Thus, the connection between the family and peer information flows was reinforcing for students' trajectories through high school coursework. Yet, this reinforcement mattered only to establishing the starting points of these trajectories—during a developmental period when young people were experiencing give and take between parent and peer influences and during an institutional period that allowed for initial sorting of youth before institutional inertia takes hold.

Discussion

With the goal of shedding light on socioeconomic disparities in the U.S. educational system, this study drew on the primary/secondary effects perspective and related literatures to explore two aims. For the first aim, Add Health tests indicated that, as expected, having college-educated parents was more of an advantage for student coursework at the start of high school. Other evidence that students with more educated parents appeared to "get more" from being immersed in school-based peer groups characterized by higher levels of parent education contradicted our expectation that these peer groups might buffer (rather than magnify) socioeconomic risk. For the second aim, exploration of the Lamar data revealed some potential mechanisms for these quantitative patterns, including parent education differences in perceptions about the academic components of college-going (e.g., grades vs. credits vs. activities) and in emphases placed on getting into or staying in college. This exploration also suggested a potentially important role of agreement between parents and peers (perhaps more so in certain academic areas like math and science). It also revealed key insights about whom and what parents considered trustworthy sources of information about students' educations and whether the potential for parents to trump peers might be limited to some academic considerations.

Overall, this research advances the field of primary/secondary effects by: 1) demonstrating their relevance to micro-events, or the academic decision points that occur *between* major institutional transitions of the educational career, 2) including peers as key components of primary/secondary effects flowing from parents' socioeconomic positions, 3) going beyond the identification of primary/secondary effects to explore mechanisms underlying them, including the social psychological mechanisms that are often obscured by structural dimensions, and 4) mixing methods to better integrate inductive and deductive approaches to theory-building and hypothesis-testing. Importantly, these contributions to the specific literature on primary/secondary effects also speak to the far broader literature on educational stratification in general. Below, we elaborate on these specific and general contributions.

First, the major branch points of the educational system are widely regarded as critical periods in socioeconomic disparities in academic progress and, as such, have justifiably been the focus of most primary/secondary effects research (Buchmann and Park 2009; Erickson et al. 2005). Yet, educational pathways are not simply demarcated by transitions between levels of the educational system but also by what students do amidst the range of options and constraints within each level of the system. Coursework trajectories offered insight into these within-level branch points, as students must actively or passively choose between various coursework possibilities in the short-term that have long-term consequences. Interestingly, this study revealed that socioeconomic disparities in these curricular micro-events within the high school level of the educational system were primarily rooted in the decision points closest to the transition into this level (see also Baker and Stevenson 1987). Parent education seemed to do the most to inject variation in starting coursework position, and then, once this initial disparity was established, the self-fulfilling nature of coursework took over. This pattern indicates how socioeconomic disparities can accumulate across major branch points in the educational system, with primary and secondary effects at the transition from middle school into high school setting in motion a series of curricular decisions that then affect primary and secondary effects at the transition from high school into college.

Second, despite evidence that peers are major sources of academic influence on youth (Scaredote 2010), they have been largely absent from primary/secondary effects research. Yet, the idea that exposing youth from low-SES families to peers from more socioeconomically advantaged backgrounds can reduce socioeconomic disparities in academic progress is a long-standing one in sociological research and has become a driving force in educational policy in the U.S. (Crosnoe 2009). Our quantitative analyses, however, indicated that socioeconomic disparities in coursework were greater in the context of socioeconomically advantaged curriculum-based peer groups, not smaller, with the high-SES youth benefitting more than the low-SES youth from exposure to such peers. Rather than compensation or protection, then, this pattern was more in line with the notion of cumulative advantage, at least Peter Blau and Otis Dudley Duncan's (1967) focused conceptualization of cumulative advantage as an advantaged group accruing more returns from some shared resource than a disadvantaged group. Moving from theory to practice, this cumulative advantage ties into concerns that policy interventions often widen academic gaps unless they are narrowly targeted to students most in need of help rather than to all students

(Ceci and Papierno 2005). As youth live their lives crossing multiple interpersonal contexts that can each be characterized by socioeconomic circumstances, focusing on only one context (e.g., parents) may obscure important dimensions of how inequality works.

Third, socioeconomic disparities in education are rooted in many structural inequalities, including segregation and funding (Arum 2000), but they also reflect social psychological processes that warrant attention. Our qualitative analyses revealed that the instrumental support that students had for devising a strategy to achieve college goals differed by parent education. Students with college-educated parents, for example, had a clearer view of the impact of coursework on college admissions. Others were focused on grades and activity enrollments that, although important, could be discounted in college admissions. Of course, to the extent that students with less educated parents are more likely to target less selective postsecondary institutions, grades *are* more crucial to them. In contrast, this tradeoff between grades/activities and challenging courses may hurt the chances that students with less educated parents stay in any college that they do enter. Moreover, it may hamper those targeting other kinds of schools. Thus, instrumental supports that differ by parent education may do less to differentiate students on *whether* they go to college than on *where* they go to college (McDonough 1997; Sutton et al. 2013). Worth stressing is that not all college-educated parents have valid information about what students need to do get to college, use such information constructively, or make accurate assessments about what is appropriate for their children's skills and aspirations. Moreover, many socioeconomically disadvantaged parents are quite agentic in finding out what needs to be done and empowered in doing it (Duncan, Huston, and Weisner 2007; Furstenberg et al. 1999). Consequently, the socioeconomic disparities in coursework and instrumental support we reported here are not deterministic. Overall, however these parent resources are an advantage in decision-making that leads to a secondary SES effect, and they may further this secondary effect if, as our findings suggest, they allow students to access and better capitalize on similar resources coming into the school via their peers' parents. Reflecting the social capital framework that we linked to the primary/secondary effects perspective, these parent and peer mechanisms would likely matter most during times of discretion and uncertainty, such as the transition into high school—a period of disrupted relationships and new norms and rules (Benner 2011)—highlighted by our quantitative analyses.

Fourth, because of the lack of depth in what survey data can provide and the limitations of generalizability and causal inference to what qualitative data can provide, mixing methods can support the overall understanding of primary/secondary effects and educational stratification more generally. Here, we used Add Health data to sketch out the basic parameters of inequality on the population level and then designed a companion study of a single school to better understand the "why?" questions that required more conversation and observation and, we hope, to organize future national data collection. There are other ways to mix methods, besides pairing national secondary data with community-based primary data, but this particular mix suited our goals well. The Texas case was especially relevant to the application of the primary/secondary effects perspective to coursework. For Texans, the 10% Plan effectively shifts uncertainty from the college admissions process to efforts to make a school's top 10%. Do students risk taking challenging courses that may affect their

grades? Are students who focus on g.p.a. giving up chances of entry into private schools or non-Texas state schools? Students who have college-educated parents and are surrounded by similar peers tended to hedge their bets, a strategy with rewards through advanced academic skills, SAT preparation, greater attractiveness to colleges outside the 10% Plan, and greater attractiveness to 10% Plan colleges even if g.p.a. falls below the required threshold. Students with less educated parents appeared to make choices to focus on g.p.a. rather than pursue more challenging courses. Our qualitative findings suggest that this tendency is less of an instrumental or strategic decision and more of a function of limited knowledge about the complexity of college admissions requirements.

Expanding the primary/secondary effects literature in these ways and informing the literature on educational stratification more broadly was important and should be continued in the future. As the bottleneck in the hourglass economy narrows and returns to college enrollment reach historic highs (Fischer and Hout 2006), socioeconomic disparities in the curricular sequence from K-12 education into higher education are strengthening the intergenerational transmission of inequality long targeted by social policy in the U.S.

Acknowledgments

This research used data from Add Health, a program project designed by J. Richard Udry, Peter S. Bearman, and Kathleen Mullan Harris and funded by a grant P01-HD31921 from the National Institute of Child Health and Human Development, with cooperative funding from 17 other agencies. Special acknowledgment is due Ronald R. Rindfuss and Barbara Entwisle for assistance in the original design of Add Health. Persons interested in obtaining data files from Add Health should contact Add Health, Carolina Population Center, 123 W. Franklin Street, Chapel Hill, NC 27516 (www.cpc.unc.edu/addhealth/contract.html). The authors acknowledge the generous support of grants from the National Institute of Child Health and Human Development (R03 HD047378-01, PI: Robert Crosnoe; R01 HD40428-02, PI: Chandra Muller; R24 HD042849, PI: Mark Hayward), the National Science Foundation (REC-0126167, Co-PI: Chandra Muller and Pedro Reyes), and the William T. Grant Foundation (PI: Robert Crosnoe) to the Population Research Center, University of Texas at Austin.

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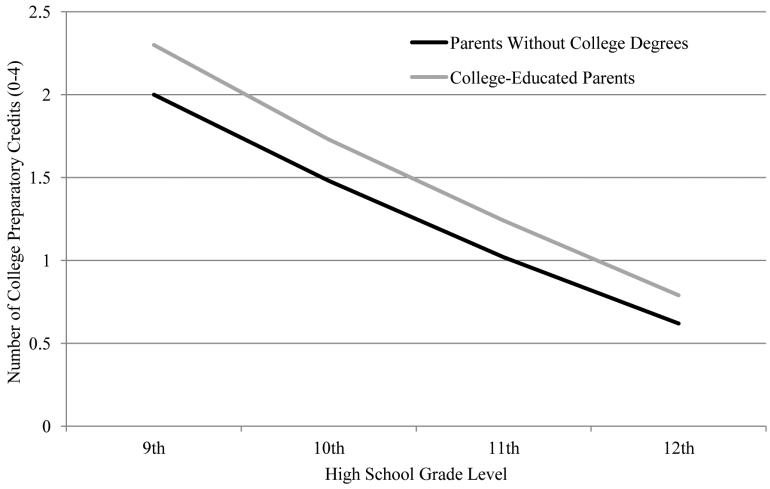

Figure 1.

Trajectories of Grade-Specific College Preparatory Coursework, by Parent Education

Note: The grade-specific level refers to the number of college preparatory credits in that grade level, not the number of college preparatory credits accumulated up to that grade level. Models controlled for all family background factors, academic factors, and covariates.

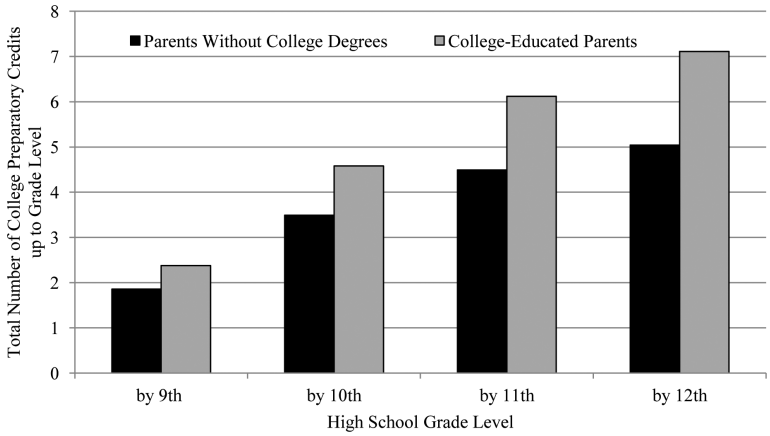

Figure 2.
Cumulative College-Preparatory Course Credits throughout High School, by Parent Education

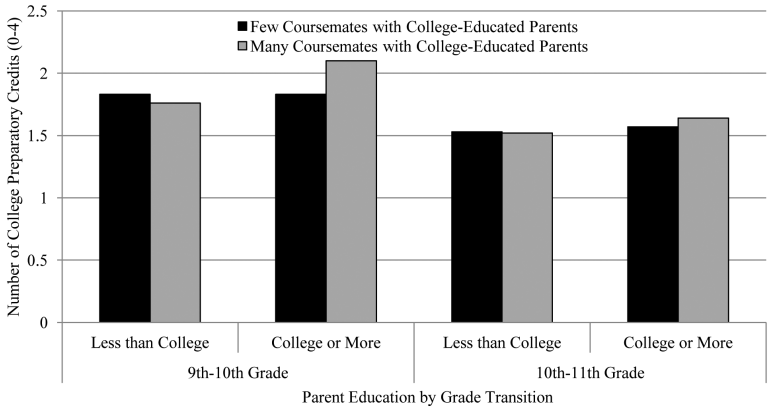

Figure 3.

Two-Year Changes in College Preparatory Coursework, by Parent Education of Adolescents and Mean Parent Education Level of their Coursemates

Table 1

Sociodemographic Characteristics of Lamar Sample

	%		M
Gender (female)	55	Age	15.25
Non-Latino/a White	44	Current g.p.a.	2.71
African-American	16		
Latino/a	33		
Other race/ethnicity	7		
First/second generation immigra	25		
Family structure (two-parent)	63		
Extracurricular participation	44		

N = 32 students

Table 2

Average College Preparatory Coursework Index and Frequency of Indicators in Each Index, by Grade

	M	SD	%
9th grade			
Overall index	2.00	1.05	
Number of indicators			
0			7.52
1			24.91
2			34.39
3			26.15
4			7.04
10th grade			
Overall index	1.79	1.23	
Number of indicators			
0			12.84
1			29.13
2			29.87
3			21.04
4			7.12
11th grade			
Overall index	1.17	1.05	
Number of indicators			
0			33.99
1			24.85
2			29.23
3			11.08
4			.85
12th grade			
Overall index	.68	.90	
Number of indicators			
0			53.02
1			25.38
2			17.84
3			3.42
4			.33

n = 7,718 (students)

Table 3

Descriptive Statistics for Study Variables

	M	SD	%
Family Socioeconomic Factors			
Parent education (college graduate)			27.36
Family income to needs	3.50	3.73	
Family structure (two-parent)			54.74
Peer Factors			
Prop. coursemates with college-educated parents			35.98
Mean g.p.a. of coursemates	2.77	.41	
Prop. friends with college-educated parents			38.44
Academic Skills/Performance			
9th grade g.p.a.	2.56	.88	
Cumulative g.p.a.	2.53	.81	
PVT score	50.82	27.77	
Sociodemographic Factors			
Gender (female)			51.77
Non-Latino/a White			50.87
African-American			19.66
Latino/a			17.86
Asian-American			8.98
Other race/ethnicity			2.63
First generation immigrant [a]			10.21
Second generation immigrant			14.99
Third-plus generation immigrant			74.80
School Factors			
Mean parent education level	2.87	.37	
Mean g.p.a.	2.74	.21	
Prop. seniors in college track	52.26	22.93	
School tracking used	.71	.45	
Math/science academy	.03	.18	

n = 7,718 (students)

Table 4

Results from Conditional Growth Curves of College Preparatory Coursework

	B (*SE*) for Base Model			*B* (*SE*) for Fianl Model		
	Intercept	**Slope**	**Quadratic**	**Intercept**	**Slope**	**Quadratic**
Growth Curve Parameters						
Intercept	1.98*** (.04)			.94* (.04)		
Time		−.34*** (.01)			−.55** (.19)	
Time^{2}			−.04** (.01)			.03 (.06)
Family Socioeconomic Factors						
Parent education (college-educated)	.45*** (.03)	.08** (.03)	−.03*** (.01)	.27*** (.03)	−.01 (.03)	−.01 (.01)
Family income to needs				.01^{+} (.00)	.01^{+} (.00)	.00 (.00)
Family structure (two-parent)				.11*** (.02)	.08** (.02)	−.02** (.01)
Academic Skills/Performance						
9th grade g.p.a.					.15*** (.01)	
Cumulative g.p.a.						−.02*** (.00)
PVT score				.01*** (.00)	.01* (.00)	.01*** (.00)
Sociodemographic Factors						
Gender (female)				.28*** (.02)	.04* (.02)	−.04*** (.01)
African-American [a]				−.14*** (.04)	.15*** (.04)	−.03* (.01)
Latino/a				−.16*** (.04)	.11* (.05)	−.03^{+} (.01)
Asian-American				−.01 (.06)	.30*** (.07)	−.06** (.02)
Other race/ethnicity				−.02 (.06)	−.04 (.07)	.01 (.02)
First generation immigrant [a]				.14** (.05)	.03 (.06)	−.02 (.02)
Second generation immigrant				.13** (.04)	.13** (.05)	−.06*** (.02)
School Factors						
Mean parent education level				.18* (.08)	−.14*** (.04)	.03** (.01)
Mean g.p.a.				−.14 (.15)	−.03 (.07)	.01 (.02)
Prop. seniors in college track				.00 (.00)	.01*** (.00)	−.01*** (.01)

	B (*SE*) for Base Model			*B* (*SE*) for Fianl Model		
	Intercept	**Slope**	**Quadratic**	**Intercept**	**Slope**	**Quadratic**
School tracking used				−.05 (.05)	−.01 (.03)	.01 (.01)
Math/science academy				.22 (.16)	−.15* (.07)	.04+ (.02)

n = 29,924 (observations), 7,481 (students), 72 (schools)

Δ −2 Res Log Likelihood = −365 (Base Model vs. Unconditional), −2506 (Final Model vs. Base Model)

Note: Models included a random intercept to account for cross-school variation in the outcome. Coefficients in slope column represent interactions between covariate and time. Coefficients in quadratic column represent interactions between covariates and time^2.

+ p < .10;

* *p* < .05.

** *p* < .01.

*** *p* < .001.

[a] White was reference for race/ethnicity dummy variables, third generation for immigration status dummy variables.

Table 5

Selected Results from Multilevel Models Predicting Wave II College Preparatory Coursework

	B (SE)		
	Model 1	**Model 2**	**Model 3**
Focal Main Effects			
Wave I college preparatory index	.60*** (.01)	.60*** (.01)	.50*** (.01)
Parent education (college graduate)	.10*** (.02)	.88** (.30)	−1.60* (.61)
Wave I grade level	−.26*** (.02)	−.23*** (.03)	−.33** (.03)
Prop. coursemates with college-educated parents	.03 (.08)	.08 (.63)	−1.12 (.90)
Two-Way Interactions			
Parent education × grade level		−.09** (.03)	−.16* (.06)
Coursemates × grade level		−.01 (.06)	.12 (.09)
Parent education × coursemates		.15 (.11)	4.86** (1.38)
Three-Way Interaction			
Parent education × coursemates × grade			−.47** (.13)
Intercept	3.02*** (.39)	2.78*** (.44)	3.60*** (.48)

n = 7,481 (students), 72 (schools)

Δ −2 Res Log Likelihood = −1 (Model 1 vs. 2), −746 (Model 2 vs. 3)

Note: Both models included a random intercept to account for cross-school variation in the outcome. Both models controlled for full set of family, sociodemographic, and school factors (family income to needs, family structure, gender, race/ethnicity, immigration status, school mean parent education level, school mean g.p.a., proportion of seniors in school in college track, school enrollment based on testing, school use of tracking, and school math/science academy status). PVT score and Wave I g.p.a. were also controlled.