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Equity or Marginalization? The High School Course-Taking of Students Labeled with a Learning Disability

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Abstract

Placement of some students into the courses needed only for high school graduation, and others into those that prepare them for college constitutes academic stratification. This study uses data from the Education Longitudinal Study of 2002 to investigate whether students labeled with learning disabilities complete fewer academic courses by the end of high school compared to their peers who are not labeled. Results indicate large disparities in completion of college preparatory coursework, especially in math, science, and foreign language, even net of students' academic preparation for high school, and their cognitive and noncognitive skills. The evidence supports the possibility that school processes contribute to the poorer course-taking outcomes of students labeled with learning disabilities.

Keywords

Academic Stratification; College Preparation; Course-Taking; High School; Learning Disabilities

Educational stratification and differences in opportunities to learn are apparent through course-taking during high school, as some students complete courses necessary for high school graduation and little more, while others take advanced coursework in preparation for college (Harwell et al., 2009; Schneider, Swanson, & Riegle-Crumb, 1998). The high school years and the courses that students accumulate during this period mark a crucial point of stratification in educational attainment that has consequences throughout the life course

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(Adelman, 2006). Although much research has been devoted to identifying and understanding inequality in educational opportunities in high school course-taking for students of color, for example, or of low socioeconomic status, or first generation college-goers, or by gender, surprisingly little attention has been paid to students labeled with learning disabilities. Learning disabilities (LDs) cut across racial, social class, and gender lines; we argue that students labeled with an LD are a potentially important status group, worthy of study.

The LD label is generally reserved for students who display not only average or above average intelligence, but also conditions that may hinder their learning and achievement in school (Fletcher, Denton, & Francis, 2005). Most contemporary students labeled with an LD attend schools and take classes alongside students who are not labeled, with the goal of providing the best possible opportunities to learn (Artiles, Harris-Murri, & Rostenberg, 2006; Idol, 2006). Classification with the LD label is intended to initiate the provision of differentiated instructional practices and accommodations that enable these students to achieve up to their potential. Nonetheless, students labeled with an LD often demonstrate poorer academic performance and other markers of social disadvantage that may preclude their enrollment in college preparatory coursework (Artiles, Kozleski, Trent, Osher, & Ortiz, 2010; Gelb & Mizokawa, 1986). In theory, through instructional modification and accommodations students labeled with an LD should potentially attain high school course-taking outcomes comparable to those of their peers without the LD label but with similar social backgrounds and academic histories and net of covarying cognitive and noncognitive factors.

We focus on course-taking outcomes as they provide some measure of students' exposure to learning opportunities. Policies regarding accommodations for students labeled with an LD are intended to provide equal access to important opportunities to learn. Nonetheless, it is possible that the LD label itself and the school practices and accommodations designed for the students labeled with an LD may have a negative effect on students' course-taking. Rather than facilitate learning among these students, the LD label may compound whatever social and academic disadvantages precipitated identification. Recent research suggests that students labeled with an LD may be disadvantaged above and beyond the challenges generally associated with their LD (Morgan, Frisco, Farkas, & Hibel, 2010). The review of the literature that follows illustrates the centrality of high school course-taking in students' postsecondary lives, how students experience stratification in high school course-taking, and why students labeled with an LD might experience even more stratification relative to similarly achieving students not labeled with a disability.

Background Literature

High School Course-Taking

In the last several decades, a college degree has become increasingly important for labor force success as well as other life course outcomes (Schneider & Stevenson, 1999), and high school coursework is an important component of college readiness (Adelman, 2006). Consequently, because of their average or high IQs, completion of high school graduation coursework may be an inadequate goal for students labeled with an LD (Gregg, 2007).

Whereas a high school diploma requires credit accumulation in the core academic subjects (math, English, social studies, and science), admission to a four-year college often depends upon advancement through sequential subjects, like math and science, and completion of foreign language credits (Adelman, 1999; Schneider et al., 1998).

Data from a 2003 national cohort of youth aged 6 through 21 showed that students labeled with an LD were more integrated into the regular education classroom on average than students with almost any other disability type (Spellings, Knudsen, & Guard, 2007). Yet, the possibility remains that the LD label will serve to marginalize students and result in academic stratification (Mehan, Hertweck, & Meihls, 1986). In the past, students' placement in special education coursework alone may have precluded their enrollment in a college preparatory curriculum; currently, however students labeled with an LD may experience more subtle forms of academic stratification through course placement processes.

Students with poor academic histories may simply be placed into less rigorous classes by teachers or counselors focused on their high school graduation rather than their college enrollment. Placement in low-level coursework can particularly hinder progress in subjects that are hierarchically ordered, such as math and science. Beginning high school in a math class lower than Algebra I makes it nearly impossible to reach Algebra II prior to graduation, which suggests readiness for a four-year college (Schneider et al., 1998). In addition, math courses sometimes serve as prerequisites for science courses; consequently, beginning high school in a low level math class could potentially exclude students from rigorous science courses.

Further slowing course-taking progress, some students may enroll in more non-academic core courses (e.g., vocational, elective, or career and technical education classes) at the expense of core academic coursework that would prepare them for college (Gray, 2002; Plank, 2001). Even when placed in academic courses, students labeled with an LD may be at heightened risk of academic marginalization as a result of school processes associated with their label (Ho, 2004; Kliewer, Biklen, & Kasa-Hendrickson, 2006). A difficulty in studying this possibility is in assessing whether students labeled with an LD simply arrive at high school with lower levels of academic achievement and are therefore less qualified for the more advanced coursework, or if high school processes exacerbate existing performance differentials (Malmer, 2000; Mayes & Calhoun, 2007). In addition, academic success is also predicated on noncognitive skills which also contribute to students' academic outcomes (Lipnevich & Roberts, 2012). Our study takes prior academic performance, background, and noncognitive skills (e.g., attitudes and behaviors) into account while investigating course-taking disparities.

Academic Background and the High School Years

By definition, students labeled with an LD are more likely to have poorer academic histories on average than unlabeled students (Jenkins et al., 2006), and it may be that their poorer high school course-taking outcomes can be attributed to cumulative disadvantages measurable through early educational experiences. Although the LD label was more prevalent among white and middle or upper class youth in the past (Sleeter, 2010 [1987]), contemporary research suggests that students are more likely to be labeled with an LD if

they are from low socio-economic status (SES) households, if they are racial minorities, boys, or language minorities (Ochoa, Pacheco, & Omark, 1988; Ong-Dean, 2006; Shifrer, Muller, & Callahan, 2011; Skiba et al., 2008). Specifically, Coutinho, Oswald and Best (2002) used district-level data to show that the proportion of Black and Latino students in a district is associated with both indicators of higher rates of student poverty and also higher rates of LD classification, despite the federal exclusionary provision preventing LD identification due to environmental causes (e.g. poverty, poor instruction). Although this does not necessarily mean that an individual student is more likely to be non-white, free-lunch eligible *and* classified as LD, it suggests that such a relationship is possible. It is worth noting that the relationship was reversed among whites, with the higher proportion of LD classification related to lower rates of poverty. The complex relationship between race, social class and opportunity in American education deserves careful consideration with respect to identification with an LD.

We do not attempt to explain away disproportional representation in special education by race and ethnicity or other socio-demographic characteristics (Artiles et al., 2010; Shifrer et al., 2011; Skiba et al., 2008), but rather to assess the possible risks of the label of LD through students' course-taking outcomes and whether the risk of poorer outcomes varies across racial and ethnic population subgroups. We investigate this possibility by incorporating multiple measures of student and school characteristics in our analyses as controls, and by estimating whether the effects of the label depend on the student's race and ethnicity.

Course-Taking Stratification Related to the LD Label

Students labeled with an LD may experience course-taking disparities for a variety of reasons, from the differences that initially led them to be labeled to lesser access to the social resources that build learning ability. Alternately, differences between students labeled with an LD and their peers may be less distinct than expected due to considerable variation in labeling procedures (Stuebing et al., 2002) and the social construction of the LD label itself (Dudley-Marling, 2004). The measures used to identify LDs are context dependent, including criteria such as behavior, social skills, intelligence, and communication abilities (Carrier, 1983; Horvath, Kass, & Ferrell, 1980). These perspectives support the need to consider students labeled with an LD relative to similarly performing but unlabeled students.

It is also possible that the label of LD itself contributes to poorer academic outcomes through social processes at school. Building on a more general theory about labeling (Becker, 1997 [1963]; Goffman, 1963), students labeled with an LD may be perceived by others as different, a perception which in itself could result in stigmatization and altered social interactions. The LD label may shape the expectations teachers and counselors hold for the student, influencing whether they encourage the student to take more demanding courses and apply to college (Mehan et al., 1986). If the label of LD contributes to defining a group of students according to shared attributes, even if socially constructed, then the resulting status group could itself become a liability for the student.

Purpose of the Present Study

Incorporating labeling theory and building upon prior research exploring the academic course-taking of students labeled with an LD, we investigate the following research questions. First, how do the high school course-taking outcomes of students labeled with an LD compare to those of students not labeled with a disability? Second, do any course-taking gaps persist once students labeled with an LD are compared to non-labeled peers with similar background characteristics, early high school experiences, achievement, attitudes and behaviors? Only a handful of studies have used national data to explore the academic outcomes of students labeled with an LD. Wagner and Blackorby (1996) found that students labeled with an LD completed advanced math and foreign language coursework at rates lower than the national average, and that they accumulated more credits in vocational courses than students not labeled with disabilities. Few, if any, previous studies have accounted for the possibility that other factors contribute to these differences. Our intent here is to attempt to isolate the estimated effects of the LD label from other factors that might covary with the label itself.

In the present study, we investigate the relationship between the LD label and students' course-taking outcomes using a large national dataset, the Education Longitudinal Study of 2002 (ELS). ELS is uniquely situated to compare students labeled with an LD to students not labeled with a disability, with measures of a host of factors potentially associated with both the LD label and academic outcomes. ELS allows us to account for students' family backgrounds and socio-demographic characteristics, academic histories, high school characteristics, 9th grade course placement, standardized test scores, and early high school achievement, attitudes and behaviors. Differences that remain in the course-taking outcomes of students labeled with an LD compared to their peers, net of all these factors, present the possibility that high school processes may compound the disadvantages of students labeled with an LD. The questions we pose are not only important for educational policy related to the education of students labeled with an LD, but also have the potential to inform the literature focused on how schools process students in general.

Data and Methods

ELS, the most recent large nationally representative dataset developed and collected by the National Center for Education Statistics (NCES), is particularly well-suited to answer our questions regarding the relationship between the LD label and students' course-taking outcomes. NCES first surveyed 16,373 spring-term 10th graders enrolled in approximately 750 public schools in 2002. The ELS sampling frame excluded special education schools (Ingels, Pratt, Rogers, Siegel, & Stutts, 2004), but included special education students enrolled in non-special education high schools. ELS students were resurveyed in 2004 when most were seniors, and again in 2006 when most had been out of high school for two years. Importantly for this study, students' high school transcripts were collected and coded. In the base year, NCES attempted to survey one of each student's parents, as well as the student's 10th grade math and English teachers. At least one teacher report was obtained for 92.4% of all participating students, and the weighted parent coverage rate was 87.4% (Ingels et al., 2004). Questions on the student and parent surveys provide information on socio-

demographic characteristics, family background and academic history. Base year high school characteristics are available from administrative data and an administrator survey.

We use ELS transcript data, as well as data from the 2002 and 2004 student surveys, and the 2002 surveys of the school administrator, a parent, and two teachers. We exclude students who did not have at least two years of transcript data[1] (approximately n=1000[2]), who had a disability other than "Specific Learning Disability"[3] according to the school Individualized Education Plan[4] (IEP) report (approximately n=300), or who attended a school that did not provide any IEP reports (discussed in greater detail below). Our final analytic sample includes approximately 10,670 students in 540 schools; about 620 (or 6%) of the students in our sample are labeled with an LD, consistent with national benchmarks (Spellings et al., 2007). All analyses use the appropriate weights to account for the survey design.

We designed this study to expand knowledge on the learning opportunities of students who are labeled with an LD, a potentially important status group, through the use of national, student-level data that includes measures of the disability label, socio-demographic background, early high school attitudes, behaviors, and achievement, and course-taking. Many studies on students with disabilities use only school district- or state-level data, or much smaller sample sizes (Hibel, Farkas, and Morgan (2010) and Morgan et al. (2010) are exceptions and include discussions on the benefits of national data). In contrast to datasets that focus specifically on special education, ELS includes peers not labeled with a disability who can be used as a comparison group. In addition, ELS continued to survey students who dropped out, a group over-represented among students labeled with an LD. Lastly, ELS provides a school report of disability label (versus a parent or student report, for example), which enables a better understanding of differences in school experiences and the potential impact of the disability label. Although the measurement of learning disabilities in ELS is limited and imperfect, as we discuss below, we argue that overall, its strengths outweigh its limitations.

Independent Variables

School Label of LD—As part of the data collection, NCES collected 10th grade student rosters from each school and asked school administrators to identify students with an IEP and state the federal disability category associated with the IEP. An IEP indicates that the student has been labeled as eligible for special education services. Ideally, we would assess course-taking disparities based on the specific type of LD; however, the ELS dataset does not include information on these distinctions. Given the number of categories within LD, as

[1]We retained students with fewer than four, but at least two, years of transcript data in our analytic sample in order consider the influence of dropping out of high school on course-taking outcomes. Dropping out is more common among students labeled with an LD, than among their non-labeled peers. Because years of transcript data are not perfectly correlated with dropping out, we also include a measure indicating whether the student ever dropped out. To test the robustness of our findings, we re-ran all models with an analytic sample limited to students with four years of transcript data. Results indicated that disparities in course-taking outcomes between labeled and unlabeled students were actually larger within every subject. The results presented in the current manuscript thus provide conservative estimates of the estimated effect of the LD label on students' course-taking outcomes.

[2]Per NCES guidelines, unweighted sample frequencies are rounded to the nearest 10 to protect confidentiality.

[3]The federal disability category and the label of interest in this study, a "Specific Learning Disability," includes but is not limited to: Reading Disorder (Dyslexia), Mathematics Disorder, Disorder of Written Expression, Expressive Language Disorder (American Psychiatric Association, 2000; Learning Disabilities Association of America, 2004).

[4]Because they are not federally classified as LDs, students with these disabilities are not the focus of this study: mental retardation, Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder, Autism, and Down syndrome.

well as the number of students identified with an LD in ELS, even if these data were available, it is unlikely the sample sizes would be sufficient to disaggregate the LD category.

In addition to the school administrator report, parents also reported whether their 10th grader had an LD. We use the school report of the LD label rather than the parent report for several reasons. Most importantly, we are interested in the effects of school processes on course-taking outcomes. Students who are labeled by their parent, but not the school, may have received accommodations through a 504 plan. A 504 plan legitimizes a more limited set of accommodations than an IEP, and does not require formal placement of the student into special education. However, ELS does not include information about whether a 504 plan was in place for the student. Given our focus on the association between the school recognized label of LD and students' course-taking outcomes, the school report proves a substantively more meaningful measure of identification. However, we do include a measure available in ELS of the parent's report as to whether the 10th grader has a cognitive disability (e.g., LD, mental retardation, emotional disturbance) as a control variable in our models.[5]

On a final note, for reasons that remain unclear, schools did not report on the IEP status of approximately 7,300 students in the sample. Approximately half of the schools (n=351) reported the IEP status of *all* students sampled; just over a quarter (n=196) reported on *some, but not all* of the sampled students; and the remaining quarter (n=204) reported on *none* of the sampled students. We compared rates of school report of IEP with other school characteristics across these three groups of schools. Despite the differences in reporting patterns, schools that reported on *all* of their students, and schools that reported on only *some* of their students had comparable proportions of students labeled as having an IEP and students labeled with an LD[6]. We concluded that the schools that reported on only some students had, for the most part, simply reported only when students had an IEP; we recoded the approximately 1,800 students with a missing IEP report in those schools as not labeled with an LD. All regression models include an imputation flag for these cases. The 4,200 students in the 204 schools that did not report the IEP status of any students are excluded from analyses.

Socio-Demographic Background and School Characteristics—In order to account for the potentially confounding influence of systematic variation in social background between students labeled with an LD and their peers on course-taking outcomes, we include controls for gender, race/ethnicity, and SES. We measure SES with an ordinal measure of family income, and dichotomous indicators of highest parental education level. We also include an index of cognitive resources by summing the presence of a daily

[5]We combined the three measures of cognitive disability into one measure because there was better correspondence between this summary measure and the school report of IEP for "Specific Learning Disability." Ancillary analyses that included only a parent report of LD indicated consistent results.

[6]To understand how our analytic sample diverges from the nationally representative sample collected by NCES, we examined differences between school characteristics for excluded schools and those in our analytic sample (Appendix A). No significant difference exists in the mean percentage of students eligible for the free lunch program between the excluded and included schools; this is important because schools with higher proportions of poor children exhibit lower educational outcomes, on average. Nevertheless, some statistically significant differences do remain between the analytic sample and excluded schools; as a result, we cannot claim with certainty that our analytic sample is nationally representative.

newspaper, magazine, computer, internet access, and fifty books or more in the household (ranges from 0 to 5); number of siblings; and dichotomous indicators of preschool or Head Start attendance. The educational expectations of each student's father, mother, friend, relative, and 10th grade English and Math teachers are summarized in an index of the number of people who expect the student to attend college. A scale (alpha=0.95) summarizes the 10th grade student's self-reported English proficiency (i.e., how well the student reads, writes, speaks and understands English).

We also include measures of school sector (public, Catholic, other private), region, and urbanicity, as well as dichotomous indicators of whether the student attends either a high-minority or high-poverty school (i.e., in the top quartile nationally for enrollment of either racial minorities, or students eligible for the free lunch program).

Academic History—Each student's early academic history is described using variables from the base year survey. Each student's age is measured at the time of that first survey (likely higher for students who have been retained). In addition, we include dichotomous measures of parental report of a cognitive disability for the student, as well as measures that indicate whether the student was ever placed in either remedial math or an ESL program. We also take into account whether the student began school in the United States after kindergarten. Lastly, we include each student's 10th grade reading test score as a proxy for academic ability. Supplementary sensitivity analyses (not shown) resulted in similar findings when the math test score was substituted for the reading test score.

Ninth-Grade Course Placement—We include indicators describing each student's 9th grade courses; these courses not only reflect students' academic backgrounds, but also set the stage for subsequent high school course taking. We constructed course-taking indicators using Classification of Secondary School Course (CSSC) codes, which capture not only course level (special education,[7] low, regular, honors, or AP/IB), credits earned, and grade earned, and also student's grade level when taking the course. Because most of our course-taking indicators measure credits earned, they measure courses that students completed and passed. We use ordinal measures of math and science course-taking (e.g., Algebra, Geometry) because of the hierarchical organization of these subjects (Schneider et al., 1998); these measures indicate the level of math and science *attempted* by each student.[8] To further tap both course placement and performance, we include measures describing students' grades in courses and the number of academic courses failed each semester. We also included controls for the number of credits in low-level or special education coursework each student completed during 9th grade. Lastly, we included the number of non-core credits completed during 9th grade. Non-core courses are those outside the academic core (math, English, science, and social studies); however, as foreign language coursework is generally

[7]NCES assigned all courses CSSC codes, which signify course subject and sometimes course level; however, these codes do not necessarily include information relevant to the LD label. To address this issue, we manually reviewed all course titles in order to locate courses that would indicate students' separation from the general school population (e.g., "resource" or "self-contained"). Students labeled with an LD take an average of 2.0 credits of special education coursework by grade 12 (out of about 24 total, or 8% of their high school credits), validating our focus on overall course-taking patterns, rather than special education placement alone.

[8]Our coding is, *Math*: 0=no math, 1=basic/remedial, 2=general/applied, 3=pre-Algebra, 4=Algebra I, 5=Geometry, 6=Algebra II, 7=advanced math, 8=pre-Calculus, and 9=Calculus; *Science*: 0=no science, 1=basic/remedial science, 2=general/Earth Science, 3=Biology, 4=Chemistry, 5=Advanced Science, 6=Physics.

required for admission to selective four-year colleges (Adelman, 2006), we include these courses in our measure of the academic core.

Early High School Attitudes, Behaviors, and Academic Achievement—We expect that the poor academic attitudes, behaviors, and achievement reported among students labeled with an LD may play a role in course-taking outcomes as well. We included relevant controls to ensure we are comparing students labeled with an LD to non-labeled students who are as similar as possible. For example, our models contain a scale indicator of the degree to which each student holds positive academic attitudes (the indicator summarizes several measures of attitudes toward math, reading, and academics in general) (alpha=0.94); an ordinal measure of the number of hours per week spent on homework outside of school; a scale measure of how often each student forgets materials, books, and homework (alpha=0.81); and a scale measure of the degree to which each student's friends are academically oriented (alpha=0.83). Two indices summarize several reports of negative academic and social behaviors from each student's 10^{th} grade math and English teachers, and a scale measure summarizes how often each student was reported to engage in negative behaviors (alpha=0.84). We capture early high school academic problems with the number of semesters failed in 9^{th} grade academic courses, and dropout or grade retention between the 10^{th} and 12^{th} grades.

Dependent Variables

For our main dependent variables, we constructed two dichotomous measures indicating curricular rigor through completion of courses expected for 1) high school graduation, and 2) preparation for college. The template for these measures was drawn from a U.S. Department of Education report (Shettle et al., 2007). The first indicator determines whether the student accumulated enough credits in core academic subjects to graduate from high school in most states: four credits of English, and three credits each of social studies, mathematics, and science. The second measures whether the student's advancement through subjects was indicative of college readiness: completion of high school graduation coursework, at least two of the three main science fields (Biology, Chemistry, or Physics), one credit of foreign language, as well as progression through at least geometry[9] in the math course sequence. Students who took pre-calculus or calculus (i.e., higher level math courses than geometry) but not geometry were coded as having completed enough math to be college ready. Students who completed at least one credit (two semesters) of Biology, Chemistry, or Physics were coded as completing a course in that subject.

Analytic Plan

Descriptive statistics for independent variables are shown in Table 1, and Figure 1 compares the course-taking outcomes of labeled and unlabeled students. Following our descriptive results, we employ multivariate analyses to determine whether these differences persist once

[9]Some would argue that more advanced coursework (e.g., Algebra II instead of Geometry; two, rather than one, foreign language credits) are preferred indicators of college readiness (e.g., Adelman, 2006). We incorporate (Shettle et al., 2007)'s less rigorous measures because so few students labeled with an LD complete the more advanced coursework. Supplementary analyses predicting the more stringent definition of college preparatory coursework indicated results consistent with those presented here (models available upon request).

we take social and academic histories, and early high school experiences into account. Specifically, we use nested logistic regression models to predict completion of all high school graduation courses (Table 2), and completion of all college preparatory courses (Table 3). The first models estimate the unadjusted gap between labeled and unlabeled students. Measures of socio-demographic background, school characteristics, and academic history are included in the second models. Our third and final models incorporate measures of 9th grade course placement, and early high school attitudes, behaviors, and achievement.

All analyses include appropriate sample weights and estimate robust standard errors to account for the clustering of students within schools. We present marginal effects from our regression models to facilitate a more intuitive understanding of the results and to address issues of scaling that arise when log odds coefficients are compared across logistic models (Hoetker, 2007). We estimate the average marginal effect (in contrast to the marginal effect at the mean), which provides the percentage point difference in the predicted probability of the outcome for the group of interest in comparison to that for the reference group (dichotomous variables), conditioning on all other variables in the model.

Our main objective is to estimate the effects of the LD label on academic outcomes in such a way that our estimates are not confounded with covariates such as race, social class or gender. However, prior research suggests that children from middle class families may be labeled with an LD as a way to distinguish them their low-performing counterparts from lower social classes (Sleeter, 2010 [1987]). If this is so, then it is possible that the meaning of the label is different for students depending on their social class. We used interaction terms to test whether the estimated effect of LD was different for students whose parents held a college degree and those who did not. The effects were never statistically significant, so we do not present them here; however they are available from the authors upon request.

Standard regression techniques may not sufficiently account for the host of characteristics that led some students and not others to be labeled with an LD; this may result in the incorrect attribution of course-taking disparities to differentiated treatment related to the LD label rather than to these precedent characteristics. Other techniques such as propensity score matching (PSM), are thought to more aptly address potential selection bias (Eide & Ronan, 2001; Rees & Sabia, 2010). Following our regression analyses, we used a PSM stratification technique to estimate the association between the LD label and course-taking outcomes. Ultimately, the PSM results were remarkably similar to those from our standard regression analyses. As our standard regression analyses are more accessible to a broader audience, we present these in the following results section, and include the PSM results in Appendix B for the interested reader.

Results

The descriptive statistics shown in Table 1 compare the sociodemographic backgrounds, academic histories, and early high school experiences of students labeled with an LD to their non-labeled peers. On average, students labeled with an LD demonstrate significantly more disadvantaged social backgrounds; several indicators suggest that the academic histories of students labeled with an LD are also significantly poorer. Students labeled with an LD begin

high school in lower level math and science coursework, complete significantly more credits in special education, low-level, and non-core coursework during the 9th grade, and exhibit significantly more negative academic attitudes and behaviors than non-labeled students. Lastly, the early high school academic achievement of students labeled with an LD is significantly poorer on average than that of their peers. Differences in cumulative high school course-taking may be entirely attributable to these pre-existing differences between these two groups of students. We compare the course-taking outcomes of labeled and unlabeled students who are similar along all of these measures through the use of regression analyses, as well as the supplemental PSM estimates available in Appendix B.

Course-Taking Patterns

Figure 1 shows the marked differences between labeled and unlabeled students in completion of high school graduation coursework (left panel), and college preparatory coursework (right panel). Significantly lower proportions of students labeled with an LD accumulate three credits in math, science, and social studies by the end of high school compared to their non-labeled peers. The biggest gap in high school graduation course-taking occurs in science, with 71% of non-labeled students compared to 45% of students labeled with an LD accumulating three or more credits in science coursework. Overall, 27% of students labeled with an LD accumulated all of the credits generally required for high school graduation, in contrast to 50% of their non-labeled peers.

On the right-hand side of Figure 1, we observe students' college preparatory course-taking patterns. Differences by LD status in the completion of college preparatory courses (indicative of progression through academic subjects) were much greater than differences in the completion of high school graduation coursework (indicative of credit accumulation). Only 4% of students labeled with an LD completed all college preparatory courses, compared to 38% of their peers. Similar to high school graduation coursework, disparities in science course-taking contribute to the relatively lower rates of college preparatory coursework among students labeled with an LD compared to their peers. While 39% of students labeled with an LD completed geometry or a higher math course, only 18% completed coursework in two of the three main sciences. With only 26% of students labeled with an LD completing one credit in a foreign language (in contrast to 79% of other students), a lack of preparation in foreign languages appears to be another major barrier to 4-year college enrollment among labeled students.

Accounting for Background and High School Experiences

Tables 2 and 3 show the marginal effects from the nested logistic regression models predicting both completion of all high school graduation coursework (Table 2), and all college preparatory coursework (Table 3). In contrast to the bivariate associations in the previous section, these analyses average differences in the course-taking outcomes of relatively comparable labeled and unlabeled students (taking into account social background, level of 9th grade coursework, performance, attitudes, and behaviors). Conditioning on all other variables in the model, the marginal effects in these tables ("dy/dx") represent differences in the predicted probability of achieving the course-taking outcome for the group of interest (students labeled with an LD) in comparison to the

reference group (for dichotomous predictors). At the baseline, the predicted probability of completing all high school graduation courses is 26 percentage points lower for students labeled with an LD than the predicted probability for students not labeled with disability (Table 2, Model 1). The reduction in this coefficient from −0.26 to −0.03 in Model 2 shows that this course-taking disparity is largely accounted for by labeled students' poorer socio-demographic backgrounds and academic histories. In other words, there is no significant difference in a labeled student's odds of completing all high school graduation courses, when compared to students who are not labeled with a disability but have similar social and academic backgrounds. Additional analyses interacting the LD label with race/ethnicity were estimated; however the interactions proved insignificant, suggesting that course-taking patterns among students labeled with an LD do not vary by race/ethnicity (models available upon request).

Table 3 shows results estimating completion of all college preparatory courses. Here, we find that the predicted probability of completing all college preparatory courses is 60 percentage points lower for students labeled with an LD in contrast to their peers (Table 3, Model 1). With the inclusion of controls for social and academic backgrounds (Table 3, Model 2), students labeled with an LD still experience a significant course-taking disadvantage (25 percentage points). In contrast, the coefficients for African American and Latino students are not statistically significant in Models 2 and 3. This suggests that, among students of similar socioeconomic advantage, the LD status group experiences more course-taking disparities than racial minorities. In contrast to the insignificant difference demonstrated in completion of high school graduation courses (Table 2, Model 3), the predicted probability that a student labeled with an LD will complete all college preparatory courses remains significantly lower (19 percentage points) than that of a similar unlabeled student with comparable early high school course placement, performance, attitudes and behavior (Table 3, Model 3). Again, we estimated additional models interacting the LD label with race/ethnicity and results proved insignificant (models available upon request).

It is worth noting that supplemental analyses using PSM techniques (Appendix B) reach very similar conclusions. Both methods showed no significant differences in the predicted probability of completing all high school graduation coursework between similar labeled and unlabeled students. And both methods indicated a gap of about 20 percentage points in the predicted probability of completing all college preparatory coursework.

Discussion

The goal of this study was to investigate how the high school course-taking outcomes of students labeled with an LD compare to those of similar, but unlabeled students. Students labeled with an LD, with appropriate school supports, may have the potential to reach normative course-taking benchmarks. Yet our findings suggest that their course-taking outcomes are considerably poorer than those of students who are not labeled with disability but are otherwise similar. Even among students who performed similarly in early high school coursework and those with similar noncognitive skills, we found that students labeled with an LD lose ground in the completion of college preparatory coursework compared to similar, unlabeled students.

We cannot be certain why a student labeled with an LD would accumulate fewer academic courses than a student not labeled with a disability. However, our results are consistent with the hypothesis that the LD label itself defines a status group that limits educational opportunities, possibly through stigma or another marginalizing processes. It is possible that the label shapes how adults perceive the student's ability and potential (Mehan et al., 1986), and ultimately results in adults being less likely to guide the student toward challenging coursework. It is also possible that the label impacts the students' own beliefs and attitudes. Although the scope of this study prevents us from specifically examining teachers' and counselors' expectations, school factors merit investigation if in fact, course-taking gaps remain between labeled and unlabeled students with similar social and academic backgrounds, attitudes and behaviors.

An alternative possibility is that the factors that influence students course-taking outcomes and are related to the label are not adequately measured in ELS. In other words, rather than high school processes impacting labeled students' course progression, it may be that labeled students' cognitive or noncognitive struggles impact their course-taking net of all the factors we included in our analyses. Nonetheless, the test score, noncognitive indicators, and early high school course placement are strongly correlated with students' academic backgrounds and their academic progress. While disparities in educational outcomes between similar labeled and unlabeled students are not conclusive evidence that special education programs are flawed, they do identify areas in which further research and policy reform may be warranted to ensure equality of learning opportunities.

Racial and ethnic variation also merits careful consideration in the possible processes of marginalization for students identified with an LD. Racial minorities (Blanchett, 2006), students from economically disadvantaged families (Shifrer et al., 2011), and language minority youth (Ochoa et al., 1988), especially when placed in English as a second language (ESL) programs (Shifrer et al., 2011), are all disproportionately more likely to be labeled with an LD. African American students placed in special education have been described as experiencing more restrictive placement than their white counterparts (Blanchett, 2006; Blanchett, Klingner, & Harry, 2009; Reid & Knight, 2006), which could compound the extent to which their exposure to rigorous curriculum is limited. Thus, the confounding of a host of factors has made it difficult for researchers to isolate potential effects of the LD label. For the most part, prior research has investigated inclusion in general rather than the course-taking outcomes using local, rather than nationally representative samples.

Our supplemental analyses indicated no statistically significant differences in course-taking outcomes between whites, African Americans, or Latinos labeled with an LD, net of background characteristics. Although it is possible that a larger sample would reveal statistically significant results, it is unlikely because the coefficients were small and not even close to statistical significance. Our analyses suggest that what may appear to be racial/ethnic disparities at the baseline, actually reflect the greater likelihood of racial and ethnic minority children to be socially disadvantaged and experience poorer educational opportunities and outcomes. In this study, the findings that we report apply equally well to students of color.

Our interpretation of these results is supported by our finding that disparities by LD status are greater in college preparatory coursework than in the courses that only contribute to high school graduation. Schools may be under less pressure to ensure that students complete college preparatory coursework than more basic graduation requirements, and assessment and accountability policies may reinforce these priorities. Educators may perceive high school graduation as the more immediate goal for students labeled with an LD, and may neglect to encourage completion of the advanced courses that prepare them for college.

Differences in accountability requirements may contribute to the greater disparities in college preparatory coursework among students labeled with an LD. Our own prior research also supports this possibility. We found that the association between teachers' opinions about whether a student will drop out and the student's likelihood of graduating was weaker in states with more extensive standardized testing (Muller & Schiller, 2000), suggesting that higher levels of standardization may moderate the influence of teachers' expectations on students. Further, the lack of consistent accountability frameworks across states (Cawthon, 2007) may leave some students labeled with an LD more disadvantaged than others. States vary in their expectations for what students should know and for the courses that they take; differences in the minimum standards may influence the progression of labeled students. The sizeable disparities in college preparatory coursework that we have observed here suggest that educational policy reform could improve the high school course-taking of students labeled with an LD.

Analyses such as those reported here are important. High schools act as a gateway to postsecondary education, with important implications for the life course. The learning opportunities of students labeled with an LD might be improved by providing educators and parents with information on the intellectual potential of students labeled with an LD, and by ensuring that students are placed in courses based on their prior achievement and potential rather than on the basis of the LD label. Future research should seek to identify specific school and student-based mechanisms that may contribute to poorer course-taking outcomes among students labeled with an LD, with an eye to policy levers that can ameliorate the negative effects of labeling while still providing students with beneficial accommodations.

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Appendix A: School-Level Proportions and Means Comparing Excluded and Analytic Samples

	IEP Reports Missing				
	None	Some	All		
	Part of analytic sample	*Part of analytic sample*	Excluded sample	Analytic sample	Difference between excluded and analytic samples
Students without an IEP report	0.00	0.73	1.00	0.28	n/a
Students in special education per IEP report[a]	0.08	0.11	n/a	0.09	n/a
Students labeled with LD per IEP[a]	0.05	0. 08	n/a	0.06	n/a
School size	1366.4 (730.)	1364.7 (775.5)	1536.3 (695.2)	1365.7 (747.4)	**
Eligible for free or reduced lunch program	23.0 (14.8)	23.8 (18.0)	24.4 (13.4)	23.3 (16.1)	
Racial/ethnicminority	34.3 (25.2)	35.8 (31.2)	44.1 (26.6)	34.9 (27.7)	***
School type:					***
Public	0.76	0.94	0.61	0.83	
Catholic	0.15	0. 03	0.18	0.11	
Private	0.09	0.02	0.20	0.06	
School region:					**
Northeast	0.16	0.21	0.17	0.18	
Midwest	0.28	0.26	0.19	0.28	
South	0.39	0.36	0.36	0.38	
West	0.16	0.17	0.28	0.16	
Urbanicity:					***
Urban	0.31	0.27	0.43	0.29	
Suburban	0.49	0.49	0.46	0.49	
Rural	0.20	0.25	0.10	0.22	
Total Schools (n)	351	196	204	547	

[a] Denominator is all students sampled at that school, regardless of whether IEP report provided.

Note:

+ p < 0. 10,

*
p < 0. 05,
**
p < 0. 01,
***
p < 0. 001.

Appendix B: Analyses Using Propensity Score Matching (PSM) Techniques

We re-estimated the association between the label of LD and the completion of all high school graduation courses, as well as all college preparatory courses, with propensity score matching (PSM) techniques to better account for selection bias. Essentially, PSM techniques allow for the distillation of a large number of covariates into a single index per student.

Our PSM technique was based on strategies developed by Hong and Raudenbush (2005). We first estimated logistic regression models predicting being labeled with an LD using the measures of socio-demographic background and early high school achievement (Table B1a), and then used the predicted probabilities of being labeled with an LD from this model as each student's propensity score. This predicted probability of being labeled with an LD was based on each student's socio-demographic background, academic history, and school characteristics, regardless of whether the student is actually labeled.

We then divided the sample into 12 strata based on the propensity scores from these models, grouping students with a similar risk of being labeled with an LD. Stratifying students based on their propensity to be labeled with an LD allows the comparison of labeled and unlabeled students with a host of similar characteristics in a way that is not possible with standard regression techniques (Dehejia & Wahba, 2002; Rosenbaum & Rubin, 1983). We conducted a series of tests to ensure that students labeled with an LD were matched to otherwise comparable unlabeled students within each stratum. Table B1b shows the balance for the propensity scores within each stratum and the percentage of covariates within each stratum for which balance was achieved.

Our final step in the propensity score stratification modeling was to estimate the average effect of the LD label on course-taking outcomes across strata. To do this, we estimated logistic regression models predicting our course-taking outcomes with the LD label as the main predictor, and the propensity scores and dichotomous indicators for all but one propensity stratum as controls (Table B2). The propensity score was included in these models to "remove remaining within-stratum bias" (Hong & Raudenbush, 2005, p. 213). The remaining controls, the potential mediators, which most likely occurred after the student received the LD label, were included in the final set of models.

Table B1

Construction of Propensity Scores and Propensity Score Strata

Table B1a: Marginal Effects from Logistic Regression Models Predicting LD Label in 10th Grade

	dy/dx (SE)		*Model, continued*	dy/dx (SE)	
Socio-Demographic Background			Attended preschool	0.01	(0.01)
Male	**0.01**	**(0.01)**	Participated in Head Start	0.00	(0.01)
Race:			10th grade English proficiency	0.00	(0.00)

Table B1a: Marginal Effects from Logistic Regression Models Predicting LD Label in 10th Grade

White, non-Hispanic (ref)	-		**Academic History**		
Black, non-Hispanic	**−0.02**	**(0.01)**	Ever in remedial math	**0.01**	**(0.01)**
Hispanic	0.00	(0.01)	Parent report of cognitive disability	**0.09**	**(0.01)**
Asian, non-Hispanic	−0.01	(0.02)	Ever in an ESL program	0.01	(0.01)
Other race	0.01	(0.01)	Started school in U.S. in:		
Highest parentaleducation level:			Kindergarten (ref)	-	
High school or less	**−0.02**	**(0.01)**	Between 1st and 2nd grade	−0.01	(0.01)
Some college (ref)	-		Between 3rd and 5th grade	−0.02	(0.03)
BA or higher	0.00	(0.01)	Between 6th and 10th grade	**-0.14**	**(0.04)**
Family income	0.00	(0.00)	10th grade reading test score	**-0.01**	**(0.00)**
Cognitive resources inhousehold	0.00	(0.00)	BIC	640752.8	
Number of siblings	**0.00**	**(0.00)**	Students (N)	10, 670	
No. people expect college	**−0.01**	**(0.00)**	Schools (N)	540	

Table B1b: Within-Stratum Balance in Mean Propensity Scores

	No Disability Label			LD Label			
	N	Mean	(SD)	N	Mean	(SD)	Balance
Stratum 0	2550	0.00	(0.00)	10	0.00	(0.00)	90%
Stratum 1	1700	0.01	(0.00)	10	0.01	(0.00)	90%
Stratum 2	2110	0.00	(0.00)	20	0.01	(0.00)	86%
Stratum 3	690	0.03	(0.00)	20	0.03	(0.00)	93%
Stratum 4	970	0.04	(0.01)	30	0.04	(0.01)	93%
Stratum 5	1060	0.07	(0.02)	80	0.07	(0.02)	90%
Stratum 6	370	0.13	(0.01)	60	0.13	(0.02)	93%
Stratum 7	120	0.17	(0.01)	30	0.17	(0.01)	90%
Stratum 8	200	0.22	(0.02)	80	0.22	(0.02)	93%
Stratum 9	160	0.34	(0.05)	120	0.35	(0.05)	100%
Stratum 10	70	0.53	(0.06)	70	0.54	(0.05)	97%
Stratum 11	50	0.77	(0.09)	100	0.78	(0.11)	83%
All	10050	**0.04**	(0.09)	620	**0.31**	(0.26)	

Note: Bolded coefficients indicate a significance level of at least $p < 0.05$. Frequencies rounded to the nearest 10 per NŒS guidelines. Balance is achieved when mean values between labeled and unlabeled students within a stratum are not statistically significant at at least a 0.05 confidence level. The column titled 'Balance' shows the percentage of covariates that are balanced within each stratum.

Table B2

Marginal Effects from Logistic Regression Models Using Propensity Score Matching Techniques to Predict Coursework Completion

	High School Graduation	**College Preparatory**	**High School Graduation**	**College Preparatory**
	dy/dx (SE)	dy/dx (SE)	dy/dx (SE)	dy/dx (SE)

	High School Graduation		College Preparatory			High School Graduation		College Preparatory	
	Model A1		Model B1			Model A2, c.		Model B2, c.	
School Label of LD	**−0.26**	(0.03)	**−0.60**	(0.05)	Position on science course sequence	**0.05**	**(0.01)**	**0.04**	**(0.01)**
	Model A2		Model B2		Credits in special education	0.01	(0.03)	−0.07	(0.06)
School Label of LD	−0.04	(0.03)	**−0.17**	**(0.04)**	Credits in low-level coursework	0.01	(0.02)	**−0.04**	**(0.02)**
Propensity score	−0.23	(0.33)	−0.56	(0.54)	Credits in non-core	0.01	(0.01)	−0.01	(0.01)
Propensity score strata:					**Early High School Attitudes and Behaviors**				
Stratum 0 (ref)					Positive academic attitudes	**0.00**	**(0.00)**	**0.00**	**(0.00)**
Stratum 1	**0.07**	**(0.02)**	**0.04**	**(0.02)**	Hours/week on homework outside of school	0.00	(0.00)	0.00	(0.00)
Stratum 2	0.03	(0.02)	0.00	(0.02)	How often forgets materials, books, etc.	**−0.01**	**(0.00)**	**−0.01**	**(0.00)**
Stratum 3	0.02	(0.03)	−0.04	(0.03)	Student thinks will complete BA or higher	**0.08**	**(0.02)**	**0.10**	**(0.02)**
Stratum 4	0.03	(0.03)	−0.03	(0.03)	Math and English teacher reports:				
Stratum 5	0.05	(0.03)	−0.01	(0.04)	Student's # of negative academic behaviors	0.00	(0.00)	0.00	(0.00)
Stratum 6	0.09	(0.05)	−0.02	(0.08)	Student's # of negative social behaviors	0.01	(0.01)	0.00	(0.01)
Stratum 7	−0.03	(0.07)	−0.05	(0.11)	Frequency of negative behavior	**−0.01**	**(0.00)**	**−0.01**	**(0.00)**
Stratum 8	0.07	(0.08)	−0.09	(0.13)	Degree to which friends are acad. oriented	**0.01**	**(0.00)**	**0.01**	**(0.00)**
Stratum 9	0.04	(0.12)	0.01	(0.19)	**Early High School Achievement**				
Stratum 10	0.07	(0.18)	0.07	(0.33)	9th grade GPA in academiccorecourses	0.02	(0.01)	**0.04**	**(0.01)**
Stratum 11	0.21	(0.26)	0.19	(0.38)	No. semesters failed in 9th gr. acad. courses	**−0.04**	**(0.01)**	**−0.05**	**(0.01)**
9th Grade Course Placement					Dropped out after the 10th grade	**−0.80**	**(0.10)**	**−0.95**	**(0.17)**
Position on math course sequence	**0.03**	**(0.01)**	**0.04**	**(0.01)**	Held back a grade after the 10th grade	**−0.32**	**(0.07)**	−0.17	(0.09)
					BIC	2676861.28		2251212.93	

Note: Each model is estimated using approximately 10,670 students in 540 schools. Bolded coefficients indicate a significance level of at least $p < 0.05$.

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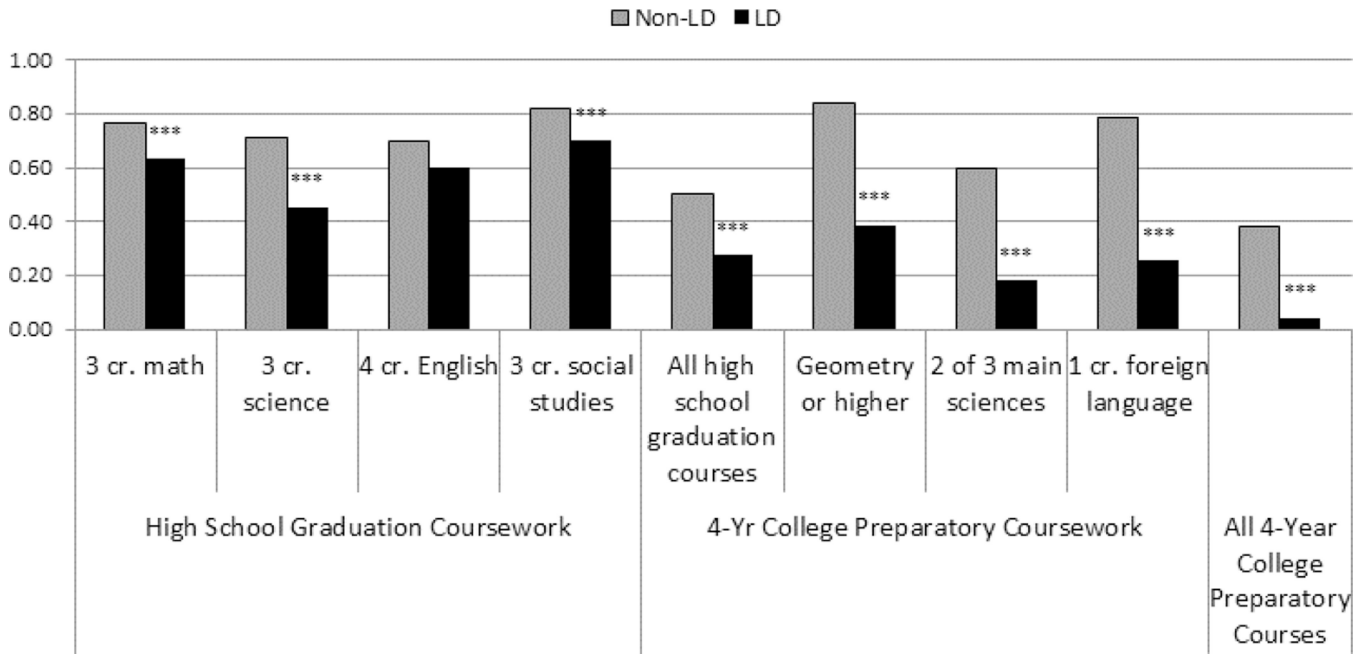

Figure 1.
Weighted Proportions of Students Completing Coursework by LD Status
Note: ***p < 0.001.

Table 1

Weighted Proportions and Means by LP Status

	Not labeled	Labeled LD		Not labeled	Labeled LD		Not labeled	Labeled LD
Soao-Democyaphic Backyound			**Academic History**			**Early High School Attitudes and Behaviors**		
Male	0.49	0.66	Age	15.85	16.14	Positive academic	50.19	46.18
Rice:				(0.57)	(0.71)	attitudes	(13.01)	(12.27)
White, non-Hispanic	0.64	0.60	Ever in remedial math	0.09	0.18	Hours/week on home-	5.75	3.79
Back, non-Hispanic	0.12	0.14	Parent report of cog. dis	0.06	0.55	work outside of school	(5.26)	(4.42)
Hispanic	0.15	0.18	Ever in an ESL program	0.07	0.13	How often forgets mat.,	2.53	3.66
Asian, non-Hispanic	0.03	0.02	Started school in U.S. in:			books, etc.	(2.11)	(2.72)
Other race	0.05	0.07	Kindergarten	0.89	0.92	Student expects BA^{+}	0.83	0.55
Highest parental education level:			Between 1st&2ndgr.	0.08	0.07	Math and English teacher reports		
High school or less	0.06	0.06	Between 3rd & 5th gr.	0.01	0.01	Student's#of negative	3.74	4.96
Some college	0.21	0.30	Between 6th & 10th gr.	0.02	0.00	academic behaviors	(2.59)	(2.98)
BA or higher	0.73	0.64	10th grade reading test	51.22	39.70	Student's#of negative	0.56	1.17
Family income	9.10	8.27	score	(9.02)	(7.95)	social behaviors	(0.89)	(1.48)
	(2.18)	(2.41)	**9th Grade Course Placement**			Frequency of negative	8.79	11.10
Cognitive resources in	3.97	3.67	Position on math course	3.85	2.52	behavior	(4.65)	(5.05)
household	(1.14)	(1.22)	sequence	(1.32)	(1.45)	Degree to which friends	7.35	6.94
Number of siblings	2.31	2.63	Position on science	2.47	2.01		(1.84)	(1.89)
	(1.30)	(1.51)	course sequence	(1.16)	(1.14)	**Early High School Achievement**		
No. people expect	3.74	2.48	Credits in special	0.01	0.29	9th grade GPA in acad.	2.52	2.06
college	(1.59)	(1.54)	education	(0.10)	(0.70)	core courses	(0.91)	(0.82)
Attended preschool	0.58	0.56	Credits in low-level	0.21	0.63	No. semesters failed in	0.58	0.79
Participated in Head St..	0.17	0.26	course work	(0.45)	(0.77)	9th gr. acad. courses	(1.44)	(1.57)
10th grade English prof.	11.79	11.67	Credits in non-core	2.27	2.53	Dropped out after 10th	0.05	0.12
	(0.85)	(1.29)	course work	(0.97)	(1.23)	Held back after 10th gr.	0.02	0.03
						Number of Students	10,050	620

Note: Standard deviations are induded in parentheses underneath respective means. All differences between studentslabeled with an LD and students not labeled with a disability are statistically significant (at least p<.05). Frequendes are rounded to nearest 10perNCESguidelines.

Table 2

Marginal Effectsfrom Logistic Regression Models Predicting Completion of All High School Graduation Coursework

	Model 1			
	dy/dx	(SE)		
School label of LD	**−0.26**	**(0.03) *****		
	Model 2		**Model 3**	
	dy/dx	**(SE)**	**dy/dx**	**(SE)**
School label of LD	−0.03	(0.03)	−0.04	(0.03)
Socio-Democyaphic Backyound				
Male	−0.02	(0.01) +	0.01	(0.01)
Rice:				
White, non-Hispanic(ref)	-		-	
Back, non-Hispanic	0.01	(0.02)	0.02	(0.02)
Hispanic	−0.03	(0.02)	−0.02	(0.02)
Asian, non-Hispanic	0.12	(0.03) ***	0.08	(0.03) **
Qher race	0.00	(0.03)	0.03	(0.03)
Highest parental education level:				
High school or less	0.01	(0.03)	0.03	(0.03)
Some college (ref)				
BA or higher	0.00	(0.01)	−0.01	(0.01)
Family income	0.00	(0.00)	0.00	(0.00)
Cognitive resources in the househol	0.01	(0.01) +	0.00	(0.01)
Number of siblings	−0.01	(0.00) *	0.00	(0.00)
No. people expect college	0.04	(0.00) ***	0.01	(0.00) *
Attended preschool	0.01	(0.01)	0.00	(0.01)
Participated in Head Start	−0.02	(0.02)	0.01	(0.02)
10th grade English proficiency	0.00	(0.01)	0.01	(0.01)
Academic History				
Age	−0.04	(0.01) ***	−0.01	(0.01)
Ever in remedial math	−0.02	(0.02)	0.00	(0.02)
Parent report of cognitive disability	−0.09	(0.02) ***	−0.06	(0.02) **
Ever in an ESL program	0.01	(0.03)	−0.01	(0.02)
Started school in U.S. in:				
Kindergarten (ref)	-			
Between 1st and 2nd grade	−0.08	(0.03) **	−0.05	(0.03) +
Between 3rd and 5th grade	0.00	(0.05)	0.00	(0.05)
Between 6th and 10th grade	−0.11	(0.05) *	−0.14	(0.04) **
10th grade reading test score	0.01	(0.00) ***	0.00	(0.00)

	Model 1			
	dy/dx	(SE)		
School label of LD	**−0.26**	**(0.03)** ***		
	Model 2		**Model 3**	
	dy/dx	**(SE)**	**dy/dx**	**(SE)**
9th Grade Course Placement				
Position on math course sequence			0.02	(0.01) ***
Position on science course sequence			0.03	(0.01) ***
Creditsin special education			0.01	(0.03)
Credits in low-level coursework			0.01	(0.01)
Credits non-core			0.01	(0.01)
Early High School Attitudes and Behaviors				
Position academic attitudes			0.00	(0.00) +
Hours'week on homework outside of school			0.00	(0.00)
How often forgets materials, books, etc.			−0.01	(0.00) ***
Student thinks will completes BA or higher			0.04	(0.02) *
Math and Biglish teacher reports				
Student's#of negative academic behaviors			0.00	(0.00)
Student's#of negative social behaviors			0.00	(0.01)
How often student engages in negative behavior			−0.01	(0.00) **
Degree to which friends are academically oriented			0.01	(0.00) **
Early High School Achievement				
9th grade GPAin academic core courses			0.05	(0.01) ***
No. semestersfailed in 9th gr. academic courses			−0.03	(0.01) ***
Dropped out between the 10th and 12th grades			−0.73	(0.09) ***
Held back a grade between the 10th and 12th grades			−0.29	(0.06) ***

Note: Each model is estimated using approximately 10,670 students in 540 schools. Although controls for school characteristics are included in Models 2 and 3, coefficients and standard errors are not shown in the interest of space. The BICs for Models 1–3 are, respectively, 3183559.5, 2802084.2, and 2421806.8.

+ $p < 0.10$,

* $p < 0.05$,

** $p < 0.01$,

*** $p < 0.001$.

Table 3

Marginal Effectsfrom Logstic Regression Models Predicting Completion of All 4-Year College Preparatory Coursework

	Model 1			
	dv/dx	(SE)		
School Label of LD	**−0.60**	**(0.05) *** **		
	Model 2		**Model 3**	
	dv/dx	**(SE)**	**dv/dx**	**(SE)**
School Label of LD	−0.25	(0.04) ***	−0.19	(0.03) ***
Socio-Demogxaphic Background				
Male	−0.01	(0.01)	0.03	(0.01) **
Rice:				
Wiite, non-Hispanic(ref)	-		-	
Back, non-Hispanic	0.00	(0.02)	0.02	(0.02)
Hispanic	0.03	(0.02)	0.04	(0.02) *
Asian, non-Hispanic	0.13	(0.03) ***	0.09	(0.03) **
Other race	0.01	(0.03)	0.04	(0.03) +
Highest parental education level:				
High school or less	0.02	(0.03)	0.03	(0.03)
Some college (ref)				
BA or higher	0.02	(0.01)	0.01	(0.01)
Family income	0.01	(0.00) *	0.00	(0.00)
Cognitive resources in the househol	0.01	(0.01) +	0.00	(0.01)
Number of siblings	−0.01	(0.00) *	0.00	(0.00)
No. people expect college	0.06	(0.00) ***	0.02	(0.00) ***
Attended preschool	0.02	(0.01)	0.01	(0.01)
Participated in Head Start	−0.03	(0.02) *	0.00	(0.02)
10th grade English proficiency	0.00	(0.01)	0.00	(0.01)
Academic History				
Age	−0.04	(0.01) ***	−0.01	(0.01) +
Ever in remedial math	−0.05	(0.02) *	−0.02	(0.02)
Parent report of cognitive disability	−0.13	(0.02) ***	−0.08	(0.02) **
Ever in an ESL program	−0.01	(0.02)	−0.03	(0.02)
Started school in U.S. in:				
Kindergarten (ref)	-			
Between 1st and 2nd grade	−0.05	(0.02) *	−0.01	(0.02)
Between 3rd and 5th grade	−0.07	(0.05)	−0.07	(0.05)
Between 6th and 10th grade	−0.03	(0.04)	−0.06	(0.04)

	Model 1			
	dv/dx	(SE)		
School Label of LD	**−0.60**	**(0.05)** ***		
	Model 2		**Model 3**	
	dv/dx	**(SE)**	**dv/dx**	**(SE)**
10th grade reading test score	0.01	(0.00) ***	0.00	(0.00) ***
9th Grade Course Placement				
Position on math course sequence			0.03	(0.01) ***
Position on science course sequence			0.03	(0.01) ***
Credits in special education			−0.05	(0.04)
Credits in low-level coursework			−0.05	(0.02) **
Credits in non-core			−0.01	(0.01)
Early High School Attitudes and Behaviors				
Positive academic attitudes			0.00	(0.00)
Hours/week on homework outside of school			0.00	(0.00)
How often forgets materials, books, etc.			−0.01	(0.00) **
Student thinks will completes BA or higher			0.07	(0.02) ***
Math and English teacher reports				
Student's#of negative academic behavior;			−0.01	(0.00) *
Student's#of negative social behaviors			−0.01	(0.01)
How often student engages in negative behavior			0.00	(0.00) *
Degree to which friends are academically oriented			0.01	(0.00) ***
Early High School Achievement				
9th grade GPAin academic core courses			0.06	(0.01) ***
No. semestersfailed in 9th gr. acadeimic courses			−0.04	(0.01) ***
Dropped out between the 10th and 12th grades			−0.86	(0.15) ***
Held back a grade between the 10th and 12th grades			−0.14	(0.07) *

Note: Each model isestimated using approximately 10,670 students in 540 schools. Although controls for school characteristics are induded in Models 2 and 3, coefficients and standard errors are not shown in the interest of space. The BCs for Models 1–3 are, respectively, 2930944.4,2338419.6, and 2074616.5.

+ $p < 0.10$,

* $p < 0.05$,

** $p < 0.01$,

*** $p < 0.001$.