Racial Differences in Special Education Identification and Placement: Evidence Across Three States

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In this article, Todd Grindal, Laura Schifter, Gabriel Schwartz, and Thomas Hehir examine race/ethnicity differences in students' special education identification and subsequent placement in segregated educational settings. Using individual-level data on the full population of K–12 public school students in three states, the authors find that racial and ethnic disparities in identification persist within income categories and are stronger for those disabilities that are typically identified in a school setting, such as learning disabilities or emotional disabilities, than those more often identified by a health-care provider, such as blindness or deafness. Also, Black and Hispanic students with disabilities were more likely to be placed in a substantially separate setting, compared to white students, regardless of income status. These results suggest that low-income status is insufficient to explain observed inequalities in the rate at which students of color are identified for special education and placed in substantially separate settings. A better understanding of the ways income status and race contribute to students' interactions with the special education system are critical for building a more equitable and just K–12 education system.

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In the US public education system, Black and Hispanic students are identified as being eligible for special education at higher rates than White students (Donovan & Cross, 2002; Losen & Orfield, 2002; USDOE, 2017; Zhang, Katsiyannis, Ju, & Roberts, 2014). Once identified, Black and Hispanic students are also more likely to be educated in a substantially separate educational setting, segregated from their typically developing peers (Pérez, Skiba, & Chung, 2008; Skiba, Poloni-Staudinger, Gallini, Simmons, & Feggins-Azziz, 2006). To track and address this problem, the Individuals with Disabilities Education Act (IDEA) requires school officials to provide information on the race and ethnicity of students who receive special education services in their districts. States are then required to use that data to identify local education agencies that demonstrate significant racial disproportionality in their special education programs.

A series of recently published research studies have questioned whether the disproportionate number of Black and Hispanic students in special education warrants federal monitoring and intervention (Morgan et al., 2015, 2017). The authors of these studies argue that, when analyses control for other factors, such as measures of social and academic skills, as well as income status, students of color are identified for special education services at lower rates than White students. In 2018, the Trump administration cited the Morgan et al. studies (2015, 2017) in its attempts to delay regulations designed to address racial disproportionality in special education, though these were eventually overturned in federal court. Key to the debate is whether higher rates of special education identification among Black and Hispanic students are the result of a higher prevalence of disability relative to White students or whether this discrepancy is the consequence of systemic bias.

The high correlation between race and income status in the United States makes it difficult to disentangle the role of these factors in driving racially disparate rates of special education identification. Black and Hispanic students are far more likely than their White peers to live in households that are low income: in 2016, 34 percent of Black children and 28 percent of Hispanic children lived in low-income households, compared to just 11 percent of non-Hispanic White children (McFarland et al., 2018). Further, children living in low-income households are more likely to be exposed to environmental conditions and adverse experiences that could plausibly lead to disability (Lustig & Strauser, 2007). It is thus possible that the observed differences in rates of special education identification between Black, White, and Hispanic students may be attributable to differences in household income.

Yet, ample qualitative evidence indicates that Black and Hispanic students experience racial discrimination in US schools. Thus, it is possible that racial bias may contribute to observed overidentification regardless of socioeconomic status. Black and Hispanic students may be referred for special education eval-

uation because teachers inappropriately perceive them to have more inherent difficulty behaving or have lower academic skill levels (Cherng, 2017; Fletcher & Navarrete, 2011; Gilliam et al., 2016; O'Connor & Fernandez, 2006) and thus to need special educational services. These perceptions of students may not be malicious or negative; rather, teachers may view special education as an opportunity to provide extra help to students in need (Harry & Klingner, 2014). If part of this perception of need is based on race/ethnicity, however, inappropriate disability identification for students of color could arise.

Using data on the full population of enrolled K–12 students in three US states, we investigate racial/ethnic differences in special education identification for students with similar levels of household income. We then examine what happens after students are identified by analyzing racial/ethnic differences in placement in substantially separate educational programs for students in the same income and disability categories. We find evidence that both low-income and non-low-income Black and Hispanic students are more likely than White students from the same income category to be identified as being eligible for special education. These differences are present for those disability categories that are typically identified as part of the schooling process (learning disabilities, emotional disabilities, and intellectual disabilities) but not in those disability categories that are most often identified by a health-care provider (deafness or blindness). We also find that, once identified as having a disability, Black and Hispanic students are more likely than White students to be placed in a substantially separate educational program. Our analyses are not able to determine for which students their special education identification or subsequent placement in a substantial separate setting is appropriate. It is therefore possible that some factor other than student race contributes to the observed differences. What the overall pattern of findings does indicate is that student economic status, as defined by receipt of free or reduced-priced lunch (FRPL), is not sufficient to explain these differences. This article therefore lends support to arguments that racial bias is a factor driving racial disproportionality in special education and thus requires monitoring from the federal Office of Civil Rights.

Background and Context

Policy on Special Education Identification and Placement

The IDEA provides US students with disabilities-specific educational rights, including the right to a Free Appropriate Public Education (FAPE). In order to be eligible for special education services under the IDEA (2004), a student must be identified as having a disability in one of thirteen federally defined categories and need special education services to benefit from education (Reg. 300.8). Although some students are identified prior to entering kindergarten, the disability identification process typically begins with a referral from a classroom teacher (Harry & Klingner, 2014; Palfrey, Singer, Walker, & Butler,

1987; Reschly, 1996). After being referred, a student is evaluated, culminating in a meeting where educators, other professionals, and the child's parents collaboratively determine whether the student meets the IDEA eligibility requirements (IDEA, 2004 Reg. 300.304 and 306).

If a student is deemed eligible, their parents, teachers, and other school officials meet to determine the special education services the child needs. They also determine the child's "placement," or where the child will receive such services. In determining placement, the IDEA (2004) requires that students with disabilities be educated in the "least restrictive environment" (LRE), where they are educated with nondisabled peers to the "maximum extent appropriate" (Reg. 300.114). As what is "appropriate" varies from disability to disability and student to student, what the appropriate LRE looks like also varies, from full participation in general education classrooms to attending a specialized school that serves only students with disabilities.

The US Department of Education requires that states collect data on the amount of time students with disabilities are educated in classes with their nondisabled peers. Students' educational placements are then categorized as included in general education classrooms for 80 percent or more of the day (full-inclusion placement), included 40–79 percent of the day (partial-inclusion placement), or included less than 40 percent of the day (substantially separate placement).

Special education can provide students with beneficial services, supports, accommodations, and legal rights that help them succeed in school (Hanushek, Kain, & Rivkin, 2002). At the same time, special education identification can result in lowered expectations from teachers, limited access to the general education curriculum, and stigma (Artiles, Kozleski, Trent, Osher, & Ortiz, 2010; Donovan & Cross, 2002; Harry & Klingner, 2014; Losen & Orfield, 2002). It is therefore critical that educators make sure they appropriately identify students who both have a disability and need special education services while not misidentifying students who would be better served by general education.

The negative consequences of misidentification may be exacerbated when students are segregated from their nondisabled peers. Prior research indicates that students with disabilities who are educated in general education settings tend to outperform similar students in separate placements on measures of academic achievement, even when controlling for a variety of factors, such as type of disability (Hehir, Grindal, & Eidelman, 2012; Newman et al., 2011; Schifter, 2016). For example, work by Blackorby, Chorost, Garza, & Guzman (2003) indicates that students who are primarily educated in inclusive settings perform more than a full year closer to grade level on tests of English and mathematics skills than do otherwise similar students who are primarily educated in segregated settings. Students educated in inclusive settings also have higher rates of attendance and a higher probability of on-time graduation than similar students in substantially separate classrooms (Rea, McLaughlin,

& Walther-Thomas, 2002; Schifter, 2016). In addition to suboptimal academic outcomes, inappropriate placement in a segregated classroom can limit students' access to challenging curricula, high-quality teachers, and social interactions with nondisabled peers (Fierros & Conroy, 2002; McLeskey, Tyler, & Flippin, 2004; Skiba et al., 2006), all of which are important resources for students' socioemotional and academic development in their own right (Fisher & Meyer, 2002; Laws, Byrne, & Buckley, 2000).

The challenge for educators is to appropriately identify those students who, because of a disability, require special education services to access the school curriculum. In addition to appropriate identification, educators must also work to ensure that students with disabilities are appropriately educated in the least restrictive environment: students need to be educated with nondisabled peers to the maximum extent appropriate.

Disproportionality

Given the importance of accurate identification and placement of students who qualify for special education, researchers and policy makers have expressed concern over the disproportionate representation of students of color in special education and the subsequent placement of these students in substantially separate educational environments (Donovan & Cross, 2002; Losen & Orfield, 2002; Zhang et al., 2014). In 2015–2016, 15.5 percent of Black students nationwide were identified as students with disabilities, compared to 13.7 percent of White students (USDOE, Office of Special Education Programs, 2017). The differences in identification rates between Black and White students vary by disability category, with some categories, including emotional disability, intellectual disability, and learning disability, exhibiting larger proportional differences. For example, 1.4 percent of Black students in public education were identified with an intellectual disability, compared to 0.8 percent of White students. Although the "true" number of students who are eligible for special education is not known, persistent differences in rates of identification raise concern that some students of color are inappropriately identified.

Once identified, students of color are also more likely to be placed in substantially separate classrooms (USDOE, 2014). For example, 17 percent of Black students with disabilities were educated in substantially separate classrooms, compared to 10.7 percent of White students with disabilities (USDOE, 2017). This double disproportionality may exacerbate the negative consequences of misidentification.

Potential Explanations of Differences in Identification and Placement

Some have attributed the high rates of special education placement among students of color to educators' implicit and explicit beliefs regarding the capacities of students from different backgrounds (interpersonal racism) and the systemic biases built into the structure of our communities and schools (structural racism). If observed differences in rates of disability identification

among students are the result of biases, then the observed disproportionality in special education identification and placement in substantially separate settings represents an indicator of discrimination and thus requires intervention to preserve students' civil rights (Harry & Klingner, 2014).

Proponents of this *bias hypothesis* point to differences in rates of disproportionality across different contexts. For example, high rates of special education identification for students of color are particularly evident for those disabilities that are often identified in a school setting, such as a learning disability, emotional disability, and/or intellectual disability, compared to those that are more often identified by a health-care provider, such as a hearing impairment, vision impairment, and/or physical impairment (Donovan & Cross, 2002; Harry & Klingner, 2014; Parrish, 2002; Skiba et al., 2008). The magnitude of racial/ethnicity disproportionality also differs across states. For example, Parrish (2002) found differences in rates of disproportionality based on how states allocate their special education funding: states where funding was tied to disability category tended to have higher rates of disproportionality. Further, the magnitude of disproportionality differs within states, from school to school. Oswald, Coutinho, and Best (2002) found that, on average, Black students who attended a school with a lower percentage of Black students had a higher probability of being identified for special education than did an otherwise similar Black student in a school with a larger proportion of Black students. Oswald and colleagues thus argue that differences in rates of identification between Black and White students are not the result of actual differences in behaviors but, rather, the result of a student appearing to stand out from their peers.

Others suggest that disproportionate identification reflects true differences in the prevalence of disability among children of different subgroups. If disproportionate rates of special education identification between subgroups of students reflect real differences in the prevalence of disability among them, then the observed subgroup differences may be appropriate. Remedies that are outside the purview of the school system—such as housing, nutrition, and health care—would thus be the more appropriate policy remedy. Proponents of this *prevalence hypothesis* note that Black and Hispanic students are more likely to live in low-income families, and that low-income children may be more susceptible to disability because of higher rates of exposure to environmental toxins, differences in nutrition, and less access to preventative health services (Hosp & Reschly, 2003; MacMillan & Reschly, 1998). As a result, low-income students would be identified for special education at higher rates than non-low-income students. One study of a single school district exploring disproportionality among low-income students, for example, found that low-income students were 85.2–92.5 percent more likely than non-low-income students to be identified for special education services (Bal, Sullivan, & Harper, 2014).

Recent work by Morgan et al. (2015, 2017) lends support to the prevalence hypothesis and argues that students of color are in fact underrepresented in

special education. The authors used hazard modeling to estimate the probability that a child will be identified in one of five disability categories by the eighth grade. They drew on a nationally representative sample of children from the Early Childhood Longitudinal Study—Kindergarten (ECLS-K), which includes special education teachers' reports of students' disability status in kindergarten, first, third, fifth, and eighth grades; classroom teachers' ratings of children's self-regulatory and externalizing behaviors; researcher-administered tests of reading and mathematics; and a large number of child and family demographic characteristics. The authors found that when controlling for a student's family characteristics, their prior performance on tests of academic skills, and their teacher's ratings of children's behavior, Black students had a statistically significantly lower probability of being identified as having a learning disability, speech or language impairment, intellectual disability, health impairment, or emotional disturbance. They similarly found that Hispanic students had a statistically significantly lower probability of being identified as having a learning disability, speech or language impairment, or health impairment. Morgan et al. (2015, 2017) argue that these lower probabilities of identification may be the result of educators' being overly concerned about inappropriate identification of students of color.

Some scholars have noted that Morgan et al.'s findings (2015, 2017) were built on the strong assumption that student scores on tests of academic skills and teacher reports of student behavior represent accurate, unbiased indicators of a students' true cognitive and behavioral capacities (Skiba, Artiles, Kozleski, Losen, & Harry, 2016). If these measures were, as some have argued (e.g., Ferguson, 2003; Steel & Aronson, 1995; Tenenbaum & Ruck, 2007), systematically biased against students of color, then their inclusion in these analyses serves to confound rather than clarify our understanding of the potential role of racial biases in special education identification. Further, the ECLS-K indicators of a student's disability status and category relied on potentially inaccurate parent and teacher reports, rather than school administrative records. (The authors acknowledged in a footnote to their 2015 article that they were unable to validate the records of special education and disability category used in these analyses.) Others have argued that Morgan et al. ignored the potential negative consequences of misidentification (e.g., segregation, stigma, and lower expectations) in suggesting that more non-White students should be identified for special education (Collins, Connor, Ferri, Gallagher, & Samson, 2016). We posit that by using these sample data, Morgan et al. were unable to take into account the broader context (the school or district) in which the student was identified.

In this study, we explore the interaction between race and income in special education identification and placement. We build on prior work by examining the racial and income components of disproportionality simultaneously, permitting us to assess the salience of income within race groups and of race within income groups. Additionally, we utilize data on the full population of

K–12 students from three states in different regions of the US to improve on the generalizability of patterns that have been observed in prior single-district or single-state studies. Finally, we examine how income and race/ethnicity are associated with the educational placements of identified students.

We address the following two research questions: (a) Within income categories, are Black and Hispanic students more likely to be identified for special education than White students? (b) Once identified, are Black and Hispanic students more likely than White students to be placed in a substantially separate environment? We examine these questions first considering all disability types together and then for four specific disability categories — sensory, learning, emotional, and intellectual. Doing so allows us to compare how race and income are associated with our outcomes for those disabilities that are typically identified by a health provider (sensory) and those that are more often identified in a school setting (learning, emotional, intellectual).

Research Design

To address our questions, we fit two sets of multilevel logistic regression models with district-level random effects. In the first, we estimate the log odds of being identified as having a disability (converted to a probability); in the second, we estimate the log odds (converted to a probability) of being placed in a substantially separate setting once a student is identified. We include income and race as intersectional dummy variables representing income-by-race interactions, allowing comparisons across race within income and across income within race. In our analyses for the first research question, we first model the log odds for any disability in each state, then repeat these analyses an additional four times, once for each of our selected disability categories. For the second research question, we report only the all-disabilities category, given concerns that biased identification processes may result in systematically different groups of students within different disability categories.

Dataset and Analytic Sample

We used student-level data from all K–12 students enrolled in public schools during the 2013–2014 school year in three states. We accessed these administrative records through separate agreements with each state, which stipulated that we would not report that state's name or other identifying information. Two states were moderately sized (500,000–1.5 million students), and one state was large (more than 1.5 million students). To protect their anonymity, these are referred to as State A (moderately sized), State B (moderately sized), and State C (large). For analyses of the log odds of placement in a substantially separate educational setting, we exclude all students in private and public schools that served only students with disabilities (0.61 percent of students with disabilities across the three states). We did this to allow for a clear comparison between students with inclusive placements and students in

substantially separate classrooms within traditional public schools, as opposed to between inclusive placements in traditional public schools and placements, for example, at a school for children with blindness.

Each state provided student-level data files, which included information on student disability status, whether or not the student received a free or reduced-priced lunch, and the student's educational placement. State data files also included a range of other student characteristics, including grade, gender, school, school district, and whether the child was an English language learner.

Table 1 provides information on student characteristics by state. The states included in the study differed from one another on a number of important dimensions. State A and State C had substantially higher numbers of low-income students than State B. Similarly, the racial/ethnic composition of sample states varied. In State A, a large majority (80 percent) of students were White, with smaller numbers of students categorized as Black (10 percent) or Hispanic (5 percent). In State B, White students (64 percent) outnumbered students of color by nearly two to one, but a substantial number were categorized as Hispanic (17 percent). State C was the most ethnically heterogeneous, with 41 percent of students categorized as White, 22 percent categorized as Black, and 30 percent categorized as Hispanic.

The percentage of students who received special education in State A and State C approximated the national average (11 percent), while State B had a substantially higher number of students in special education (18 percent). States also differed in the percentage of special education students who were placed in substantially separate settings (9 percent in State A, 13 percent in State B, and 15 percent in State C).

Although the primary data elements—placement categories and disability categories—were consistent across states (as all states must report these to the US Department of Education), there were some notable differences in the state-level datasets. For example, in one state, student disabilities were recorded as both "primary" and "secondary." For the purposes of these analyses, we categorized the students' disabilities using the indicators for their primary disability, except in cases where "gifted" was their primary category and a non-"gifted" disability was listed as a secondary category. In another state, disability files were provided for three different time periods during the year, so disability variables were coded as "ever disabled" over the course of the year; the child was recorded as having a substantially separate educational placement if they were in such a placement at any point during the school year. Given these state-to-state differences, we chose to examine each state separately and did not attempt to combine the results into a single estimate.

Measures

Within each state, we used the following measures to estimate the probability (converted from the log odds) of identification in special education and placement in a substantially separate setting.

TABLE 1 *Demographic characteristics, special education identification, and placement in study states*

Characteristic	*State A (moderately sized)*	*State B (moderately sized)*	*State C (large)*
Low-income (FRPL eligible)	56%	40%	59%
Black	10%	9%	22%
White	80%	64%	41%
Hispanic	5%	17%	30%
Other race/ethnicity	5%	9%	7%
Limited English proficiency	3%	8%	13%
Special education	11%	18%	11%
Learning	2%	5%	5%
Emotional/Behavioral	1%	2%	<1%
Intellectual	2%	1%	<1%
Sensory disabilities[a]	<1%	<1%	<1%
Other disabilities[b]	6%	10%	5%
Educational placement (% of special education students)			
Full inclusion	72%	65%	71%
Partial inclusion	17%	16%	10%
Substantially separate	9%	13%	15%
Other placements[c]	2%	6%	5%

Notes: [a] Includes hearing, vision, and deaf-blindness; [b] includes communication, physical, neurological, autism, multiple disabilities, and developmental disabilities; [c] includes correctional facility, homebound/hospital, parentally placed private school, residential facility, and separate special education school.

Outcomes 1a–1d: Identification as requiring special education services, modeled separately for each of the four focal disability categories. For our first outcome, we investigated the log odds of being identified as eligible for special education services. We examined identification separately in each of four disability categories: learning disability (LD), intellectual disability (ID), emotional disability (ED), and sensory disability (SD). Each of the four dichotomous disability designations is reported at the student level and documented in the student's Individual Education Plan (IEP) as their primary disability.

Outcome 2: Substantially separate classroom placement. Our second outcome was a dichotomous variable indicating whether a student was educated in a substantially separate classroom within a public school (1 = substantially separate; 0 = fully or partially included). Once a child is identified as eligible for special education, the IDEA (2004) requires that students with disabilities be educated in the "least restrictive environment" (LRE), where, to the "maximum extent appropriate," they are educated with peers who do not have a disability

(Reg. 300.114). To monitor compliance with LRE provisions, the US Department of Education requires that states collect data on the amount of time students with disabilities are educated in classes with their typically developing peers. Students' educational placements are then categorized as included in general education classrooms for 80 percent or more of the day (full inclusion); included between 40 percent and 79 percent of the day (partial inclusion); and included less than 40 percent of the day (substantially separate).

Predictor 1: Student low-income status. We used FRPL eligibility to indicate low-income status, creating a dichotomous variable. Students who were eligible to receive a free or reduced-priced lunch were categorized as low-income (= 1), and students who were not eligible were categorized as non-low-income (= 0). Nationally, students receiving free or reduced-priced lunch correspond to living at or below 185 percent of the federal poverty line.

Predictor 2: Student race/ethnicity. We classified students as being in one of four mutually exclusive race/ethnicity categories: Black, Hispanic, White, and other race/ethnicity. The other race/ethnicity category includes students who reported their race as Asian, Pacific Islander, Native American, or multiple races. In many districts, the numbers of students in these categories were insufficient to support the analyses, especially in states where these race/ethnicity groups constituted a very small proportion of the population. It was therefore necessary to group these students into a single category to conduct consistent analyses. Though we include these students in our models, we do not display or interpret the results in our main tables, as the composition of this category varied across state samples.[1]

Student-level covariates. We included as covariates the following individual-level characteristics: *female*, a dichotomous variable set equal to 1 if the student was female, 0 otherwise; *English learner*, a dichotomous variable set equal to 1 if the student was classified as an English learner, 0 otherwise; and *grade*, a set of 13 dichotomous variables set equal to 1 if the student was in the specified grade, 0 otherwise.

District-level covariates. We also included the proportion of students with a disability, the proportion of students who qualified for free or reduced-price lunch, and the proportion of English learners in the district. All of these were coded as continuous variables ranging from 0 to 1. We also included district-level random effects, which adjusted our variance estimates to account for other differences between districts not directly measured.

Analyses

We used multilevel logistic regression models to estimate the probability (converted from log odds) that different groups of students would be identified as having any disability, identified as having one of the four focal disability types,

and educated in substantially separate classrooms, conditional on having been identified. The multilevel nature of these models allowed us to adjust our estimates to account for the nesting of children within school districts—that is, to partition out the portion of the variation attributable to students' shared educational environments.

This model took the form

$$\begin{aligned} logit(Y_{ij}) = {} & \beta_0 + \beta_1 FRPL * NHB_{ij} + \beta_2 NOT_{ij} * NHB_{ij} + \beta_3 FRPL * HISP_{ij} + \\ & \beta_4 NOT_{ij} * HISP_{ij} + \beta_5 FRPL * OTHER_{ij} + \beta_6 NOT_{ij} * OTHER_{ij} + \\ & \beta_7 FRPL * WHITE_{ij} + V_{ij} + Z_j + (u_j + \varepsilon_{ij}) \end{aligned}$$

where Y_{ij} represents the outcome of interest (special education identification or placement) for student i in district j; *FRPL* represents a dichotomous variable coded as 1 if the student received a free or reduced-priced lunch and 0 otherwise; and *NHB, HISP, OTHER,* and *WHITE* represent dichotomous variables indicating whether the student identified as Black, Hispanic, other/race ethnicity, or White, respectively. We interact income status and race/ethnicity, resulting in a set of seven dichotomous variables representing each combination of the race and income categories (e.g., low-income Black, non-low-income Black, low-income Hispanic, etc.), with non-low-income White students as the reference category. All analyses include a set of individual (V) and district (Z) level covariates, and ε and u represent individual- and district-level random terms, respectively. Individual covariates are student grade, sex, limited English proficient status; district covariates are proportion of students in each district with any disability; proportion of students in the district who are eligible for free or reduced-price lunch; and proportion of students in the district with limited English proficiency.

For ease of interpretation, we used the coefficients from these fitted models to calculate probabilities for low-income and non-low-income students in each racial category while holding other covariates at their means. For district-level variables, we calculated these means at the district level (for the average district), not at the student level. We then conducted F-tests to test for differences by race/ethnicity category within strata of income. We also report the results of t-tests for differences between low-income and non-low-income students within each race/ethnicity category. We do this to acknowledge the important role of income status in identification and placement but refer readers to prior work examining specifically the role of income status (Schifter, Grindal, Schwartz, & Hehir, 2019). Finally, we calculated risk ratios by dividing the fitted probabilities of identification and substantially separate placement for non-Hispanic Black and for Hispanic students, respectively, by the corresponding probability for a non-Hispanic White student.

We ran all analyses via the *xtlogit* command in the statistical analysis software Stata, version 14.1.

Findings

Identification

Table 2 displays fitted probabilities that low-income and non-low-income students from each of the focal race/ethnicity categories would be identified for special education in any disability category, as well as the probabilities that a student would be identified as having a learning disability, emotional disturbance, intellectual disability, or sensory disability. We also include p-values from tests of whether these probabilities differ across income groups within race/ethnicities (t-tests) or across race/ethnicities with income groups (F-tests).

— Research Question 1: Differences in the Probability of Special Education Identification Between Black, Hispanic, and White Students

We find meaningful, statistically significant racial and ethnic disproportionality in identification among non-low-income students. Figure 1 shows the risk ratios for non-low-income Black and Hispanic students being identified for special education, as compared to non-low-income White students. For those disabilities that are more often identified in a school setting (learning, emotional, and intellectual), the probability that a non-low-income Black or Hispanic student would be identified for special education was higher in nearly every case than the probability for an otherwise similar non-low-income White student. Specifically, across all three states, non-low-income Black students had about two times (or higher) the probability of identification with an emotional disability or identification with an intellectual disability. For instance, in State B, non-low-income Black students had a fitted probability of being identified with an emotional disturbance of 1.57 percent, compared to 0.75 percent for non-low-income White students. (This comparison is the equivalent of a risk-ratio of approximately 2.) For sensory disabilities, however, racial disparities among non-low-income students were more variable across states, in some cases nonexistent and in other cases in the reverse direction. In fact, non-low-income White students were slightly more likely to be identified as having a sensory disability than either Black or Hispanic students in State C.

Differences between low-income students of different races/ethnicities (not displayed in figure 3) were less consistent. In most cases, the probabilities of identification for low-income White, Black, Hispanic, and other students were statistically significantly different, but the magnitude of the difference was not as large as differences for non-low-income students. For instance, low-income Black students had a substantially higher probability than low-income White students of being identified as having an emotional disability in State A (risk ratio = 1.7) and State C (risk ratio = 1.4) but had a slightly lower probability in State B (risk ratio = 0.8).

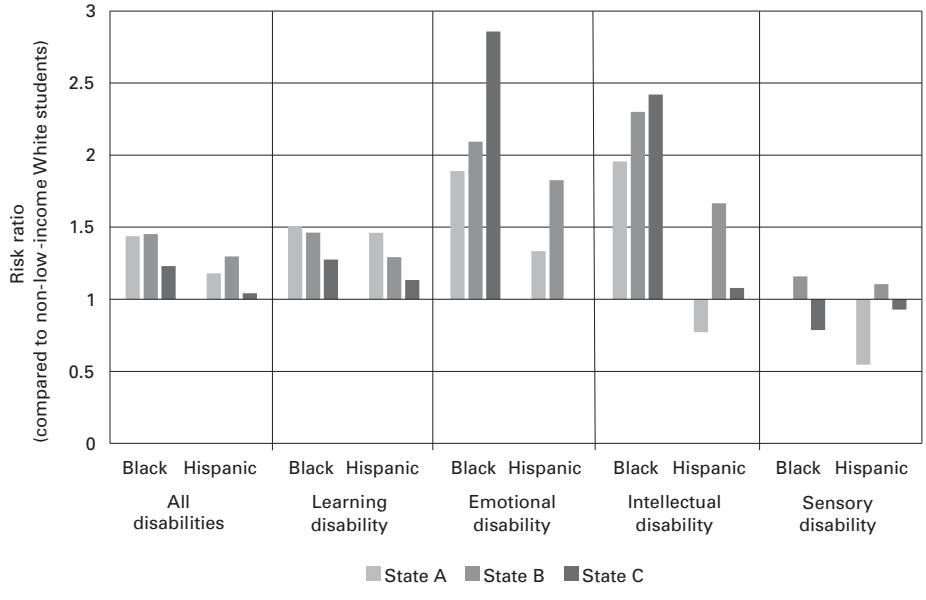
Differences between low-income and non-low-income students were also present, as shown in table 2 and figure 2. But the magnitude of these income differences varied by race: while present for every race/ethnicity examined,

TABLE 2 *Estimated probabilities of being identified as a special education student, by income, race/ethnicity, disability category, and state*

	State A			State B			State C		
Disability & race/ethnicity	*Non-low-income*	*Low-income*	*p value: across income*	*Non-low-income*	*Low-income*	*p value: across income*	*Non-low-income*	*Low-income*	*p value: across income*
All disabilities									
White	6.50	14.78	<.001	14.54	26.37	<.001	8.41	14.82	< .001
Black	9.34	16.30	<.001	21.12	24.65	<.001	10.35	14.64	< .001
Hispanic	7.67	10.11	<.001	18.87	26.31	<.001	8.76	12.83	< .001
p value: across race	<.001	<.001		<.001	<.001		< .001	< .001	
Learning									
White	0.63	1.64	<.001	3.22	5.87	<.001	2.03	4.16	< .001
Black	0.95	1.91	<.001	4.71	6.07	<.001	2.59	4.44	< .001
Hispanic	0.92	1.34	<.001	4.16	6.53	<.001	2.30	4.10	< .001
p value: across race	<.001	<.001		<.001	<.001		< .001	< .001	
Emotional									
White	0.09	0.40	<.001	0.75	2.32	<.001	0.14	0.50	< .001
Black	0.17	0.67	<.001	1.57	1.92	<.001	0.40	0.70	< .001
Hispanic	0.12	0.20	.045	1.37	1.84	<.001	0.14	0.27	< .001
p value: across race	<.001	<.001		<.001	<.001		< .001	< .001	
Intellectual									
White	0.70	2.58	<.001	0.30	0.85	<.001	0.38	0.97	< .001
Black	1.37	3.15	<.001	0.69	1.13	<.001	0.92	1.55	< .001
Hispanic	0.54	1.35	<.001	0.50	1.01	<.001	0.41	0.85	< .001
p value: across race	<.001	<.001		<.001	<.001		< .001	< .001	
Sensory									
White	0.11	0.17	<.001	0.19	0.19	.889	0.14	0.19	< .001
Black	0.11	0.14	.488	0.22	0.14	.005	0.11	0.17	< .001
Hispanic	0.06	0.13	.107	0.21	0.15	.005	0.13	0.18	< .001
p value: across race	.325	.081		.309	.011		.047	.209	

Note: p values for F tests across racial groups include estimates for students in the other race/ethnicity category, though this group's probabilities are not reported due to inconsistencies between the composition of these groups between states.

FIGURE 1 *Risk ratios comparing the probability of being identified as a special education student for non-low-income students of color to that of non-low-income White students, by disability type and state*



risk ratios by income were particularly large for White students. For instance, in State C, the fitted probability for being identified with an intellectual disability among low-income White students was 2.6 times the fitted probability for non-low-income White students. For Black students in the same state, the risk for identification with intellectual disability among low-income students was 1.7 times that of non-low-income students.

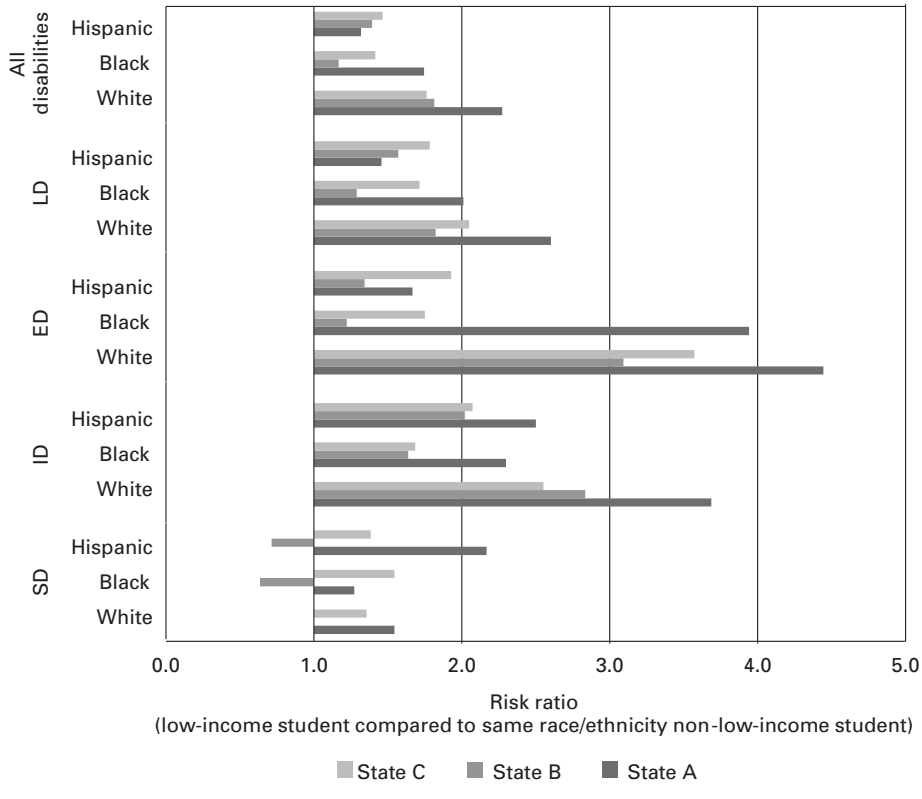
Placement

Table 3 displays fitted probabilities that low-income and non-low-income students with disabilities from each of our race/ethnicity categories would be placed in a substantially separate classroom. We generated p-values from tests of whether these probabilities differ across income groups within race and ethnicities (t-tests) or across race/ethnicities within income groups (F-tests).

— Research Question 2: Differences in Probability of Placement in a Substantially Separate Setting Between Black, Hispanic, and White Special Education Students

Among students with disabilities in the same income bracket, Black and Hispanic students tended to have a higher probability of being placed in a substantially separate classroom than their White peers. This difference is of greater magnitude among non-low-income students, as was the case with iden-

FIGURE 2 *Risk ratios comparing the probability of being identified as a special education student for a low-income student to that of a non-low-income student of the same race/ethnicity, by disability type and state*



tification. For instance, in State C, the fitted probability that a non-low-income Black student was placed in a separate classroom was 16.2 percent, or 1.57 times the fitted probability for placement in a substantially separate classroom for non-low-income White students (10.3 percent). These relative risks are shown in figure 3.

Limitations

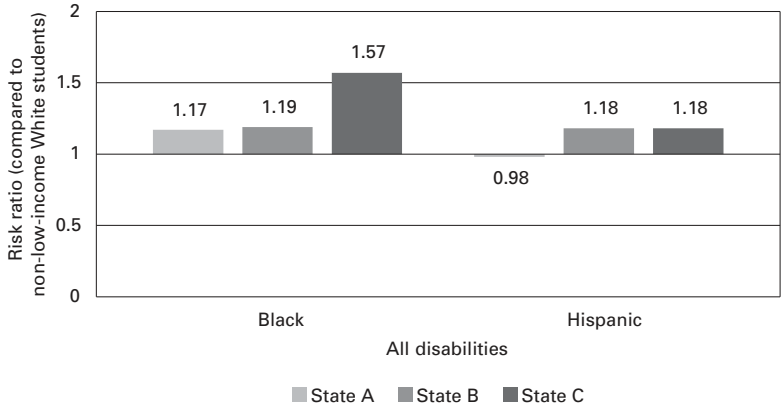
This study has important limitations. First, although these findings represent associations between student characteristics and the probability of being identified as having a disability and subsequently being placed in a segregated classroom, these results should not be interpreted as causal. That is, our findings do not prove that race and income status cause students to be identified or segregated. Rather, we see these findings as raising concerns related to sys-

TABLE 3 *Estimated probabilities that a special education student would be placed in a substantially separate setting, by income, race/ethnicity, disability category, and state*

	State A			State B			State C		
Disability & race/ethnicity	*Non-low-income*	*Low-income*	*p value: across income*	*Non-low-income*	*Low-income*	*p value: across income*	*Non-low-income*	*Low-income*	*p value: across income*
All disabilities									
White	4.81	5.06	.157	5.81	9.44	<.001	10.32	14.71	<.001
Black	5.62	5.49	.796	6.93	10.51	<.001	16.19	17.54	<.001
Hispanic	4.70	4.54	.856	6.84	10.06	<.001	12.13	14.73	<.001
p value: across race	0.219	0.085		<.001	<.001		<.001	<.001	

Note: p values for F-tests across racial groups include estimates for students in the other race/ethnicity category, though this group's probabilities are not reported due to inconsistencies between the composition of these group between states.

FIGURE 3 *Risk ratios comparing the probability that a non-low-income special education student of color, as compared to a non-low-income White special education student, would be placed in a substantially separate setting, by state*



temic discrimination or bias in patterns of overrepresentation of students of color in special education.

Second, FRPL status represents a coarse measure of family income. A continuous measure of family income might provide a more nuanced picture of the relationship between income and students' probability of special education identification and subsequent placement. In particular, it is possible that, within income categories, Black and Hispanic students have a different continuous distribution of income than White students.

Although we generally find that Black and Hispanic students are more likely than their within-income category White peers to be identified as requiring special education services and subsequently placed in a substantially separate setting, the magnitude of these differences varies substantially from state to state. To protect the anonymity of the participating states, it is not possible to offer insights here on how the unique historical, cultural, and policy contexts of each state help shape their particular pattern of disproportionality. It is also not possible for us to conduct a robust quantitative analysis of how state-level demographic and economic factors influence these patterns with data from only three states. Finally, findings from these states may not generalize to those outside our sample. It is possible that the disproportionate identification of students of color we found may not be present, or may not be present in the same ways, in states with different overall rates of disability identification or racial composition.

Discussion

We examined the probability that a student would be identified as having a learning, emotional, intellectual, or sensory disability and, once identified,

be educated in a substantially separate placement. To better understand the intersection of race and income in special education, we looked at differences across race within income groups. We found substantial racial and ethnic disparities after stratifying by income category, even after controlling for grade, gender, English learner status, district-level random effects, and several district characteristics.

Although our findings are correlational and do not examine the factors immediately preceding identification and placement, these patterns suggest that systemic bias may be a factor in determinations of special education identification and placement. That is, while our findings clearly indicate that income plays a role in special education, income did not explain away racial disparities. Our findings are thus consistent with the bias hypothesis: discrimination and implicit biases against students of color lead to disproportionately high representation of Black and Hispanic students in special education.

Three trends suggest systematic bias in identification: (1) there is a consistent pattern of overrepresentation of students of color in special education among non-low-income students; (2) patterns of overrepresentation are not present in sensory disability categories that are typically identified by a healthcare provider; and (3), for students of color, the magnitude of the difference in probability of identification between non-low-income students and low-income students was smaller than the magnitude of the difference for White students.

First, our analyses indicate that racial disparities in disability identification persist even when stratifying by income status. Among students not eligible for free or reduced-price lunch (>185 percent of the poverty line), Black and Hispanic students have consistently and statistically significantly higher probabilities of being identified as having learning, emotional, and intellectual disabilities. The findings that non-low-income Black students have twice the probability of being identified with emotional or intellectual disabilities should be concerning to educators. Among FRPL-eligible children (<185 percent of the federal poverty line), these differences were less consistent. Those researchers arguing the prevalence hypothesis have suggested that disproportionality in special education could be explained in part by family income—that students of color are overrepresented in special education because students of color are also more likely to be from low-income families. Yet, our findings demonstrate across three states that disproportionality does not appear attributable to differences in income status between race groups alone, and, in fact, the magnitude of the differences in disproportionality are greater for non-low-income students.

Second, controlling for income, Black and Hispanic students did not have a higher risk of being identified with sensory disabilities than White students. The lack of disproportionality for sensory disabilities—which are more commonly diagnosed in early childhood by medical professionals—are striking when compared to the disparities we observed for learning disabilities or emo-

tional disabilities, for example, which are largely diagnosed during schooling (Palfrey et al., 1987; Reschly, 1996).

Third, if the prevalence hypothesis were true, one would expect that identification differences between low-income and non-low-income students would be consistent and of similar magnitude across race. However, higher incomes do not appear to be as protective against disability identification for some racial groups as they do for others. The risk of identification comparing low-income students to non-low-income students was larger for White students than for Black or Hispanic students in non-sensory-related disability categories in every state. For instance, in State B, a low-income White student had three times the probability of being identified with an emotional disability than a non-low-income White student, but a low-income Black student only had 1.2 times the probability of being identified with an emotional disability as a non-low-income Black student.

Our findings converge with the study by Morgan et al. (2015) in a number of ways. We, too, find that several characteristics in addition to race are associated with the probability of special education identification. We differ, however, on our interpretation of the likely role of implicit and/or explicit bias in this process. Morgan et al. control for the relationship between disability identification and teacher reports of children's behavioral self-regulation and externalizing problem behavior, as well as their academic achievement. In so doing, they ignore the possibility that these measures may themselves reflect racial biases rather than students' inherent capacities. Our results, using individual-level income and race characteristics and not conditioning on these potentially biased indicators, suggest that bias is present in special education identification.

Also absent from Morgan et al.'s (2015) research is a thorough consideration of the educational placement of students with disabilities. The decision to remove a student from general education for the majority of the day and place them in a substantially separate classroom can limit that child's opportunities to succeed. There are cases where substantially separate classrooms are needed, but, overall, students in these settings have less access to highly qualified teachers and challenging curricula and have worse academic outcomes. In this study, we offer an initial examination of how race relates to placement in substantially separate classrooms and see a concerning pattern of students of color within income categories being more likely to be segregated from the general education population.

Given these findings, we recommend that the next reauthorization of the IDEA require states to also report on special education identification and placement by income status, or by race and income together. It is clear from these data that disproportionality is not merely a function of race; income and race interactively shape who is identified as having a disability and in which kinds of educational environment they receive IDEA services. Without these data, it is difficult to monitor disproportionality and take meaningful corrective action.

Our findings also suggest that educators acknowledge and work to remedy potential bias in special education identification and subsequent educational placement. Doing so might include teacher, school leader, and administrator preparation and training that directly engages with systemic and interpersonal bias. Additionally, states should consider targeting reviews and supports in districts where significant disproportionality is evident for low-income students in addition to students of color.

Notes

1. In State A, 4.5 percent of all students were categorized as other race/ethnicity. Multiracial students made up nearly 3 percent, Asian students another 1.5 percent, and American Indian and Alaska Native (AIAN) and Native Hawaiian or other Pacific Islander (NHPI) students less than 0.15 percent each. In State B, 9.5 percent of all students were categorized as other race/ethnicity (more than twice the proportion in State A). Multiracial students made up 3 percent, Asian students 2.5 percent, and AIAN and NHPI students less than one-third of a percentage point each.

Tables with state-specific regression results are available on request from Todd Grindal.

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APPENDIX A *Identification model regression coefficients: State A*

	DISABILITY TYPE									
	All		*Learning*		*Emotional*		*Intellectual*		*Sensory*	
VARIABLE	*Estimate*	*SE*	*Estimate*	*SE*	*Estimate*	*SE*	*Estimate*	*SE*	*Estimate*	*SE*
Group										
Low-income NHW	0.91***	(0.010)	0.97***	(0.022)	1.50***	(0.047)	1.33***	(0.026)	0.41***	(0.079)
Low-income NHB	1.03***	(0.016)	1.12***	(0.035)	2.04***	(0.058)	1.53***	(0.039)	0.22	(0.139)
Low-income Hispanic	0.48***	(0.025)	0.76***	(0.050)	0.83***	(0.116)	0.66***	(0.068)	0.18	(0.197)
Low-income other	0.60***	(0.025)	0.67***	(0.056)	1.62***	(0.091)	0.78***	(0.070)	–0.07	(0.227)
Non-low-income NHW (omitted)	–		–		–		–		–	
Non-low-income NHB	0.39***	(0.035)	0.41***	(0.076)	0.67***	(0.142)	0.68***	(0.088)	0.00	(0.294)
Non-low-income Hispanic	0.18***	(0.048)	0.38***	(0.093)	0.33	(0.228)	–0.26	(0.182)	–0.68	(0.515)
Non-low-income other	–0.06	(0.040)	–0.38***	(0.105)	0.29	(0.180)	–0.06	(0.128)	0.31	(0.247)
Female	–0.81***	(0.008)	–0.66***	(0.018)	–1.40***	(0.039)	–0.42***	(0.018)	–0.18***	(0.065)
LEP	–0.11***	(0.028)	0.53***	(0.053)	–1.22***	(0.182)	0.40***	(0.071)	0.51**	(0.200)
District level										
% FRPL	–0.88***	(0.034)	–0.90***	(0.260)	–1.34***	(0.394)	0.87***	(0.221)	0.09	(0.273)
% LEP	0.10	(0.207)	–0.10	(1.848)	2.74	(2.758)	–8.58***	(1.545)	1.08	(1.709)
% special education	8.96***	(0.197)	1.25*	(0.660)	1.22	(1.032)	1.04*	(0.625)	8.89***	(0.298)
Grade										
Kindergarten	1.16***	(0.030)	–2.75***	(0.223)	–1.63***	(0.221)	–1.73***	(0.091)	0.96***	(0.253)
1	1.58***	(0.029)	–0.45***	(0.092)	–0.27*	(0.142)	–0.78***	(0.065)	1.52***	(0.237)
2	1.47***	(0.029)	0.90***	(0.073)	0.49***	(0.124)	–0.06	(0.055)	1.27***	(0.244)
3	1.45***	(0.029)	1.46***	(0.070)	0.91***	(0.117)	0.28***	(0.052)	1.41***	(0.241)
4	1.40***	(0.029)	1.62***	(0.069)	1.09***	(0.115)	0.43***	(0.051)	1.39***	(0.242)
5	1.37***	(0.029)	1.76***	(0.068)	1.26***	(0.113)	0.51***	(0.050)	1.47***	(0.240)
6	1.24***	(0.030)	1.64***	(0.069)	1.24***	(0.113)	0.52***	(0.050)	1.48***	(0.239)
7	1.22***	(0.030)	1.66***	(0.069)	1.39***	(0.112)	0.58***	(0.049)	1.35***	(0.242)
8	1.16***	(0.030)	1.62***	(0.069)	1.43***	(0.112)	0.55***	(0.050)	1.14***	(0.247)
9	1.13***	(0.030)	1.55***	(0.069)	1.51***	(0.110)	0.50***	(0.050)	1.23***	(0.243)
10	1.08***	(0.030)	1.50***	(0.070)	1.34***	(0.113)	0.63***	(0.049)	1.07***	(0.248)
11	1.03***	(0.031)	1.42***	(0.071)	1.16***	(0.116)	0.60***	(0.051)	1.32***	(0.246)
12 (omitted)	–		–		–		–		–	
Constant	–4.07***	(0.037)	–5.26***	(0.188)	–6.44***	(0.287)	–5.45***	(0.157)	–9.14***	(0.281)
$\ln(\sigma_{u0}^2)$	–7.77***	(0.400)	–1.42***	(0.126)	–0.72***	(0.151)	–1.85***	(0.131)	–2.89***	(0.536)

Notes: Standard errors in parentheses. ***p < 0.01; **p < 0.05; *p < 0.1. District- and student-level Ns not included to protect anonymity of states.

APPENDIX B *Identification model regression coefficients: State B*

VARIABLE	DISABILITY TYPE									
	All		*Learning*		*Emotional*		*Intellectual*		*Sensory*	
	Estimate	*SE*	*Estimate*	*SE*	*Estimate*	*SE*	*Estimate*	*SE*	*Estimate*	*SE*
Group										
Low-income NHW	0.74***	(0.008)	0.63***	(0.013)	1.14***	(0.022)	1.05***	(0.033)	0.01	(0.068)
Low-income NHB	0.65***	(0.012)	0.66***	(0.021)	0.95***	(0.032)	1.33***	(0.043)	−0.30***	(0.106)
Low-income Hispanic	0.74***	(0.010)	0.74***	(0.017)	0.90***	(0.028)	1.22***	(0.038)	−0.24***	(0.087)
Low-income other	0.18***	(0.016)	0.11***	(0.028)	0.48***	(0.044)	0.62***	(0.060)	−0.21	(0.128)
Non-low-income NHW (omitted)	–		–		–		–		–	
Non-low-income NHB	0.45***	(0.019)	0.40***	(0.033)	0.74***	(0.049)	0.84***	(0.071)	0.15	(0.142)
Non-low-income Hispanic	0.31***	(0.016)	0.27***	(0.027)	0.60***	(0.043)	0.52***	(0.065)	0.11	(0.118)
Non-low-income other	−0.48***	(0.015)	−0.81***	(0.033)	−0.47***	(0.053)	−0.19**	(0.082)	−0.13	(0.110)
Female	−0.71***	(0.005)	−0.29***	(0.009)	−0.65***	(0.016)	−0.24***	(0.021)	−0.06	(0.044)
LEP	−0.18***	(0.011)	−0.05***	(0.018)	−0.74***	(0.036)	0.48***	(0.030)	−0.10	(0.089)
District level										
% FRPL	−0.82***	(0.022)	−0.81***	(0.149)	−0.78***	(0.155)	1.54***	(0.176)	0.46**	(0.211)
% LEP	0.54***	(0.065)	0.05	(0.534)	3.02***	(0.539)	−2.35***	(0.584)	0.52	(0.670)
% special education	6.71***	(0.108)	6.12***	(0.625)	6.36***	(0.695)	1.93**	(0.832)	5.26***	(1.023)
Grade										
Kindergarten	−0.34***	(0.015)	−3.88***	(0.102)	−2.19***	(0.066)	−3.34***	(0.132)	−0.08	(0.113)
1	−0.21***	(0.014)	−1.72***	(0.038)	−1.66***	(0.053)	−2.83***	(0.103)	0.03	(0.110)
2	−0.02	(0.014)	−0.70***	(0.027)	−1.33***	(0.047)	−1.90***	(0.070)	−0.08	(0.113)
3	0.08***	(0.014)	−0.16***	(0.023)	−1.02***	(0.042)	−1.20***	(0.054)	0.04	(0.110)
4	0.12***	(0.014)	0.08***	(0.022)	−0.78***	(0.038)	−0.83***	(0.048)	0.01	(0.111)
5	0.17***	(0.013)	0.20***	(0.021)	−0.61***	(0.036)	−0.61***	(0.045)	−0.12	(0.114)
6	0.16***	(0.014)	0.21***	(0.021)	−0.55***	(0.036)	−0.54***	(0.044)	0.04	(0.110)
7	0.15***	(0.013)	0.20***	(0.021)	−0.40***	(0.034)	−0.52***	(0.044)	−0.12	(0.114)
8	0.10***	(0.013)	0.14***	(0.021)	−0.27***	(0.033)	−0.42***	(0.042)	−0.10	(0.112)
9	0.11***	(0.013)	0.14***	(0.021)	−0.01	(0.030)	−0.36***	(0.040)	−0.20*	(0.113)
10	0.08***	(0.014)	0.11***	(0.021)	0.04	(0.030)	−0.33***	(0.041)	−0.06	(0.111)
11	< −0.01	(0.014)	0.05**	(0.022)	0.02	(0.031)	−0.26***	(0.042)	−0.01	(0.111)
12 (omitted)	–		–		–		–		–	
Constant	−2.46***	(0.021)	−3.76***	(0.110)	−4.87***	(0.124)	−5.43***	(0.148)	−7.28***	(0.199)
$\ln(\sigma_{u0}^2)$	−8.28***	(0.482)	−2.16***	(0.092)	−2.33***	(0.117)	−2.33***	(0.147)	−2.80***	(0.287)

Notes: Standard errors in parentheses. ***p < 0.01; **p < 0.05; *p < 0.1. District-and student-level Ns not included to protect anonymity of states.

APPENDIX C *Identification model regression coefficients: State C*

	DISABILITY TYPE									
	All		*Learning*		*Emotional*		*Intellectual*		*Sensory*	
VARIABLE	*Estimate*	*SE*	*Estimate*	*SE*	*Estimate*	*SE*	*Estimate*	*SE*	*Estimate*	*SE*
Group										
Low-income NHW	0.64***	(0.006)	0.74***	(0.009)	1.25***	(0.027)	0.94***	(0.022)	0.30***	(0.048)
Low-income NHB	0.63***	(0.006)	0.81***	(0.010)	1.59***	(0.027)	1.41***	(0.021)	0.20***	(0.049)
Low-income Hispanic	0.47***	(0.007)	0.72***	(0.010)	0.63***	(0.031)	0.81***	(0.024)	0.25***	(0.051)
Low-income other	0.24***	(0.012)	0.35***	(0.018)	0.92***	(0.047)	0.66***	(0.041)	0.16*	(0.089)
Non-low-income NHW (reference)	–		–		–		–		–	
Non-low-income NHB	0.23***	(0.010)	0.25***	(0.016)	1.01***	(0.038)	0.88***	(0.031)	–0.24***	(0.088)
Non-low-income Hispanic	0.05***	(0.009)	0.13***	(0.014)	–0.07	(0.047)	0.07**	(0.036)	–0.06	(0.068)
Non-low-income other	–0.31***	(0.014)	–0.49***	(0.025)	–0.25***	(0.075)	–0.04	(0.052)	0.02	(0.092)
Female	–0.76***	(0.004)	–0.57***	(0.006)	–1.43***	(0.019)	–0.32***	(0.013)	–0.16***	(0.030)
LEP	–0.03***	(0.007)	0.15***	(0.009)	–0.81***	(0.039)	–0.24***	(0.025)	–0.00	(0.051)
District level										
% FRPL	–0.53***	(0.046)	–0.17	(0.396)	–0.00	(0.394)	0.79*	(0.469)	–0.70*	(0.369)
% LEP	0.14*	(0.079)	0.49	(0.898)	–0.29	(0.842)	–0.67	(1.025)	0.71	(0.718)
% special education	8.54***	(0.417)	–1.52*	(0.817)	–0.01	(0.829)	–1.24	(0.994)	11.06***	(0.433)
Grade										
Kindergarten	–1.91***	(0.015)	–3.57***	(0.047)	–3.45***	(0.121)	–3.08***	(0.058)	–1.42***	(0.112)
1	–0.36***	(0.010)	–2.03***	(0.023)	–1.52***	(0.051)	–1.77***	(0.032)	–0.15**	(0.074)
2	–0.28***	(0.010)	–1.30***	(0.018)	–1.21***	(0.046)	–1.64***	(0.032)	–0.10	(0.074)
3	–0.11***	(0.009)	–0.58***	(0.014)	–0.78***	(0.040)	–1.46***	(0.029)	0.05	(0.071)
4	–0.06***	(0.009)	–0.29***	(0.014)	–0.65***	(0.039)	–1.33***	(0.029)	–0.09	(0.075)
5	–0.04***	(0.009)	–0.15***	(0.013)	–0.48***	(0.037)	–1.24***	(0.028)	–0.10	(0.075)
6	–0.13***	(0.009)	–0.09***	(0.013)	–0.38***	(0.035)	–1.23***	(0.027)	–0.13*	(0.075)
7	–0.15***	(0.009)	–0.06***	(0.013)	–0.23***	(0.034)	–1.21***	(0.027)	–0.10	(0.074)
8	–0.14***	(0.009)	–0.01	(0.013)	–0.11***	(0.033)	–1.09***	(0.026)	–0.11	(0.075)
9	–0.16***	(0.009)	–0.00	(0.013)	0.07**	(0.031)	–1.13***	(0.026)	–0.05	(0.072)
10	–0.17***	(0.010)	0.01	(0.013)	0.05	(0.032)	–1.04***	(0.026)	–0.13*	(0.075)
11	–0.22***	(0.010)	–0.02	(0.013)	–0.10***	(0.034)	–0.94***	(0.026)	–0.10	(0.076)
12 (reference)	–		–		–		–		–	
Constant	–2.55***		–2.71***		–5.03***		–4.31***		–7.40***	
$\ln(\sigma_{u0}^2)$	–6.92***		–1.49***		–1.73***		–1.28***		–2.42***	

Notes: Standard errors in parentheses. ***p < 0.01; **p < 0.05; *p < 0.1. District- and student-level Ns not included to protect anonymity of states.

APPENDIX D *Placement model regression coefficients: State A*

	DISABILITY TYPE									
	All		*Learning*		*Emotional*		*Intellectual*		*Sensory*	
VARIABLE	*Estimate*	*SE*	*Estimate*	*SE*	*Estimate*	*SE*	*Estimate*	*SE*	*Estimate*	*SE*
Group										
Low-income NHW	0.05	(0.037)	22.30***	(1.038)	0.66***	(0.181)	−0.33***	(0.071)	22.49***	(1.208)
Low-income NHB	0.14***	(0.048)	22.43***	(1.043)	0.97***	(0.201)	−0.69***	(0.097)	22.79***	(1.242)
Low-income Hispanic	−0.06	(0.097)	21.84***	(1.155)	0.60	(0.390)	−0.21	(0.173)	23.61***	(1.293)
Low-income other	0.12	(0.086)	22.41***	(1.129)	0.80***	(0.284)	−0.25	(0.174)	22.83***	(1.616)
Non-low-income NHW	(Omitted)		21.19***	(1.072)	(Omitted)		(Omitted)		22.23***	(1.255)
Non-low-income NHB	0.16	(0.102)	22.25***	(1.152)	0.18	(0.433)	−0.17	(0.210)	23.27	(0.000)
Non-low-income Hispanic	−0.03	(0.183)	(Omitted)		−0.35	(1.105)	0.16	(0.444)	(Omitted)	
Non-low-income other	0.20	(0.141)	22.21	(0.000)	0.86*	(0.520)	−0.24	(0.318)	(Omitted)	
Female	−0.16***	(0.030)	−0.56***	(0.218)	−0.47***	(0.131)	−0.20***	(0.050)	0.23	(0.376)
LEP	−0.03	(0.105)	0.06	(0.607)	0.36	(0.565)	−0.39**	(0.174)	0.47	(0.741)
District level										
% FRPL	0.55	(0.388)	−0.72	(1.392)	0.56	(0.955)	−0.31	(0.572)	−0.80	(1.918)
% LEP	3.08	(2.541)	7.30	(8.245)	9.59*	(5.724)	8.17**	(3.724)	18.31*	(9.390)
% special education	−4.55**	(2.139)	−14.52	(9.442)	1.34	(5.585)	−4.76	(3.144)	−8.82	(13.331)
Grade										
Kindergarten	−2.47***	(0.091)	(Omitted)		0.13	(0.778)	−0.95***	(0.234)	20.77	(22,850.975)
1	−2.40***	(0.081)	20.97	(19,302.446)	1.00**	(0.484)	−0.87***	(0.165)	22.62	(22,850.975)
2	−2.04***	(0.079)	(Omitted)		1.12**	(0.436)	−0.99***	(0.138)	22.51	(22,850.975)
3	−2.13***	(0.081)	20.20	(19,302.446)	0.50	(0.432)	−1.39***	(0.136)	(Omitted)	
4	−1.94***	(0.079)	20.25	(19,302.446)	0.62	(0.423)	−1.26***	(0.130)	21.42	(22,850.975)
5	−1.87***	(0.079)	21.03	(19,302.446)	0.59	(0.418)	−1.39***	(0.130)	20.46	(22,850.975)
6	−1.62***	(0.078)	20.92	(19,302.446)	0.82**	(0.416)	−1.17***	(0.127)	21.77	(22,850.975)
7	−1.46***	(0.076)	21.88	(19,302.446)	0.69*	(0.415)	−0.93***	(0.123)	20.40	(22,850.975)
8	−1.50***	(0.077)	21.62	(19,302.446)	0.86**	(0.413)	−1.05***	(0.125)	21.27	(22,850.975)
9	−1.45***	(0.076)	22.05	(19,302.446)	0.43	(0.411)	−1.11***	(0.125)	20.86	(22,850.975)
10	−1.38***	(0.077)	22.20	(19,302.446)	0.78*	(0.418)	−1.02***	(0.123)	20.80	(22,850.975)
11	−1.33***	(0.079)	21.92	(19,302.446)	0.35	(0.430)	−0.99***	(0.127)	22.17	(22,850.975)
12	(Omitted)		21.77	(19,302.446)	(Omitted)		(Omitted)		(Omitted)	
Constant	−1.02***	(0.299)	−47.53	(19,302.446)	−4.45***	(0.850)	0.08	(0.441)	−47.15	(22,850.975)
$\ln(\sigma_{u0}^2)$	−0.91***	(0.153)	0.44	(0.400)	0.29	(0.243)	−0.23	(0.163)	−0.23	(0.874)

Notes: Standard errors in parentheses. ***p < 0.01; **p < 0.05; *p < 0.1. District- and student-level Ns not included to protect anonymity of states.

APPENDIX E *Placement model regression coefficients: State B*

	DISABILITY TYPE									
	All		*Learning*		*Emotional*		*Intellectual*		*Sensory*	
VARIABLE	*Estimate*	*SE*	*Estimate*	*SE*	*Estimate*	*SE*	*Estimate*	*SE*	*Estimate*	*SE*
Group										
Low-income NHW	0.52***	(0.022)	0.79***	(0.073)	0.42***	(0.066)	0.16**	(0.077)	0.43	(0.283)
Low-income NHB	0.64***	(0.030)	0.83***	(0.089)	0.61***	(0.088)	–0.05	(0.097)	1.17***	(0.393)
Low-income Hispanic	0.59***	(0.026)	1.01***	(0.081)	0.54***	(0.079)	0.06	(0.087)	1.01***	(0.320)
Low-income other	0.57***	(0.040)	0.79***	(0.122)	0.39***	(0.114)	0.14	(0.134)	1.55***	(0.443)
Non-low-income NHW (reference)	–		–		–		–		–	
Non-low-income NHB	0.19***	(0.053)	0.24	(0.158)	0.06	(0.166)	–0.33**	(0.168)	0.82	(0.567)
Non-low-income Hispanic	0.17***	(0.047)	0.53***	(0.139)	0.22	(0.141)	–0.21	(0.152)	1.60***	(0.469)
Non-low-income other	0.37***	(0.050)	0.03	(0.230)	–0.33	(0.200)	–0.11	(0.189)	0.41	(0.503)
Female	–0.28***	(0.016)	–0.47***	(0.045)	–0.44***	(0.047)	–0.22***	(0.047)	–0.50***	(0.183)
LEP	0.04	(0.025)	0.39***	(0.064)	0.13	(0.091)	–0.11	(0.070)	–0.01	(0.302)
District level										
% FRPL	1.18***	(0.239)	0.78	(0.534)	1.78***	(0.435)	–0.75	(0.462)	2.24**	(0.880)
% LEP	1.36	(0.847)	1.78	(1.804)	0.12	(1.461)	4.93***	(1.542)	–2.65	(2.629)
% special education	–0.17	(1.044)	6.81***	(2.412)	2.90	(2.051)	–0.50	(2.209)	–4.54	(4.463)
Grade										
Kindergarten	–0.58***	(0.044)	–1.09	(1.020)	0.03	(0.185)	–0.95***	(0.299)	–0.41	(0.448)
1	–0.32***	(0.041)	0.18	(0.207)	0.71***	(0.139)	–0.41*	(0.226)	0.06	(0.415)
2	–0.26***	(0.039)	–0.09	(0.155)	0.85***	(0.127)	–0.40***	(0.154)	–0.07	(0.429)
3	–0.20***	(0.038)	0.27**	(0.123)	0.82***	(0.118)	–0.12	(0.121)	–0.91*	(0.489)
4	–0.16***	(0.038)	0.57***	(0.112)	0.74***	(0.110)	–0.18*	(0.108)	–0.08	(0.419)
5	–0.13***	(0.037)	0.38***	(0.112)	0.50***	(0.107)	0.12	(0.103)	–0.93*	(0.518)
6	–0.11***	(0.037)	0.48***	(0.111)	0.59***	(0.106)	–0.08	(0.101)	0.30	(0.399)
7	–0.08**	(0.037)	0.39***	(0.111)	0.51***	(0.103)	0.09	(0.101)	–0.95*	(0.544)
8	–0.06	(0.037)	0.62***	(0.109)	0.36***	(0.102)	0.18*	(0.099)	0.06	(0.422)
9	–0.03	(0.036)	0.69***	(0.106)	0.21**	(0.096)	0.05	(0.093)	–0.07	(0.435)
10	–0.08**	(0.038)	0.50***	(0.111)	0.24**	(0.100)	–0.01	(0.095)	–0.40	(0.436)
11	–0.05	(0.039)	0.24**	(0.119)	0.12	(0.104)	0.09	(0.097)	–0.42	(0.466)
12 (reference)	–		–		–		–		–	
Constant	–2.82***	(0.185)	–6.36***	(0.449)	–3.27***	(0.372)	0.21	(0.388)	–2.35***	(0.866)
$\ln(\sigma_{u0}^2)$	–1.28***	(0.102)	–0.04	(0.143)	–0.40***	(0.144)	–0.30**	(0.141)	–0.16	(0.383)

Notes: Standard errors in parentheses. ***p < 0.01; **p < 0.05; *p < 0.1. District- and student-level Ns not included to protect anonymity of states.

APPENDIX F *Placement model regression coefficients: State C*

	DISABILITY TYPE									
	All		*Learning*		*Emotional*		*Intellectual*		*Sensory*	
VARIABLE	*Estimate*	*SE*	*Estimate*	*SE*	*Estimate*	*SE*	*Estimate*	*SE*	*Estimate*	*SE*
Group										
Low-income NHW	0.40***	(0.018)	0.74***	(0.052)	0.48***	(0.075)	0.07	(0.060)	0.75***	(0.166)
Low-income NHB	0.61***	(0.018)	0.93***	(0.053)	0.66***	(0.074)	–0.34***	(0.055)	1.25***	(0.158)
Low-income Hispanic	0.41***	(0.019)	0.78***	(0.056)	0.29***	(0.087)	0.16**	(0.066)	1.10***	(0.161)
Low-income other	0.49***	(0.032)	0.80***	(0.086)	0.32**	(0.129)	0.05	(0.105)	1.19***	(0.247)
Non-low-income NHW (reference)	–		–		–		–		–	
Non-low-income NHB	0.52***	(0.029)	0.61***	(0.096)	0.41***	(0.115)	–0.29***	(0.078)	0.71**	(0.294)
Non-low-income Hispanic	0.18***	(0.027)	0.44***	(0.082)	0.15	(0.135)	–0.06	(0.095)	0.40*	(0.227)
Non-low-income Other	0.40***	(0.041)	0.25	(0.157)	0.10	(0.217)	0.13	(0.143)	0.55*	(0.294)
Female	–0.16***	(0.011)	–0.25***	(0.028)	–0.14***	(0.052)	–0.02	(0.032)	–0.13	(0.087)
LEP	–0.27***	(0.019)	0.10**	(0.043)	0.31***	(0.100)	–0.39***	(0.063)	–0.21	(0.132)
District level	(0.019)		(0.043)		(0.100)		(0.063)		(0.132)	
% FRPL	0.46	(0.416)	1.07	(0.878)	–0.69	(0.707)	–0.56	(0.668)	2.21**	(0.912)
% LEP	1.11	(0.914)	–3.10	(1.913)	1.29	(1.455)	3.01**	(1.444)	1.73	(1.779)
% special education	4.40**	(1.983)	9.38**	(4.726)	1.29	(3.938)	5.96	(3.986)	5.36	(3.999)
Grade										
Kindergarten	0.01	(0.039)	1.04***	(0.170)	2.86***	(0.289)	0.39***	(0.140)	1.58***	(0.274)
1	–0.16***	(0.025)	1.31***	(0.087)	2.83***	(0.134)	0.78***	(0.086)	0.79***	(0.204)
2	–0.20***	(0.025)	0.80***	(0.081)	2.83***	(0.124)	0.99***	(0.087)	0.60***	(0.204)
3	–0.20***	(0.024)	0.68***	(0.069)	2.76***	(0.108)	0.91***	(0.079)	0.51**	(0.198)
4	–0.21***	(0.024)	0.90***	(0.065)	2.22***	(0.103)	0.89***	(0.077)	0.37*	(0.212)
5	–0.24***	(0.024)	0.55***	(0.066)	2.11***	(0.099)	0.82***	(0.073)	–0.14	(0.228)
6	–0.37***	(0.025)	0.55***	(0.065)	1.39***	(0.097)	0.49***	(0.069)	–0.15	(0.224)
7	–0.45***	(0.025)	0.25***	(0.067)	1.31***	(0.094)	0.58***	(0.069)	0.03	(0.216)
8	–0.44***	(0.025)	0.29***	(0.066)	0.96***	(0.094)	0.39***	(0.064)	–0.37	(0.230)
9	–0.63***	(0.026)	0.11*	(0.068)	0.40***	(0.095)	0.13**	(0.063)	–0.52**	(0.225)
10	–0.69***	(0.026)	–0.05	(0.071)	–0.03	(0.102)	0.08	(0.062)	–0.58**	(0.244)
11	–0.65***	(0.027)	–0.06	(0.074)	–0.11	(0.109)	–0.11*	(0.061)	–0.14	(0.229)
12 (reference)	–		–		–		–		–	
Constant	–2.64***	(0.320)	–5.64***	(0.725)	–2.36***	(0.611)	0.01	(0.624)	–4.81***	(0.712)

Notes: Standard errors in parentheses. ***p < 0.01; **p < 0.05; *p < 0.1. District- and student-level Ns not included to protect anonymity of states.