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WHO IS PLACED INTO SPECIAL EDUCATION?

Jacob Hibel,

Department of Sociology and Population Research Institute, The Pennsylvania State University

George Farkas, and

Department of Education, University of California, Irvine

Paul L. Morgan

Department of Educational Psychology, School Psychology, and Special Education, The Population Research Institute, The Pennsylvania State University

Abstract

We use nationally representative data from the Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K) to identify variables measured in the fall of 1998 (when the sample's students were in kindergarten) that predict special education placement by the spring of 2004 (when those not retained were finishing fifth grade). Placement's strongest kindergarten predictor is a student's own level of academic achievement. Also important is the student's frequency of classroom task engagement. There is a "frog-pond" contextual effect -- attending an elementary school with high levels of overall student academic ability and behavior increases a student's likelihood of special education placement. This is the case even after statistically controlling for a wide range of individual-, family-, and school-level characteristics. Social class background displayed a weak or statistically non-significant relation with special education placement. However, girls are placed less frequently than boys. African American, Hispanic, and Asian students are placed less frequently than non-Hispanic whites. The under- or equal-placement rates for racial/ethnic minorities are partially explained by their concentration in high-minority schools.

Funding under the Individuals with Disabilities Education Act (IDEA) provides special education and related services to nearly 6 million K-12 schoolchildren per year (US Department of Education 2005). These services are individually designed to meet the cognitive, emotional, behavioral, and/or physical needs of a student with a disability. Special education should provide the student with the resources, adapted instruction, and specialized assistance to mitigate the effects of his or her disability, and so allow the student to successfully benefit from the school's general curriculum (e.g., Bateman & Lindem, 2006).

Despite its intended benefit, special education placement also entail substantial costs. The federal government spends 90% more (or about an additional $4,000 per year) to provide a student with special rather than a regular education (U.S. Department of Education 2002). States and localities also allocate substantial funds to provide special education services. For instance, and for 2008, the state of Kansas estimates that it will spend $404 million to provide students with special education services, after subtracting out the costs of providing

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regular education services and accounting for funds received in federal aid and Medicaid reimbursements (Kansas Legislative Research Department, 2004).

Special education placement can also be costly to individual students. Placing a student into special education requires that he or she be "labeled" as requiring special assistance in order to meet the cognitive, behavioral and/or physical demands of the school's general curriculum. Such a special needs label may in turn elicit lowered expectations from the student's teachers and peers (Gillung and Rucker 1977; Jones 1972). The student's disability, in addition to both these lowered expectations and the reduced curricular coverage typical of special education programs, may result in the student learning a school's curriculum at a slower rate than those students educated in regular education settings (Donovan and Cross 2002).

For many students with disabilities, the benefits of participating in a specialized educational program may far outweigh these potential educational and psychological costs. However, it remains important to investigate how characteristics of a student and his or her school relate to the student's placement into special education. To what degree do a student's characteristics (e.g., his or her social class background, race/ethnicity, or gender) predict such placement? Does special education placement vary according to the social context of the student's school? The disproportional placement of some groups of student into special education may limit the provision of special education services to other groups of eligible students. Such disproportional placement would be particularly problematic if special education services are less likely to be delivered to those most at risk or disadvantaged.

SPECIAL EDUCATION AND ACADEMIC STRATIFICATION

The early years of schooling strongly predict a student's later academic success and educational attainment (Alexander and Entwisle 1988; Entwisle, Alexander, and Olsen 1997, 2005; Stanovich 1986). Those students initially placed in lower-ability learning groups or curriculum tracks are unlikely to later be placed in higher groups or tracks. Those placed in lower-ability groups also lag increasingly behind students placed higher groups and tracks over time (Gamoran 1986; Hallinan 2003; Hoffer 1992; Lucas 1999; Rosenbaum 1980; Tach and Farkas 2006). Children and youth placed into special education consistently display below-basic levels of academic achievement (e.g., National Assessment of Educational Progress 2007). Reynolds and Wolfe (1999) found that students with learning disabilities experienced a widening gap in reading ability relative to their non-disabled peers between the ages of six and twelve. Students placed into special education might therefore be expected to experience a stratified educational system's lack of opportunities.

Empirical work repeatedly indicates that students placed into special education are more likely to experience long-term negative outcomes. The drop out rate for those identified as learning disabled exceeds 30 percent (Donovan and Cross 2002). About 30 and 40 percent of students with disabilities who are white and African Americans, respectively, are arrested. Over half of students with disabilities are unemployed two years after leaving school (Oswald et al. 2002). Students who attended special education and who are able to find work after leaving school are more likely to achieve very low earnings and typically work in

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entry-level jobs that offer little potential for upward mobility (Phelps and Hanley-Maxwell 1997).

Current policies emphasizing high-stakes testing may increase the likelihood that students placed into special education continue experiencing such negative outcomes. Students in special education already fail promotion and graduation tests at disproportionate rates (Heubert 2002). Special education students failing exit exams in certain states are eligible for alternative diplomas (e.g., certificates of completion or attendance or IEP diplomas). However, the post-secondary education and employment outcomes for those graduating with alternative diplomas more resemble those of high school dropouts than of graduates with traditional diplomas (Heubert 2002).

DISPROPORTIONATE REPRESENTATION IN SPECIAL EDUCATION

Certain groups of students are routinely found to be overrepresented (compared to their share in the school-aged population) in special education classrooms. For example, Dunn (1968) estimated that 60–80 percent of students identified as disabled were from low SES or ethnic minority households. Most of these investigations have examined the extent to which children of racial/ethnic minority heritage are disproportionately represented (e.g., Donovan and Cross 2002; Dunn 1968; Hosp & Reschly 2003; Mercer 1973; Oswald et al. 1999). Oswald, Coutinho, Best, and Singh (1999) reported that African American children were about 2.4 times more likely to be identified as mentally retarded and about 1.5 times more likely to be identified as emotionally disturbed than their non-African American peers. Disproportionate representation may be especially likely to occur for those types of disabilities that rely more on a teacher's judgment and contextual factors (e.g., learning disability, emotional disturbance) than those types that rely on relatively more objective criteria (e.g., mental retardation, visual impairment) (Coulter 1996; Donovan and Cross 2002).

To date, estimating the extent of disproportionate representation has typically relied on either "best judgment" (Dunn 1968) or simple population share comparisons (Chinn and Hughes 1987; Mercer 1973). For example, Chinn and Hughes (1987) reported that, whereas African Americans represented 20 percent of the U.S. population, they represented 45 percent of those students identified as mentally retarded. This over-representation has been accepted as evidence of racial discrimination (i.e., *Larry v. Riles* 1972, 1974). However, some scholars have noted that such comparisons to population proportions are merely descriptive. That is, they fail to account for the fact that some groups of children are more likely to be exposed to the health, environmental, nutritional, social, and economic factors that themselves contribute to the occurrence of disabilities (e.g., Hosp and Reschly 2003; MacMillan and Reschly 1996).

Investigations of disproportionate representation increasingly attempt to account for confounding factors when estimating whether a child's race or ethnicity predicts his or her special education placement (e.g., Hosp and Reschly 2003; Oswald et al. 1999). Skiba and colleagues' (2005) analyses used the most extensive set of covariates to-date. Here the investigators statistically controlled for differences in poverty, the school district's

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resources, and measures of academic performance and behavior. Like both Oswald et al. and Hosp and Reschly, Skiba and colleagues found that race and ethnicity continued to be statistically significant predictors of special education placement, although the effect varied by disability category. For example, African Americans were 2.6 times as likely to be identified as mentally retarded, and 1.3 times as likely to be identified as emotionally disturbed as non-African American children, but only .98 times as likely to be identified as learning disabled.

However, relatively few investigations (i.e., only Hosp and Reschly 2004; Oswald et al. 1999) have analyzed nationally representative datasets. Instead, and despite special education constituting federal-level educational policy (and minority disproportionate representation a phenomenon that is presumably occurring nation-wide), most prior investigations (e.g., Artiles et al. 2005; Skiba et al. 2005) have analyzed aggregated district- or state-level data. In addition, the investigations to-date (including those using nationally representative datasets) have used district-level data to statistically control for confounding factors. For example, Skiba and colleagues estimated the effects of poverty by using the percentage of students attending the particular school who were eligible for free and reduced lunch. Both Hosp and Rechley and Skiba and colleagues controlled for differences in academic achievement (and, in the case of Skiba et al., in behavior using district-level aggregates (e.g., the district's average score on a state-wide assessment, a district's suspension-expulsion rate). Thus, no nationally representative study to date has statistically controlled for an extensive number of individual-, family-, and school-level covariates in attempting to determine whether a child's race/ethnicity elevates his or her likelihood of being placed in special education.

Including individual-, family-, and school-level covariates helps provide a more rigorous investigation of potential bias in special education placement. For example, one hypothesized explanation of African Americans' increased likelihood of being identified as emotionally disturbed is that their mostly white teachers use a culturally biased set of reference behaviors to judge their actions as problematic (e.g., Hosp and Reschly 2004). Yet the interaction between teacher and student race cannot be investigated using only district-level data. Including a wide range of covariates also allows for a rigorous investigation of the extent to which the student's individual level of academic achievement or behavior—rather than his or her race/ethnicity—could be characterized as a "driving force" of the student's placement into special education.

SUBJECTIVITY IN SPECIAL EDUCATION ELIGIBILITY

Over 12 percent of American K–12 students were diagnosed with disabilities in 1998 (Donovan and Cross 2002). A majority of these (59 percent) were diagnosed with either learning disability (LD) or emotional disturbance (ED). These and other "judgmental" disabilities differ from more "medically-defined" disabilities (e.g., blindness, orthopedic impairment) in their greater use of social norms (Harry & Anderson 1994). Physicians rarely diagnose judgmental disabilities. Rather, and at some point during the student's K-12 career, the eligibility process for judgmental disabilities is initiated when a teacher begins to consider the student as performing significantly below grade-level learning or behavioral

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standards, and so refers the student for evaluation as possibly having a disability. This referral results in a process of teacher and administrator consultation, psychological evaluation, examination of the student's record, committee meetings, and meetings with the child's parents. Estimates of the proportion of referrals that result in special education placement range from 50 to 85 percent (Fugate et al. 1993, Gottlieb et al. 1994). (For a detailed explanation of the referral and placement process, see Donovan and Cross [2002].) However, teacher judgments of acceptable student achievement or behavior are necessarily based on the performance of the teacher's particular referent group, which is other students in the school. Thus, the student's school helps provides a normative standard for identifying whether he or she is disabled and so is eligible for special education.

Consider the counterfactual of a low-performing student simultaneously attending two very different schools. One school's student population averages a high level of academic achievement. The other averages a low level of achievement. The student should be more likely to be placed into special education when attending the high-performing school. This is because the teacher's judgment of student performance will be relative to that of other students in the school. A "frog-pond effect" (Davis 1966; Farkas et al. 1990) may therefore exist, in which the same student appears worse when compared to higher- than to lower-performing schoolmates. Additionally, the special education resources of a low-performing school may be more severely strained by a larger number of referrals. The school's limited resources may result in referral only being initiated for those students displaying extremely low academic achievement or much more frequent problem behavior, again relative to those students attending the low-performing school.

Figure 1 illustrates this phenomenon. The figure displays normalized test score distributions based on the means and standard deviations of two schools – numbers 850 and 1271 – from the ECLS-K database that we analyzed. The students attending school 850 have a mean test score approximately 0.67 standard deviations above the sample grand mean. In contrast, school 1271's mean is 0.67 standard deviations below the grand mean. The point plotted on each curve represents the average kindergarten standardized test score (−0.66) of all students in the database who were placed into special education by spring, 2004 (i.e., these special education students' grand mean). If school context did not predict special education placement, then a hypothetical student with this initial test score, *ceteris paribus*, should have the same likelihood of special education placement whether attending either school. But a score of −0.66 is much further below the average in school 850 than in school 1271 (where it is, in fact, nearly equal to the average). Consequently, a student with this score who attends school 850 is more likely to "stand out." In addition, if the sample-wide grand mean test score of special education students were used as a criterion for special education placement in all schools, teachers in school 1271 would be referring half of the school's students. This is of course not a feasible solution, nor is it financially possible. Thus, lower-achieving schools may be less able than higher-achieving schools to meet the needs of all their underperforming students by placing their students into special education. Any particular student's likelihood of being placed into special education should decreases as his or her school's resources are allocated to a proportionally larger number of underperforming students.

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We would expect this “frog pond” phenomenon to occur for behavior problems (as measured by a teacher’s report or rating) as well as for academic achievement (as measured by a student’s test score). Thus, a student with a given level of behavior problems is less likely to be referred for special education placement in a school where academic disengagement and problem behavior occur more frequently.

There may be additional mechanisms that contribute to subjective and contextually-influenced placement. The student’s social class or race/ethnicity, the teacher’s social class or race/ethnicity, and the social class or racial/ethnic composition of students in the school may interact in complex ways to result in higher placement rates for particular groups of students. For example, Downey and Pribesh (2004) reported that kindergarten teachers who were white judged students who were black to have significantly more externalizing behavior (e.g., fighting, acting out) problems (but not significantly different levels of task engagement) than did teachers who were white. Limitations in the study’s data resulted in the investigators being unable to identify which of three rival explanations were responsible for this effect– (a) white teachers’ negative prejudice toward the behavior of black students, (b) black teachers’ positive prejudice toward the behavior of black students, or (c) black students behaving more positively with black teachers. It is unknown whether effects of this sort depend on the social class or minority composition of the teachers or students in the school. It is also unknown whether this type of effect lead to differential special education placement rates across demographic sub-groups or schools.

Class and race effects (either at the individual- or school-levels) on special education placement are further complicated by the greater exposure of lower income, African American, and Hispanic children to those factors that themselves contribute to disability identification. Such factors include biological trauma (e.g., low birth weight, poor nutrition and child health), and increased exposure to environmental toxins. They also include “social trauma” such as being raised in poverty, or by a single- or teenage-parent. Additional risk factors include parents who are high school dropouts or second-language learners, depressed, disorganized, unemployed, or incarcerated, and who reside in high-risk neighborhoods. These factors may result in the lower cognitive and behavioral performance displayed by low-income minority students when they begin kindergarten (Blair and Scott 2002; Carey 1999; Downey, von Hipple, and Broh 2004; Duncan et al. 1994; Duncan and Magnuson 2005; Farkas and Beron 2004; Farkas and Hibel, 2007; Fryer and Levitt 2004; Guo 1998; Guo and Harris 2000; Phillips et al. 1998; Smith et al. 1997; Tach and Farkas 2006). The lower academic performance of low-SES and ethnic minority children elevates their likelihood of special education placement. However, the long-term effects of segregation can place these students in schools where frog-pond contextual effects reduce their special education placement rates. In addition, class- and race-stereotyping, and social dynamics involving both the class and race of teachers and students may have effects. The resulting complex inter-play in factors is highlighted by Coutinho et al.’s (2002) finding that minority children’s special education placement rates declined as the percent of minority children attending the school district increased.

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STUDY'S PURPOSE

We sought to empirically estimate how a range of individual student-, family-, and school-level factors increase a student's likelihood of being placed into special education. We do so by analyzing data from the Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K). Whereas prior studies have been largely aggregate and cross-sectional (e.g., Blair and Scott 2002; Coutinho et al. 2002; Hosp and Reschly 2002, 2004), the ECLS-K provides longitudinal data on individual student achievement and behavior. We were therefore able to estimate to what extent these children's academic skill proficiency and frequency of learning-related behaviors at school entry predicted whether they had been placed into special education by the end of fifth grade. By using multilevel modeling and statistical control for schools' average achievement and learning-related behavior levels as well as their socioeconomic and racial/ethnic makeup, we are also able to estimate how a school's context related to the child's likelihood of later special education placement.

DATA AND METHODS

The ECLS-K is a nationally representative longitudinal survey of children, their parents, teachers, and school administrators. The data is maintained by the U.S. Department of Education, National Center for Education Statistics. Children participating in the ECLS-K began their kindergarten year in 1998. Data on these children have been collected in spring 1999, fall 1999 (data were collected from only a random subset of children at this wave), spring 2000, spring 2002, spring 2004 and spring 2007. Of those who began the study, 11,138 students in 970 schools had complete data on whether they had been placed into special education by the spring of 2004.We use the child panel weight included in the ECLS-K restricted dataset in our analyses. Doing so helped adjust for unequal selection probabilities and more accurately represent the national population of kindergarteners in the fall of 1998.

There is substantial missing data in the ECLS-K when analyzed from kindergarten through fifth grade. We did not consider these data as meeting the assumption of missing completely at random (MCAR). Thus, the removal of cases with missing data from the analytic sample would likely introduce bias to our analyses while causing improper estimation of correlations and standard errors (Acock 2005; Allison 2002). However, the ECLS-K contains much information on children, their families, and their schools, including variables that help account for the mechanisms resulting in missing data (e.g., race/ethnicity, age, gender, SES). Controlling these variables leads to a reasonable assumption of missing at random (MAR), and allowed us to use multiple imputation procedures to retain the largest possible number of cases in our analytic sample (Acock 2005; Allison 2002; Rubin 1996; Schafer 1999).

Multiple imputation involves the use of multiple complete data sets containing imputed values for missing data, each of which can be analyzed using standard complete-data methods. The estimates garnered from the separate data sets are then combined into one coherent set of findings (Rubin 1977, 1996). Multiple imputation is considered superior to single imputation because it incorporates uncertainty into the standard errors of imputed

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values by accounting for variance between imputed solutions (Acock 2005; Schafer 1999). Because single imputation approaches assume perfect estimation of imputed values and ignore between-imputation variability, single imputation may result in artificially small standard errors and increased likelihood of type-one errors, particularly when the proportion of missing items is high. We used the IVEware computer program (Raghunathan et al. 2001) to impute missing values five times, creating five separate complete data sets. The analyses were then conducted separately on each of these data sets. The five resulting sets of parameter estimates were then combined using formulas developed by Rubin (1977) to produce the results reported here.

Data Analysis Procedures

We used individual and school-level variables measured in the fall of kindergarten in 1998 to predict a student's likelihood of being placed into special education by the spring of 2004[1]. Using predictors measured in the fall of kindergarten, 1998, helps avoid endogeneity problems, in that a student's academic performance or behavior as measured during the 1998 – 2004 period might be the result of the student's special education placement. We also include a predictor for whether or not students changed schools during this time period. We are unable to include variables characterizing the average performance or behavior in the schools that students moved to. This is because other students in these schools were not generally part of the ECLS-K sample. However, any bias introduced by using school-level measures from fall of kindergarten should result in more conservative estimates. This is because measurement error in these independent school-level variables for students who moved should bias the estimated effects of these variables toward zero.

Logistic regression is appropriate for modeling a student's likelihood of special education placement and estimating the magnitudes of effect for various predictors. However, basic logistic regression models are unable to adequately account for data that result from cluster-sampling within schools. The ECLS-K includes such data. Thus, we used multilevel modeling. Doing so should have resulted in more accurate estimation of student-level effects within separate schools (i.e., within-school effects), as well as accurate estimation of the unique influences of the school environment (i.e., between-school effects). Our analyses used a two-level Bernoulli sampling model to appropriately adjust standard errors to reflect data clustering and account for the effects of individual-, family-, and school-level characteristics on a student's likelihood of special education placement (Raudenbush and Bryk 2002). This type of multilevel model produces coefficients that can be interpreted in the same way as traditional logistic regression coefficients.

Variables

In these analyses, we used as a dependent variable the dichotomous receipt or non-receipt of special education services during the student's 2003 – 2004 school year. As shown in Table 1, 8.8 percent of students received special education services for any disability during the 2003 – 2004 school year. About 3 percent of students were placed with a diagnosis of

[1]As the most recent data available for the ECLS-K at the time of this analysis, data collected in spring 2004 provide more cases of students receiving special education services, and, thus, greater explanatory power.

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speech/language impairment (SLI), 5.7 percent with a diagnosis of learning disability (LD), 0.7 percent with mental retardation (MR), and 0.6 percent with an emotional/behavioral problem (EBD). The remaining students were diagnosed with less frequently occurring disabilities. These included developmental delay, brain injury, health impairment, hearing impairment, hard of hearing, visual impairment, deaf/blind, and physical impairment[2].

Student gender is indicated by a dichotomous variable labeled “male”, with a score of “1” attributed to males and “0” to females. The sample is 50.4 percent male. Five racial/ethnic groups are included: non-Hispanic white, black/African American[3], Hispanic, Asian, and a group labeled “other ethnicity” composed of the remaining students, including Native Hawaiians and other Pacific Islanders, American Indians, Alaskan Natives, and multiracial non-Hispanics. Non-Hispanic white students comprise the majority of the sample (57.7 percent), followed by Hispanics (18.5 percent), black students (11.3 percent), Asians (6.8 percent), and students of other racial/ethnic backgrounds (5.5 percent).

We estimated the effects of a family’s SES using the continuous SES measure employed by NCES. This measure surveyed the parents’ (i.e., both the mother’s and father’s) income, educational attainment, and occupational status at the time of their child’s entry into kindergarten. We standardized SES for the fall of children’s kindergarten year, using the mean of all other students in the ECLS-K sample. Thus, the SES variable has a mean of about zero and a standard deviation of about one[4].

We estimated a student’s academic achievement using an Academic Test Score variable. The ATS is the average of a student’s Reading and Mathematics Test item response theory (IRT) score at kindergarten entry in the fall of 1998, standardized across all individuals in the ECLS-K. The Reading Test and the Mathematics Test were administered individually, using an untimed format. The Reading Test measures children’s basic skills (e.g., print familiarity, letter recognition, decoding, sight word recognition), vocabulary (receptive vocabulary), and comprehension (i.e., making interpretations, using personal background knowledge). The Mathematics Test measures a range of age- and grade-appropriate mathematics skills (e.g., identify numbers and shapes, sequence, add or subtract or multiply or divide, use rates and measurements, use fractions, calculate area and volume). Each demonstrates strong psychometric properties (see NCES, 2005). For example, the fall of kindergarten Reading and Mathematics Tests displayed theta reliability coefficients of .91 and .92, respectively (NCES, 2005).

[2]The data collection instrument used school records to create separate variables for the receipt of special education services, as well as each of the separate diagnoses. It was therefore possible for a student to be coded with more than one diagnosis. When our analyses focus on placement with a particular disability, we use the variable created for that diagnosis, thus including every student recorded as being diagnosed with that disability. Despite our use of a methodology that maximizes the number of cases for each diagnosis, the “rarer disabilities” listed above all had sample shares much lower than the 0.6 percent observed for EBD[0].

[3]When referring to the ECLS-K data, we use the terms “black” and “African American” interchangeably, mirroring the terminology used in the questionnaires which draws no distinction between the two.

[4]Deviations from a mean of zero and standard deviation of one for standardized variables are due to between-imputation variation and sample attrition. Missing values are imputed and the measures standardized five separate times. The atypical means and standard deviations are produced when the five data sets are combined and summarized. Additionally, variables reflecting information from fall 1998 were standardized relative to the fall 1998 sample. Non-zero means and reduced standard deviations partially reflect the changing composition of the ECLS-K sample from kindergarten entry through the end of fifth grade.

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We used two measures of a student's behavior. The first measure, termed Approaches to Learning, is a scale of a teacher rating on six questions evaluating a student on his or her task engagement. Example behaviors include attentiveness, task persistence, eagerness to learn, learning independence, and organization. Higher ratings indicate that the student is more frequently engaged in classrooms tasks. The second measure, termed Externalizing Problem Behaviors, also is a scale on which teachers rated the frequency that a student displayed externalizing behavior problems. Example behaviors include arguing, fighting, acting impulsively, getting angry, and disrupting class activities. Higher ratings indicate that students are more frequently displaying such problem behaviors. Both measures of behavior again display strong psychometric properties (NCES, 2005).

The approaches to learning and externalizing problem behaviors measures were also converted into Z-score form. Because these variables were measured at the time children entered school, they can be interpreted as representing particular dimensions of students' academic and behavioral school readiness (Farkas and Hibel 2007). The approaches to learning and externalizing behavior scales measure the degree to which a child is adhering to the norms for learning-related (e.g., attending to a teacher's instruction, completing tasks) and non-aggressive or -disruptive (e.g., not fighting, refraining from arguing with a teacher) behaviors the time of kindergarten entry. Academic test scores should indicate a student's level of cognitive functioning and initial familiarity with academic topics at kindergarten entry. However, academic test scores measure administered at school entry should mostly index what a student has learned prior to entering school. These may not index to what extent a student will respond to an elementary school teacher's delivery of formal instruction.

Downey and Pribesh (2004) found that teacher race was significantly associated with black-white student differences in teacher judgments of externalizing behavior. (Their test of such differences for approaches to learning was not statistically significant). To test for the possibility of such effects in our data, we constructed a measure of the proportion of each student's teachers that were non-Hispanic white during the 1998-99, 1999–2000, 2001-02, and 2003-04 school years. (ECLS-K data were not collected during the 2000-01 or 2002-03 school years). We add this mean white teacher variable to statistical models as both a main effect and interaction with student race to test and control for any effects of teacher-student racial matching on the likelihood of special education placement.

We also use as a statistical control a dichotomous indicator of whether a student moved away from his or her original school before spring of the 2003–2004 school year. Sixteen percent of students had changed schools by this time period. The school-level measurement error introduced by such student mobility biases our school-level effects downward, such that our estimates of these effects are conservative.

We computed school averages for academic test scores, approaches to learning, externalizing problem behaviors, and SES by aggregating student scores in fall kindergarten, 1998, by school ID. The school percent minority enrollment was obtained from a questionnaire administered to school principals. This variable ranged from 0 to 100 percent.

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Table 2 shows rates of special education placement and diagnosis in spring 2004, separately by race/ethnicity. The highest overall placement rate is for the other ethnicity category, with a rate of 10.7 percent. The next highest is for African Americans, with a rate of 10.6 percent. This is followed in order by non-Hispanic whites (8.8 percent), Hispanics (8.8 percent), and Asians (4.1 percent). Examining the diagnoses separately for whites, blacks, Hispanics, and other ethnicity students, the learning disability and speech/language diagnoses are most common. Placement rates for LD fall near 6 percent for all groups except Asians. Placement rates for SLI near 3 percent.

Mental retardation and emotional/behavioral disabilities are diagnosed much less frequently. The infrequency of these diagnoses makes a reliable application of inferential statistical methods problematic. Multilevel logit regression models predicting these outcomes often failed to converge. Thus, we mostly restrict our reporting to regression analyses predicting special education placement, as measured using those four outcomes that converged in the regression models. These were: (a) placement with any disability, (b) placement as learning disabled, (c) placement as having a speech/language impairment[5], (d) and placement as mentally retarded. The estimate for placement overall should be relatively accurate. This is because mental retardation and emotional/behavioral disorder, as well as the other diagnoses, so rarely occur for each of the race/ethnicity groups that their placement patterns that they should have little effect on our estimates for the overall special education placement patterns.

However, and because prior research has identified mental retardation as a category of specific concern with regard to minority overrepresentation (e.g., Donovan and Cross 2002), we do report on models predicting special education receipt with a mental retardation diagnosis. Results of these models should be interpreted very cautiously. The low special education placement rates for emotional/behavioral disorder precluded multilevel regression analysis of this outcome. We therefore could not reliably estimate predictors of placement for EBD. Despite the fact that these disability categories are relatively infrequently diagnosed and, as such, cannot be fully investigated here, they are important to further study. For example, extant research has identified EBD as an arena in which minority over-representation is especially likely (e.g., Harry and Klingner 2006, Skiba et al. 2006).

Table 2 shows that African Americans have higher special education placement rates than non-Hispanic whites. Hispanic and white students tend to have comparable placement rates (an exception being LD, for which Hispanics more often receive special education services). Asian students have substantially lower placement rates than any other racial/ethnic group. Table 3 displays the means of individual-, family-, and school-level variables that are likely to predict special education placement, separately by racial/ethnic group. At the individual-level, blacks, Hispanics, and other ethnicities might initially be expected to display higher special education placement rates. Specifically, their test scores, approaches to learning, and

[5]SLI is not generally a disability category of concern to researchers of minority overrepresentation in special education (Donovan and Cross 2002). Also, SLI differs from the other disability categories insofar as certain manifestations of the disability (e.g., articulation disorders) do not necessarily relate directly to academic achievement. In additional analyses (results not shown) we examined placement patterns for all disabilities *except* SLI, but found no differences between the results of those models and models predicting placement for any disability, including SLI.

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family SES tend to be lower, and their externalizing behaviors higher than those of non-Hispanic whites.

However, Table 3 also indicates that blacks and Hispanics typically attend schools that average lower test scores and approaches to learning scores, and higher externalizing behavior scores. If there is a frog-pond effect, such that students in lower-performing schools are less likely to be placed into special education, then this greater concentration of black and Hispanic students in lower-performing schools may reduce their placement rates. This may partly explain the lower rates of placement for racial/ethnic groups after statistically controlling for individual-level variables. We investigate this further in the regression results reported in Tables 4 – 8.

MULTI-LEVEL LOGISTIC REGRESSION RESULTS

Table 4 presents the results of multilevel logistic regression models predicting special education placement, regardless of the disability identified, in the spring of 2004. Although models 1 through 4 include only predictors measured at the individual-level, each of the models was specified as multilevel. Doing so should have resulted in standard errors that corrected for the ECLS-K's clustered sampling design.

Model 1 uses only gender and race/ethnicity as predictors. Males are significantly more likely than females to be placed into special education. Both blacks and Asians are more likely than whites to be so placed. The placement rates of Hispanics and children of other ethnicities are not significantly different from non-Hispanic whites.

Model 2 adds a family's SES. Being raised in a family with a higher SES significantly decreases a student's odds of special education placement, statistically controlling for variation attributable to the student's race/ethnicity. Controlling for a family's SES results in (a) Hispanics being significantly less likely than whites to be placed into special education and (b) the positive African American coefficient becoming statistically non-significant. The male and Asian effects are essentially unchanged.

Model 3 add the student's mean academic test score (i.e., the average of his or Reading and Mathematics Test scores) at kindergarten entry. Being relatively more proficient academically at school entry strongly reduces a student's likelihood of being placed in special education by fifth grade. Further, higher levels of academic achievement fully mediates the predicted effect of the family's SES. We therefore find no evidence that a family's social class biases a school's decision to place a student into special education, after accounting for the relation between the parents' SES and their student's academic readiness for school.

Statistically controlling for the student's initial level of academic achievement results in the black, Hispanic, and Asian students being significantly and strongly under-placed into special education. This result contradicts prior research that failed to control individual-level student achievement test scores. *Controlling for a student's academic achievement at school entry, students who are , black, Hispanic, Asian, and of other race or ethnicity are much less likely than non-Hispanic white students to be placed into special education programs*. Even

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after statistically controlling for variation attributable to their levels of academic achievement, male students are significantly more likely than females to be placed into special education.

Model 4 adds the frequency of the student's task engagement and externalizing behavior problems, as well as the predictor of school change. A student who is frequently engaged in classroom tasks is less likely to be placed into special education. A student who frequently engaged in externalizing behavior problems is more likely to be so placed. However, this effect is much smaller in magnitude and only marginally significant (p=.06). Changing schools does not have a statistically significant effect on the odds of special education placement.

Adding these behavior variables to the model slightly reduces the effect of the student's test scores. However, the effect remains large and statistically significant. The estimate for gender decreases, but it also remains large and statistically significant. That is, statistically controlling for the student's academic proficiency and behavior does not mediate the effect attributable to the student's gender. This is despite descriptive statistics of the ECLS-K sample indicating that (a) teachers rated as less engaged in classroom tasks and more disruptive than girls and (b) boys scored somewhat lower on measures of their academic achievement[6]. The estimates for black, Hispanic, Asian, and other race or ethnicity remain large, negative, and statistically significant after statistically controlling for classroom behavior.

Modes 5 through 8 add the school-level variables (i.e., Models 5 through 8). We first add school percentage minority enrollment. This variable has a statistically significant negative relation with special education placement. The inclusion of this school-level variable explains some of the individual-level race/ethnicity effects. The coefficients for black, Hispanic, Asian and other ethnicity are all reduced in magnitude. The estimates for black and other race or ethnicity are no longer statistically significant. This mediation indicates that much of the negative effect of minority status on special education placement is attributable to students of minority race/ethnicity attending school attended by many other minority students.

Model 6 adds school-level SES. The school's SES increases a student's likelihood of special education placement. The variable also explains a small portion of the school minority enrollment effect. Model 7 adds the school's mean test score. The effect of this variable is positive and large. It is thus consistent with the hypothesized "frog-pond" effect. As with individual-level SES and test score measures, school-level test scores explain the school-level SES effects. However, the lower special education placement rates in high minority schools are not explained by these schools' lower levels of academic performance. Instead, minority schools under-place students into special education occurs over and above that predicted by an academic "frog-pond" effect.

[6]In this sample, for example, boys' means are as follows: test score = −0.02; approaches to learning = −0.14; externalizing problem behaviors = 0.12. Girls averaged much better sores: test score = 0.04; approaches to learning = 0.25; externalizing behavior problems = −0.24.

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Model 8 adds all five school-level variables. Two of these are statistically significant – school percent minority, and school mean approaches to learning. The latter variable, like school average test scores, produces a “frog-pond” effect. Students attending schools with higher average levels of student engagement are at greater risk of special education placement. However, the school-level approaches to learning and school-level test scores variables correlate (r=.374), and so may ‘share’ their effects via collinearity. The full model indicates that family SES does not have a statistically significant (p=.098) relation with special education placement, nor do school means for externalizing behaviors, SES, and test scores. However, individual-level externalizing behavior has a statistically significant and positive relation with placement. The magnitude of the other effects are essentially unchanged. Individual-level test scores and school engagement are strongly related to placement.

We can contrast the magnitudes of the aforementioned coefficients because they are measured as Z-scores. Doing so indicates that the single largest effect is for individual-level test scores. Further, and after statistically controlling for a wide range of variables, boys are over-placed into special education relative to girls. Hispanic and Asian students are under-placed relative to non-Hispanic whites. The placement rates for black and other ethnicity students are not significantly different from non-Hispanic white students’ placement rates.

To test for effects of student-teacher racial matching, we re-estimated Model 8. We included students’ mean teacher race and its interaction with student race/ethnicity as predictors (i.e., Model 9). These effects were not statistically significant. The effects of the other variables are not changed substantially. These results do not provide support for the hypothesis that special education placement is biased by a teacher’s race/ethnicity or its interaction with student race/ethnicity. This pattern holds for all outcomes examined below.

We next examined whether these data patterns for special education placement overall hold for the specific disability diagnoses. Thus, we estimated the regression models separately for the diagnoses of learning disability, speech/language impairment, and mental retardation, Tables 5 through 7 displays these estimates.

Table 5 displays the estimated models predicting placement into special education as a result of a learning disabilities diagnosis. The results are genrally consistent with those of the aggregated special education placement for all disabilities (Table 4). However, there are some notable differences in magnitudes of effect. At the individual-level, the effect for a student’s academic achievement for special education placement for LD is even stronger than the effect for special education placement in general. The effect of approaches to learning is about the same size for placement with LD as for placement in general. Externalizing behavior problems have no significant effect on LD placement. Males have even stronger over-placement into special education with LD than they do for special education placement overall. The effect for Asian race/ethnicity of under-placement in special education with LD is stronger, as is the effect for Hispanic race/ethnicity, than those for overall placement in Table 4. The complete model indicates that LD placement rates for black and other ethnicity students are not statistically different from those of white students. This is consistent with our analyses of special education placement overall.

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At the school-level, the racial/ethnic composition of the student body is a slightly stronger predictor of under-placement for special education for LD than for placement overall. However, the "frog–pond" contextual effect of school-average learning-related behavior weaker for placement because of LD than for placement overall. None of the other school-level average variables – SES, academic test score, or externalizing behaviors – have statistically significant effects on special education placement for LD.

Table 6 displays results of models predicting special education placement for speech/language impairment. The pattern of results is again consistent with those for placement overall, albeit with some differences in magnitude and statistical significance. We again find that after statistically controlling for a student's academic achievement (i.e., Model 3) that social class effects are fully explained. Each of the racial/ethnic groups have significantly lower special education placement rates than whites. Males continue to be placed more frequently than females.

For the school-level variables, a student's odds of placement because of SLI are affected by the racial composition of the school (i.e., reduced in high minority schools) to a slightly greater extent than his or her odds of placement overall. However, individuals' odds of placement with SLI are not significantly influenced by the other measures of school context.

Table 7 displays results of models estimating the odds of special education placement with the diagnosis of mental retardation. These models produce few statistically significant effects, which is likely due to the very low prevalence of this diagnoses (0.7 percent of the sample). Nevertheless, the patterns of the estimated coefficients approximate those observed for the other outcomes. Academic test scores and approaches to learning are strongly and negatively associated with students' odds of placement with MR. After statistically controlling for these variables, students of minority race/ethnicity are under-placed compared to whites. Boys are over-place compared to girls. Of the school-level variables, only school minority enrollment has a significant (and negative) effect on placement for mental retardation. Collectively, these analyses indicate that the patterns of special education placement with LD, SLI, and MR are very consistent with the patterns for special education placement for disability in general.

DISCUSSION

We used nationally representative data to identify the individual-, family-, and school-level variables (measured in the fall of kindergarten, 1998) that predicted a student's likelihood of placement into special education. We estimated the effects for these variables both for the general class of disabilities and for the specific diagnoses of learning disability, speech/language impairment, and mental retardation. Our analyses of special education placement overall indicated that the strongest explanatory factor is the student's academic achievement at school entry. This factor explains much of the social class differences in placement rates. Our analyses of the specific disability categories indicated that the student's level of academic achievement (a) fully mediated the SES effect on placement with SLI and (b) partially mediating the effect for overall placement and placement with LD and MR. Second in importance is the frequency in which the kindergarten student engaged in classroom

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tasks. After statistically controlling for academic achievement and behavior, our analyses indicated that boys are significantly more likely than girls to be placed in special education in general, and for both LD and SLI separately. We also found that students of minority race/ethnicity are less likely than whites to be placed into special education in general. This was also the case for each of the specific diagnoses that we analyzed.

At the school level, our analyses yielded evidence of “frog-pond” contextual effects. Specifically, higher school-level means in academic achievement and engagement increased a student’s odds of being placed into special education. This was the case even after statistically controlling the student’s own background characteristics. We also found that schools where a high percentage of minority students were enrolled were less likely to place students into special education in general. This was also the case for the specific disabilities of LD, SLI, and MR. This contextual effect partially mediated the under-placement of Hispanic and Asian students into special education. It also fully explained African American under-placement. For reasons that are not attributable (given the data patterns reported here) to the average performance, conduct, or SES of their students, high-minority schools do not utilize special education as a system of specialized service delivery as often as schools with lower minority enrollments.

A number of our findings are consistent with prior research. For example, our finding of a gender effect on placement is consistent with recent research indicating that boys are more at-risk of disability identification than girls. Colligan, Barbaresi, Schaid, and Jacobsen (2001) found that boys were two to three times more likely to be reading disabled than girls. This was the case regardless of whether a regression-, discrepancy, or low-achievement identification method was used to identify the children as disabled. However, our finding that the effects for race/ethnicity – that is, that students who are black, Hispanic, and Asian are under- or equally placed in special education compared to whites, after extensive statistical control for other variables– contrasts strongly with almost all other research in this area (e.g., Oswald et al. 1999; Skiba et al. 2005, 2008; but see Mann et al., 2007).

Why might minority students be under- or equally placed into special education? As evidenced by the descriptive statistics reported in the bottom panel of Table 3, racial/ethnic minority students are more frequently attend schools having, on average, greater percentages of minority students, lower levels of academic achievement and classroom task engagement, and lower average family SES than schools typically attended by non-Hispanic white students. Sociological research consistently shows that schools’ social contexts strongly predict the organization of their institutional structures, particularly the internal differentiation of the student body into instructional sub-units (Barr and Dreeben 1983; Gamoran 1986; Gamoran and Dreeben 1986; Hallinan 1987). Lower-resource schools encountering daily challenges associated with low-performing student bodies might employ different organizational strategies than higher-resource, higher-achieving schools. Special education placement may be initiated more frequently in more advantaged schools that are attended by relatively few low-performing students and who are able to allocate more financial and human resources to intervention than in those schools encountering the dual challenge of scarce resources and higher proportions of underperforming students., Thus,

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black or Hispanic students may be less likely to be placed into special education than non-Hispanic white students because of their enrollment in less advantaged schools.

A second explanation of minority under-placement could be that teachers are more attentive to the issue of minority overrepresentation in special education. Minority over-representation has been repeatedly investigated and debated since the late 1960s. Research has consistently reported on possible racial inequality in special education placements (e.g., Donovan and Cross 2002; Dunn 1968; Hosp and Reschly 2003; Mercer 1973; Oswald et al. 1999). Teachers (particularly those in high-minority schools) may have reduced their special education referral rates for minorities as they became more sensitive to the possibility of such racial inequality. We measured special education placement during spring, 2004. Because the ECLS-K captures a relatively recent time period, we may have observed a period of correction during which teachers are working to reduce their special education referrals for minority students.

One finding complicates interpretation of our results. Specifically, our results indicated that Asian students are under-placed and that controlling for the school's percentage of minority students partially explains this under-placement. As a group, Asian students are relatively high-performing. As indicated by Table 3, their level of academic achievement approximates those of non-Hispanic whites, while their approaches to learning and externalizing behavior problems scores are better than those of whites. To our knowledge, there has not been any substantial public discussion of Asian over-placement into special education that could have led educators to intentionally reduce Asian children's special education referral rates. The typical Asian student attends a school with reasonably high levels of academic achievement and a high percentage (58%) of minority students (Table 3). Presumably, many of these schools have high concentrations of Asian students. Asian parents often highly regard school achievement (e.g., Goyette and Xie 1999). If Asian parents view special education placement as possibly impeding their children's academic leanring, then they may be less willing to allow their children to be so placed. It may also be that teachers in schools with high concentrations of such parents and students may be attempting interventions other than special education placement.

LIMITATIONS

We believe that our findings are robust, as they are derived using a large, longitudinal, and nationally representative sample, individually-administered achievement measures, multiple measures of behaviors, a wide range of additional individual-, family-, and school-level covariates, as well as advanced statistical modeling techniques. Nevertheless, we believe that our study has at least three limitations. First, we analyzed data on placement patterns using a sample of elementary school students. It is possible that analyses of students attending middle or high school would have yielded other types of placement patterns.

Second, sample size limitations limited our ability to analyze the placement patterns of some disability categories, including those (e.g., mental retardation and emotional/behavioral disorders) for which minority overrepresentation has been previously reported to be particularly strong (Chinn and Hughes 1987; Oswald, Coutinho, Best, and Singh 1999;

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Skiba et al. 2005, 2006, 2008). We did conduct analyses for special education diagnoses separately by race/ethnicity. We found that speech/language impairment and learning disability accounted for the great majority of all placements. This was also the case separately for each of the race/ethnic groups. Placement with a diagnosis of mental retardation or emotional/behavioral disorder was too infrequent an occurrence, for all groups, to account for race/ethnic differentials in overall special education placement. Further, we conducted separate regression analyses predicting the two most common diagnoses – SLI and LD. These analyses yielded patterns similar to those for special education placement as a whole (Tables 5 and 6). We also estimated models predicting special education placement with MR. However, these results should be treated cautiously and are not necessarily generalizable to the population of children with MR. The number of race-specific sample members placed in each of the MR and EBD categories was too small (about 12 out of 1,260 blacks and 10 out of 2,061 Hispanics) to permit reliable regressions predicting these outcomes. Although the pattern of results for MR was generally similar to those for the other diagnoses, future studies targeting a large and nationally representative sample of children diagnosed with MR and EBD would be better suited to disaggregating individual and contextual effects on the likelihood of placement with these relatively uncommon disabilities.

A third limitation of our study is that, although we hypothesized that school financial and human resources help determine students' likelihood of special education placement, the ECLS-K does not include information about schools' funding and other resource allocations. The inclusion of explicit measures of school-level per-pupil expenditures into future statistical models predicting special education placement rates with individual-level data (including individual-level test scores) would greatly contribute to the field's understanding about the effects of such factors on special education placement.

FUTURE DIRECTIONS FOR RESEARCH

Our finding that ethnic/racial minority students are under-placed into special education runs contrary to most of the extant work, and so should be replicated. raises many questions. Additionally, future studies should investigate the types of services that are provided to students of minority race/ethnicity who would have seemed likely to be placed into special education. Are these students more typically retained in grade? Do schools provide such students with extra educational resources through programs other than special education (e.g., Title I)

Our study indicates "context matters." Future studies should investigate the organizational structure of low-SES and low-achievement schools, and how these organizational structures contribute to the service delivery. For instance, do high-achieving schools "help" or "hurt" under-performing children by placing them into special education at greater rates? Do these schools provide, as a result of their greater resources, higher-quality special education services? What do under-performing students in low-achievement schools experience when placed into special education? Our own investigation of special education (Morgan, Frisco, Farkas, & Hibel, in press) provides little evidence that it positively impacts children's learning or behavior.

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Future work should also investigate the interaction between a minority student's placement into special education and the type of setting in which he or she receives these services. Students placed into special education are expected to be receive services in the "least restrictive environment," or the classroom setting that as closely as possible approximates the general classroom setting. Yet some work has also begun to indicate that the restrictiveness of a student's placement varies by his or her race/ethnicity. Skiba et al. (2006) reported that black students were more likely to be educationally segregated, in that they less often received instruction in general education classroom and more often received instruction in restricted settings. This pattern held regardless of whether the student had been identified as LD, ED, SLI, and MR. Additional work on minority disproportionate representation in special education is clearly warranted.

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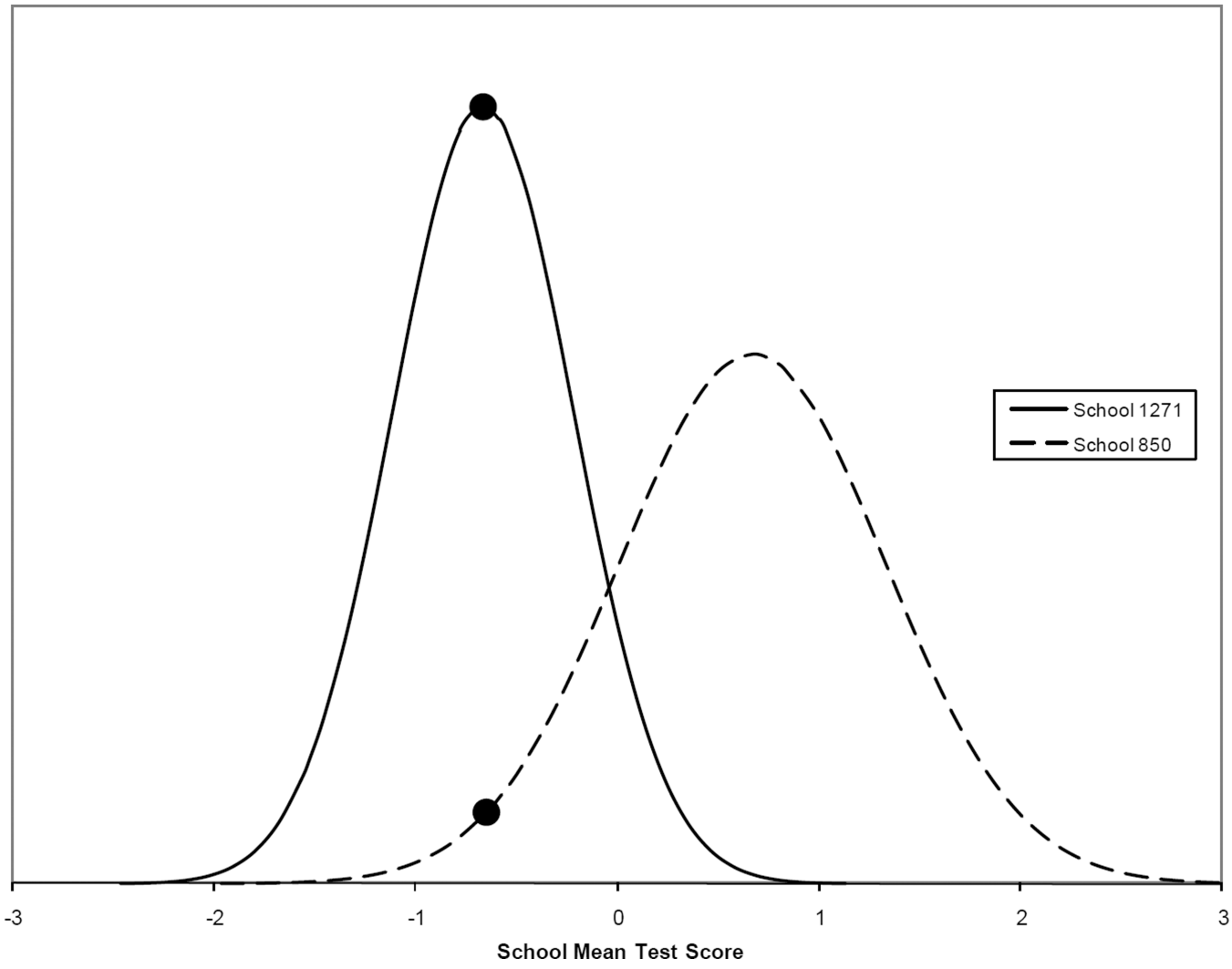

FIGURE 1.

Mean Test Score for all Special Education Students (−0.66) in Relation to Normalized Test Score Distributions of a High- and a Low-Performing ECLS-K School

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Table 1

Descriptive Statistics, Analytic ECLS-K Sample

Variables				
Unstandardized Child-level Variabels	*Mean*			
Student in Special Ed., All Disabilities	0.088			
Student in Special Ed., Speech/Language	0.031			
Student in Special Ed., Learning Disability	0.057			
Student in Special Ed., Mental Retardation	0.007			
Student in Special Ed., Emotional/Behavioral Problem	0.006			
Male	0.504			
Non-Hispanic White	0.577			
Black/African American	0.113			
Hispanic	0.185			
Asian	0.068			
Other Ethnicity	0.055			
Student Changed Schools During Study	0.162			
Mean White Teacher	0.833			
Black Student X Mean White Teacher	0.071			
Hispanic Student X Mean White Teacher	0.139			
Asian Student X Mean White Teacher	0.052			
Other Ethnicity Student X Mean White Teacher	0.040			
Standardized Child-Level Variables	*Mean*	*SD*	*Min.*	*Max.*
Family SES	0.032	0.983	−5.75	3.47
Academic Test Score	0.022	0.92	−2.86	6.33
Approaches to Learning	0.041	0.979	−3.78	2.97
Externalizing Problem Behaviors	−0.007	0.971	−3.78	4.15
Standardized School-Level variables	*Mean*	*SD*	*Min.*	*Max.*
School Percent Minority	42.35	34.47	0.00	100
School Mean SES	0.007	0.686	−2.81	3.24
School Mean Test Score	0.000	0.550	−1.26	2.45
School Mean Approaches	0.031	0.464	−2.21	1.49
School Mean Externalizing	−0.031	0.425	−1.02	3.24

Child-Level n = 11,138

School-Level n = 970

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Table 2

Special Education and Disability Diagnosis Rates and Frequencies, Spring 2004, by Race/Ethnicity

Race/ Ethnicity	All Disabilities	Speech/ Language	LD	MR	EBD	N
White	8.8%	3.1%	5.6%	0.7%	0.5%	6,423
Black	10.6%	3.7%	6.1%	1.1%	0.9%	1,260
Hispanic	8.8%	3.1%	6.3%	0.5%	0.5%	2,061
Asian	4.1%	2.5%	1.8%	0.5%	0.1%	761
Other Ethnicity	10.7%	3.1%	7.6%	0.5%	1.0%	633
Total	8.8%	3.1%	5.7%	0.7%	0.6%	11,138

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Table 3

Variable Means by Race/Ethnicity

Child-Level Variables					
Race/Ethnicity		**Test Score**	**Approaches to Learning**	**Externalizing Behaviors**	**Family SES**
	Non-Hispanic White	0.21	0.12	−0.06	0.30
	Black	−0.31	−0.27	0.26	−0.47
	Hispanic	−0.44	−0.12	−0.03	−0.53
	Asian	0.16	0.14	−0.24	0.18
	Other Ethnicity	−0.21	−0.17	0.20	−0.14

School-Level Variables						
Race/Ethnicity		**School Mean Test Score**	**School Mean Approaches**	**School Mean Externalizing**	**School Mean SES**	**School Percent Minority**
	Non-Hispanic White	0.16	0.09	−0.05	0.24	18.30
	Black	−0.24	−0.15	0.12	−0.39	72.34
	Hispanic	−0.30	−0.08	−0.01	−0.37	68.55
	Asian	0.04	−0.02	−0.06	0.05	58.08
	Other Ethnicity	−0.19	−0.10	0.15	−0.11	56.74

Note: Child-level variables are standardized across all students. School-level variables (except percent minority) are within-school aggregates of the child-level measures, and are therefore not standardized across schools.

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Table 4

Individual- and Two-Level Logistic Regression Models Predicting Receipt of Special Education Services Any Disability, Spring 2004

	Individual-Level Models				Two-Level Models				
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**	**Model 9**
Intercept	0.06***	0.06***	0.05***	0.05***	0.06***	0.06***	0.05***	0.05***	0.07**
Student-Level Variables									
Male	2.06***	2.08***	1.97***	1.64***	1.64***	1.64***	1.64***	1.64***	1.64***
Black	1.25*	0.91	0.67**	0.61***	0.82	0.82	0.82	0.84	0.53
Hispanic	1.04	0.75**	0.40***	0.44***	0.59***	0.59***	0.60***	0.59***	0.26*
Asian	0.47***	0.43***	0.28***	0.31***	0.39***	0.39***	0.38***	0.38***	0.12^
Other Ethnicity	1.22	1.03	0.70*	0.67*	0.86	0.85	0.86	0.88	0.57
Family SES		0.65***	0.96	0.97	0.94	0.90^	0.91^	0.91^	0.91
Test Score			0.19***	0.26***	0.25***	0.25***	0.23***	0.24***	0.24***
Approaches to Learning				0.61***	0.60***	0.61***	0.61***	0.58***	0.58***
Externalizing Behaviors				1.08^	1.08^	1.08*	1.08*	1.09*	1.09*
Changed Schools				0.99	0.97	0.97	0.98	0.97	0.97
Mean White Teacher									0.74
Black X Mean White Teacher									1.70
Hispanic X Mean White Teacher									2.63
Asian X Mean White Teacher									3.80
Other Eth. X Mean White Teacher									1.61
School-Level Variables									
School Percent Minority					0.93***	0.94**	0.95**	0.96**	0.95*
School Mean SES						1.21*	0.99	0.98	0.97
School Mean Test Score							1.42*	1.22	1.22
School Mean Approaches								1.48**	1.49**
School Mean Externalizing								0.88	0.87

Significance levels (two-tailed tests):

^ p < .10,

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[*] $p < .05$,

[**] $p < .01$,

[***] $p < .001$

Note: Results are reported as odds ratios; Odds ratios for School Percent Minority reflect a 10% increase in minority enrollment.

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Table 5

Individual- and Two-Level Logistic Regression Models Predicting Receipt of Special Education Services for a Learning Disability, Spring 2004

	Individual-Level Models				Two-Level Models				
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**	**Model 9**
Intercept	0.04***	0.04***	0.03***	0.03***	0.03***	0.03***	0.03***	0.03***	0.04***
Student-Level Variables									
Male	2.13***	2.15***	2.01***	1.78***	1.78***	1.77***	1.77***	1.76***	1.77***
Black	1.13	0.78	0.57**	0.54***	0.76	0.76^	0.76	0.79	0.43
Hispanic	1.17	0.81^	0.43***	0.46***	0.64**	0.65**	0.66**	0.65**	0.32^
Asian	0.32***	0.29^**	0.19***	0.20***	0.25***	0.25***	0.25***	0.25***	0.06
Other Ethnicity	1.35	1.12	0.74	0.73	0.98	0.95	0.98	1.02	0.71
Family SES		0.62***	0.91^	0.91	0.89*	0.82**	0.83**	0.83**	0.83**
Test Score			0.18***	0.23***	0.23***	0.22***	0.21***	0.21***	0.22***
Approaches to Learning				0.66***	0.66***	0.66***	0.67***	0.63***	0.63***
Externalizing Behaviors				0.99	0.98	0.99	0.99	1.00	1.00
Changed Schools				0.94	0.92	0.92	0.92	0.92	0.91
Mean White Teacher									0.75
Black X Mean White Teacher									2.06
Hispanic X Mean White Teacher									2.22
Asian X Mean White Teacher									4.71
Other Eth. X Mean White Teacher									1.47
School-Level Variables									
School Percent Minority					0.92***	0.94***	0.94**	0.95**	0.95*
School Mean SES						1.38**	1.12	1.11	1.09
School Mean Test Score							1.47*	1.22	1.23
School Mean Approaches								1.57**	1.58**
School Mean Externalizing								0.81	0.80

Significance levels (two-tailed tests):

^ $p < .10$,

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*p < .05,

**p < .01,

***p < .001

Note: Results are reported as odds ratios; Odds ratios for School Percent Minority reflect a 10% increase in minority enrollment.

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Table 6

Individual- and Two-Level Logistic Regression Models Predicting Receipt of Special Education Services for Speech/Language Impairment, Spring 2004

	Individual-Level Models				Two-Level Models				
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**	**Model 9**
Intercept	0.02***	0.02***	0.02***	0.02***	0.02***	0.02***	0.02***	0.02***	0.03***
Student-Level Variables									
Male	1.75***	1.75***	1.60***	1.37*	1.37*	1.37*	1.37*	1.37*	1.37*
Black	1.2	0.91	0.70*	0.65*	0.89	0.89	0.89	0.91	0.47
Hispanic	1.02	0.77	0.45***	0.50***	0.67*	0.68*	0.68^	0.68^	0.16^
Asian	0.84	0.78	0.58*	0.62^	0.8	0.79	0.78	0.78	0.35
Other Etity	0.99	0.85	0.58*	0.57*	0.75	0.74	0.76	0.78	0.25
Family SES		0.71***	1.02	1.02	1.00	0.96	0.97	0.97	0.97
Test Score			0.23***	0.32***	0.31***	0.31***	0.29***	0.29***	0.30***
Approaches to Learning				0.59***	0.60***	0.60***	0.60***	0.58***	0.58***
Externalizing Behaviors				0.97	0.97	0.97	0.97	0.98	0.98
Changed Schools				0.9	0.89	0.89	0.89	0.89	0.88
Mean White Teacher									0.8
Black X Mean White Teacher									2.09
Hispanic X Mean White Teacher									5.39
Asian X Mean White Teacher									2.29
Other Eth. X Mean White Teacher									3.83
School-Level Variables									
School Percent Minority					0.94**	0.94*	0.95*	0.95*	0.96***
School Mean SES						1.18	0.93	0.93	0.91
School Mean Test Score							1.51^	1.35	1.34
School Mean Approaches								1.26	1.27
School Mean Externalizing								0.82	0.81

Significance levels (two-tailed tests):

^ $p < .10$,

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* p < .05,

** p < .01,

*** p < .001

Note: Results are reported as odds ratios; Odds ratios for School Percent Minority reflect a 10% increase in minority enrollment.

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Table 7

Individual- and Two-Level Logistic Regression Models Predicting Receipt of Special Education Services for Mental Retardation, Spring 2004

	Individual-Level Models				Two-Level Models				
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**	**Model 9**
Intercept	0.01***	0.01***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.01**
Student-Level Variables									
Male	1.08	1.09	0.87	0.64^	0.66	0.65	0.65	0.66	0.65
Black	1.57	0.96	0.65	0.55^	1.24*	1.24	1.24	1.25	0.30
Hispanic	0.78	0.45*	0.15***	0.21**	0.47	0.47	0.46	0.46	0.17
Asian	0.90	0.80	0.34^	0.43	0.77	0.77	0.79	0.79	0.09
Other Ethnicity	0.78	0.57	0.27*	0.27*	0.58	0.57	0.55	0.57	0.05
Family SES		0.53***	0.77^	0.76^	0.72*	0.70*	0.69*	0.68*	0.68*
Test Score			0.08***	0.17*	0.16**	0.16**	0.16**	0.16**	0.17**
Approaches to Learning				0.28***	0.28***	0.28***	0.28***	0.28***	0.27***
Externalizing Behaviors				0.86	0.84	0.84	0.84	0.85	0.85
Changed Schools				1.04	1.00	1.00	1.00	0.99	0.97
Mean White Teacher									0.20
Black X Mean White Teacher									5.23
Hispanic X Mean White Teacher									2.84
Asian X Mean White Teacher									12.74
Other Eth. X Mean White Teacher									21.35
School-Level Variables									
School Percent Minority					0.84**	0.85**	0.85**	0.85**	0.84**
School Mean SES						1.16	1.42	1.42	1.40
School Mean Test Score							0.70	0.66	0.65
School Mean Approaches								1.11	0.16
School Mean Externalizing								0.92	0.89

Significance levels (two-tailed tests):

^ $p < .10$,

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*$p < .05$,

**$p < .01$,

***$p < .001$

Note: Results are reported as odds ratios; Odds ratios for School Percent Minority reflect a 10% increase in minority enrollment.