

Disproportionality and Learning Disabilities: Parsing Apart Race, Socioeconomic Status, and Language

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Abstract

The disproportionate identification of learning disabilities among certain sociodemographic subgroups, typically groups that are already disadvantaged, is perceived as a persistent problem within the education system. The academic and social experiences of students who are misidentified with a learning disability may be severely restricted, whereas students with a learning disability who are never identified are less likely to receive the accommodations and modifications necessary to learn at their maximum potential. The authors use the Education Longitudinal Study of 2002 to describe national patterns in learning disability identification. Results indicate that sociodemographic characteristics are predictive of identification with a learning disability. Although some conventional areas of disproportionality are confirmed (males and language minorities), differences in socioeconomic status entirely account for African American and Hispanic disproportionality. The discrepancy between the results of bivariate and multivariate analyses confirms the importance of employing multivariate multilevel models in the investigation of disproportionality.

Keywords

learning disabilities, disproportionality, diagnosis, race/ethnicity, language minority

Although federal guidelines for the identification of students with a learning disability are based on a medical model of diagnosis, disproportional identification of certain sociodemographic groups across the nation suggests that diagnoses may be operationalized through a social or functional perspective (Field, Jette, & Martin, 2006). The fact that disproportional identification with a learning disability occurs among groups that are already socially disadvantaged—racial/ethnic minorities, language minorities, students of low socioeconomic status (SES)—is of particular concern to both educators and researchers (Anderson, 1997; Coutinho & Oswald, 2005; Daniels, 1998; Deshler et al., 2004). Disproportionality raises concerns about the validity and reliability of the label *learning disabled* (Giovingo, Proctor, & Prevatt, 2005) and/or suggests that placement in special education may function as a tool of discrimination (McDermott, Goldman, & Varenne, 2006; Ong-Dean, 2006; Reid & Knight, 2006). Accurate diagnoses of learning disability are generally of interest in the hopes of facilitating a timely and appropriate response from the education system to the unique needs of students. We employ a large nationally representative data set of both regular and special education high school students, the Education Longitudinal Study of 2002 (ELS), to locate the groups of students who are disproportionately identified

with learning disabilities once we account for systematic differences in background that are also correlated with identification.

Background

Who Is Identified With a Learning Disability?

The proportion of American children aged 12 to 17 identified with a learning disability by their schools, in other words, those in receipt of special education services, increased from 6.0% to 6.9% from just 1993 to 2007 (Office of Special Education Programs [OSEP], 2007). Learning disability identifications are not distributed proportionately throughout the population. In 1993, males composed 73% of the population identified with a learning disability (Anderson, 1997). In contrast to all other racial/ethnic groups combined, American Indian or Alaska Native students were 1.8 times more

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likely and Hispanic students were 1.1 times more likely to receive special education services for specific learning disabilities (OSEP, 2007). Although previous literature has tended to focus on the disproportional identification of Black students with mental retardation and emotional disturbance (OSEP, 2007; Skiba et al., 2008), there is evidence to suggest that the gap between Black and White students in rates of identification with a learning disability has increased since the 1970s, with Blacks being increasingly more likely to be identified (Ong-Dean, 2006). Asian students are at lower risk than White students of being in receipt of special education services for a learning disability (OSEP, 2007). Ochoa, Pacheco, and Omark (1988) found that limited English proficient (LEP) students are disproportionately placed in classes for students with learning disabilities. Statistics such as these raise concerns that students are identified with a learning disability according to characteristics unrelated to their cognitive processes.

Disproportionate identification with a learning disability is perceived to be one of the central problems within special education for several reasons: (a) Students may be referred to special education in response to issues other than a learning disability, (b) the identification process may be inconsistent and/or inaccurate, and (c) the disproportionately underidentified may not receive needed services. In recognition of issues such as these, the 1997 reauthorization of the Individuals With Disabilities Education Act (IDEA) mandated that diagnoses of learning disability not be associated with "cultural factors," "environmental or economic disadvantage," or being of "limited English proficiency" and also required the disaggregation of special education data by race/ethnicity (Education Resources Information Center, Office of Special Education Programs, 2000; OSEP, 2007). Appropriate reformation of policy and practice relies on identifying the student characteristics associated with disproportional identification as well as the mechanisms whereby disproportionate identification occurs.

Roots of Disproportionality

The ever-evolving and, one might argue, subjective definitions of and criteria for learning disabilities may contribute to the disproportional identification of various sociodemographic status groups. The literature provides a reasonable consensus that being learning disabled describes a student who has trouble learning, relative to his or her intelligence, but not as a result of some other condition or context; beyond this, though, a wide range of definitions and criteria describe learning disabilities more specifically than the federal category of "specific learning disability" (Algozzine & Ysseldyke, 1986; Daniels, 1998; Fletcher, Denton, & Francis, 2005; Levine & Nourse, 1998). For example, the Learning Disabilities

Association of America (LDA) differentiates among four types of learning disabilities (Input, Integration, Memory, and Output; LDA, 2009), whereas the fourth edition, text revision, of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR)* published by the American Psychiatric Association (2000) describes six different types of learning disabilities: Reading Disorder (Dyslexia), Mathematics Disorder, Disorder of Written Expression, Expressive Language Disorder, Mixed Receptive-Expressive Language Disorder, and Phonological Disorder. With overlapping symptoms and manifestations as well as inconsistent criteria, cultural, linguistic, and/or gender differences may be misinterpreted as symptoms of a learning disability.

Disproportionality is also attributed to variation in, and even inaccurate, methods of referral, assessment, and diagnosis. Before the introduction of response to intervention (RTI) in 2004 (our data precede this), three basic models were employed to diagnose learning disabilities: the ability-achievement discrepancy, low-achievement, and intraindividual discrepancy models. The classic model of diagnosis, the ability-achievement discrepancy model, aligns with the archetypal notion of learning disabilities. Once a student is identified as exhibiting low achievement, without a discernible outside factor (behavior, family background, etc.), a "specific degree of difference between intellectual ability and performance" must be documented to classify that student with a learning disability (LDA, 2009). This model came under criticism when it was suggested that the group of students identified with a learning disability by the discrepancy model was not distinct from those designated as simply low achieving (Fletcher et al., 2005; Shinn, 2007); others, though, maintain that the two groups of students are distinct (Fuchs et al., 1997; Kavale, Fuchs, & Scruggs, 1994).

The low-achievement model, in which any student unexpectedly performing below a certain threshold can be identified with a learning disability, has been widely criticized for its tendency to overidentify; it is also criticized for (a) not identifying whether a child's low achievement is commensurate with his or her ability and (b) not facilitating the identification of high-ability students with learning difficulties and average achievement (Fletcher et al., 2005; Giovingo et al., 2005; Meyen, 1989). The third model, the intraindividual discrepancy model, compares specific cognitive measures of individual students; an uneven profile (strengths in some areas and weakness in others) suggests a learning disability, whereas a flat profile is an indicator of "expected underachievement." This final model is also criticized for overidentifying students (Fletcher et al., 2005; Giovingo et al., 2005). Although inconsistent diagnosis methods are undesirable in general, current referral and diagnosis methods may capture various cultural and/or status characteristics rather than the sorts of learning difficulties they are intended to measure.

The Case of Racial/Ethnic Minorities

Many researchers are concerned that disproportionate identification of racial/ethnic minorities with learning disabilities is part of the long history of racism and stratification within education (Patton, 1998; Skiba et al., 2008). Some attribute disproportionality to blatant educator racism (Anderson, 1997; Skiba et al., 2008). An institutional perspective portrays disproportionality as the rejection of minority cultures by the dominant culture (Patton, 1998) or the use of the disability label as an instrument of disadvantage (Reid & Knight, 2006). However, little empirical research exists to substantiate such claims. For example, Reid and Knight (2006) describe disproportionality as a result of the "historical legacies of racism, classism, sexism, and ableism" (p. 21), which contradicts the fact that males, rather than females, are disproportionately identified with learning disabilities.

Alternatively, it is possible that disproportionate identification by race/ethnicity results from current methods of assessment. The lower average achievement levels of racial/ethnic minorities may leave them more vulnerable to identification with a learning disability, particularly within the low-achievement model of diagnosis (Meyen, 1989). In addition to criticisms that IQ tests are culturally biased (Skiba et al., 2008), identification with the discrepancy model has been shown to vary depending on the type of IQ and/or achievement assessments used as well as the methodology for determining the discrepancy (Clampitt & Silver, 1990; McLeskey, Waldron, & Wornhoff, 1990). McLeskey et al. (1990) demonstrated that using a regression-based versus a standard-score-based procedure actually resulted in proportionate identification of learning disability among a sample of African American and White students. The variability in diagnostic models across schools may underlie disproportionate identification of racial/ethnic minorities, who are more likely to attend high-poverty schools (Skiba et al., 2008). Thus, cultural differences and lower average achievement levels may leave racial/ethnic minorities at greater risk of identification through current diagnostic methods, or disproportionate identification may result from systematic differences in the methods of identification experienced by racial/ethnic minorities.

Although previous research in the field of special education has tended to emphasize the potential that racism underlies the overidentification of racial/ethnic minorities, it is possible that these are valid diagnoses resulting from the greater likelihood of racial/ethnic minorities to have low SES (Blair & Scott, 2002; Daniels, 1998; MacMillan & Reschly, 1998; O'Connor & Fernandez, 2006; Skiba et al., 2008). A multidisciplinary report released in 2000 by the National Research Council and Institute of Medicine of the National Academies concludes that early experiences influence brain development, that culture influences early development

through child-rearing beliefs and practices, and that the brain can actually be harmed by poor nutrition, health, or chronic stress (Shonkoff & Phillips, 2000). Similarly, *DSM-IV-TR* (American Psychiatric Association, 2000) explicitly links cognitive disorders and environmental factors, associating Mixed Receptive-Expressive Language Disorder with Environmental Deprivation in one example. Although some studies have made the theoretical connection between race and SES, a major contribution of this study to the disproportionality literature is the *analytic* consideration of race and SES in conjunction.

The Case of Language Minorities

Language minorities may be at risk of disproportional identification because of the complications presented by distinguishing between limited English proficiency and a learning disability. In a review of 21 "English language learners" identified with a learning disability by their school, it was determined that 10 seemed to be experiencing learning difficulties for reasons other than disability (Wilkinson, Ortiz, Robertson, & Kushner, 2006). Likewise, Artiles, Rueda, Salazar, and Higuera (2005) found that students with limited proficiency in both their first language and English had the highest rates of overrepresentation among Hispanics in classes for students with learning disabilities across the grade levels. It is difficult to gauge rates and levels of "normal second language acquisition," and a lack of English proficiency is sometimes interpreted as limited intelligence or a disability (Klingner, Artiles, & Barletta, 2006; Klingner & Harry, 2006). Language minorities are also affected by the lack of proper assessment in their native language (Artiles et al., 2005; Klingner & Harry, 2006). The correlation between limited English proficiency and relatively low levels of academic achievement further complicates the appropriate identification of language minority students with learning disabilities.

Samson and Lesaux (2009) used the nationally representative Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 data set to determine that language minority students are identified later and in higher proportions than their native-English-speaking peers, being underrepresented in special education in kindergarten and first grade but overrepresented by the third grade. This study suggests that the risk of identification with a learning disability may vary depending on when the student started attending school in the United States and official recognition as a language minority. Nonnative English speakers who are not recognized by the school or their teacher as being limited in English proficiency or those who appear to have achieved fluency in English (social proficiency) but still struggle with academic proficiency may be most at risk of being misdiagnosed with a learning disability.

The Case of Males

Although dramatic disproportionality in identification by gender exists, it receives relatively little academic attention. The paucity of research interest in gender disparities may be in part because of evidence that biological differences may make boys more prone to learning disabilities or girls better equipped to compensate for them (Anderson, 1997). Although the gender gap narrowed from 1976 to 2000-2001, evidence of state and regional variation in male disproportionality remains; males are from 1.7 to 2.7 times more likely to be identified than females depending on the state, and the gender gap is slightly greater in the South (Coutinho & Oswald, 2005). Although the gender gap in identification and variation across states was greater for serious emotional disturbance than for learning disabilities (Coutinho & Oswald, 2005), this regional disparity suggests that there are nonbiological factors that contribute to the disproportional identification of males with learning disabilities. Anderson (1997) theorizes that, historically, male overrepresentation has resulted in definitions of learning disability that are based on male norms, such that the “good” behavior of girls leads to their underidentification. Meyen (1989) notes that the low-achievement model likely contributes to the overrepresentation of males, as males tend to achieve at relatively lower levels than females. Although the measures available to us do not allow us to determine if genetic differences contribute to the disproportional identification of males, it is clear that it is important to consider the role of gender in our analysis.

In this study, we employ multivariate, multilevel modeling with national data to simultaneously consider the influence of several characteristics of a student on being identified with a learning disability. Incorporating a range of sociodemographic measures, we examine (a) what patterns of identification emerge among a large sample of U.S. high school students and (b) to what extent these patterns are explained by SES and/or other background characteristics.

Data and Method

The ELS is a nationally representative data set of approximately 16,000 students in 750 schools. We employ student-level measures from the base year wave of student, administrator, and parent surveys; the students were in the 10th grade during the base year (2002). As evident by the dearth of studies that use large data sets to study learning disabilities, it is difficult to find data with both measures of disability and sociodemographic characteristics (Ong-Dean, 2006). In contrast to ELS, the federal data sets that specifically focus on special education do not include peers who are not identified with a learning disability as a base of comparison.

Dependent Variable

We utilize the variable indicating whether the student is identified with a learning disability by their school in the 10th grade (see Note 1). An individualized education program (IEP) is enacted when students are identified as eligible for special education services, and the school’s designation indicates specifically whether the student has an IEP for a specific learning disability. Although a range of learning disabilities exists, all are encompassed within one of the 13 federal categories under which a student is qualified as eligible for special education services: “specific learning disability.”

For reasons that are unclear, schools did not report on the IEP status of 7,314 of the students in the sample. With the knowledge that students in ELS are clustered within schools, we were able to determine that 351 of the schools indicated the IEP status of all of the students sampled from their school, 196 schools reported on some of the students sampled, and 204 schools reported on none of the students sampled. By comparing school-level distributions, we found that, despite differences in reporting, there were comparable percentages of students identified as having an IEP and identified with a learning disability in the two sets of schools that reported on (a) *all* of their students and (b) *some* of their students. Concluding that the schools that reported on some of their students had for the most part simply reported only when students did have an IEP, we were able to impute that the school had not identified the student with a learning disability for the 1,788 students who did not have an IEP report at those schools. After excluding the 4,213 students attending schools that did not report the IEP status of any of their students, we achieve an analytic sample of 10,847 students within 546 high schools. Although the proportions of schools that are high-minority and high-poverty within the analytic sample and the sample of excluded schools are similar, we cannot claim with confidence that our analytic sample is nationally representative.

Independent Variables

To locate patterns of disproportional identification of learning disability, our primary independent variables include the conventional predictors of disproportionality: gender, race/ethnicity, language status, and SES. In addition to considering these predictors simultaneously, we include clusters of variables that express more specific aspects of SES, academic history, and language-immigration history in an attempt to either explain existing associations or detect other related factors that predict identification. Because the actual learning disability diagnosis may have occurred before the 10th grade, we were careful to select time-invariant or retrospective measures that were not likely to be a result of having been identified with a learning disability. Weighted descriptive statistics

for all student-level variables are presented in Table 1 at the beginning of the results section. Mean and mode imputation was used to account for missing values on all independent variables except for race and gender; imputation flags were included in all multivariate models.

Basic measures of and covariates of SES. Two distinct basic measures of SES—highest parental education level and family income—were used rather than a composite measure because each component may contribute differentially to identification with a learning disability. Students with parents who completed high school or less and students with parents who have a BA, MA, or PhD are compared to students whose parents completed some college. Family income is measured with a scale that ranges from 1 to 13 (*none to \$200,001 or more*). To enrich our exploration of the association between SES and identification with a learning disability, we also include various available correlates of SES: family structure, number of siblings, cognitive family resources, material family resources, and the student's early academic history. The cognitive family resources indicator is an index, ranging from 0 to 5, summing the presence of the following items in the student's home: daily newspaper, magazine, computer, Internet access, and 50 books or more. The material family resources indicator is an index, ranging from 0 to 5, summing the presence of these items in the student's home: DVD player, electric dishwasher, clothes dryer, fax machine, and student's own room. The student's early academic history is described by two dichotomous variables indicating whether the student participated in preschool or Head Start, experiences that are associated with SES.

Academic history. Because of a potential correlation between grade retention and identification with a learning disability and the greater likelihood of low SES students to be held back, we include four dummies indicating whether the student repeated one or more grades during early elementary (K–2), late elementary (3–5), or middle or high school (6–10). A control for age is also included. We are intentionally parsimonious in our inclusion of measures of academic experiences and outcomes because these may be the *result* rather than the *cause* of identification with a learning disability.

Language-immigration history. Because a student report of being a nonnative English speaker does not capture the great variation in English proficiency among students and across their years of schooling, we attempt to expand on this measure with an assortment of other language status and immigration history indicators. First, we include a scale that summarizes the student's report of 10th grade English proficiency to attempt to capture the progression of language proficiency over the life course. This scale ranges from 0 (*most English proficient*) to 12 (*least English proficient*) and was coded to 0 for native English speakers. The scale is the sum of nonnative English speaker's responses to the following four questions on how well (0 = *very well*, 1 = *well*, 2 = *not well*, and

3 = *not at all*) they do the following: “understand spoken English,” “speak English,” “read English,” and “write English.” In addition, we include a dummy variable indicating whether the student reported having ever been in an English as a Second Language (ESL) program; because more recent immigrants were more likely to report having been in ESL than students who started school in the United States during the elementary years, we suspect the presence of some measurement error particularly for students who may have forgotten or been unaware that they participated in ESL during their early schooling.

To complete the language history, we include an additional dummy variable indicating whether the parent who completed the parent survey is a nonnative English speaker. This variable may capture students who reported being a native English speaker but grew up in a non-English-speaking household. Parent language skills may also tap different mechanisms than student language skills because parents with less English proficiency may have more difficulty acting as an advocate for their child within the school system. Last, to capture the most relevant aspect of the immigration experience insofar as identification with a learning disability, we include three dummies to compare students who started school in the United States between Grades 1–2, 3–5, or 6–10 to students who started in kindergarten or were not immigrants at all. Although these measures are not holistic expressions of the early academic experiences of language minorities, they do allow us to consider important aspects of the intersection between being a language minority and being identified with a learning disability.

Analytic Plan

In an attempt to replicate much of the previous research on disproportionality, we begin with a bivariate analysis of patterns in identification with a learning disability by race/ethnicity, language status, and gender (bivariate analyses consider only one characteristic of the student at a time). Next, we conduct multivariate analyses that simultaneously consider multiple characteristics of the student. In addition to providing a contrast to the results from the bivariate analysis, the results from the multivariate analyses illuminate which characteristics are still predictive of identification once we account for other characteristics of the student. Our multivariate analyses consist of a series of nested hierarchical logistic regression models (conducted with HLM6 software) predicting identification with a learning disability in the 10th grade; hierarchical models account for students being clustered in schools. All independent variables are centered around the grand mean, and models are weighted with a student-level weight. Laplace estimates are reported because these estimates are more robust and accurate for logistic regression modeling within HLM (Raudenbush, Yang, &

Table 1. Weighted Descriptive Statistics by Identification with a Learning Disability

	Mean or Proportion			Mean or Proportion	
	Not LD	LD		Not LD	LD
<u>Race/ethnicity and gender</u>			<u>Covariates of SES, cont.</u>		
Male	0.50	0.66	Material resources in household	4.27 (1.26)	4.24 (1.43)
Race			Participated in Head Start	0.13	0.20
White	0.64	0.60	Participated in preschool	0.68	0.67
Black	0.13	0.14	<u>Academic History</u>		
Hispanic	0.15	0.17	Age	15.88	16.14
Asian	0.03	0.02	Repeated 1 or more grades between:		
American Indian or Alaska Native	0.01	0.01	K and 2nd grade	0.05	0.21
Other race ^a	0.04	0.06	3rd and 5th grade	0.01	0.05
<u>Basic measures of SES</u>			6th and 8th grade	0.01	0.03
Highest parental education level:			9th and 10th grade	0.02	0.02
High school degree or less	0.26	0.35	<u>Language-immigration history</u>		
Some college	0.38	0.39	Student nonnative English speaker	0.12	0.15
Bachelor's degree or higher	0.36	0.26	Lack of current English proficiency	0.17	0.30
Family income	9.04 (2.31)	8.30 (2.59)	Ever been in an ESL program	0.07	0.12
<u>Covariates of SES</u>			Parent nonnative English speaker	0.10	0.07
Bio mother and bio father in household	0.58	0.48	Started U.S. school:		
Siblings	2.04	2.31	In kindergarten		
Cognitive resources in household	4.08 (1.21)	4.02 (1.39)	Between 1st and 3rd grades	0.96	0.98
			Between 4th and 6th grades	0.01	0.01
			Between 7th and 10th grades	0.01	0.00
				0.02	0.00
N (students)				10,260	580

Note: Standard deviations are in parentheses. SES = socioeconomic status; ESL = English as a Second Language.

^a"More than one race" or "Native Hawaiian/Pacific Islander."

Yosef, 2000). Our first model reestimates gender and racial/ethnic differences in identification. We then proceed into a series of nested models with the addition of basic measures of SES in Model 2, covariates of SES in Model 3, measures of academic history in Model 4, and, finally, indicators of language status and immigration history in Models 5 and 6. These models will illuminate the characteristics of students that drive disproportionality.

Results

We begin with a summary of the bivariate descriptions of the conventional markers of disproportionality to benchmark with previous research. We then contrast these results to findings from a multivariate analysis to emphasize the importance of employing multivariate modeling to account for systematic variation in background characteristics. The results section concludes with a more expansive exploration of the individual- and school-level sociodemographic characteristics that are

significantly associated with identification with a learning disability.

Conventional Markers of Disproportionality: Bivariate Analysis

The descriptive statistics in Table 1 replicate the sort of bivariate analysis commonly used to examine disproportionality (Anderson, 1997; Artiles et al., 2005; OSEP, 2007). Of our analytic sample, 6% are identified with a learning disability as indicated by an IEP, which corresponds with findings from federal reports (OSEP, 2007). Males are disproportionately identified, representing 50% of our analytic sample but 66% of those identified with a learning disability. Similarly, nonnative English speakers compose 12% of the analytic sample but 15% of those identified with a learning disability. Last, according to our bivariate analyses, African Americans, Hispanics, and students of an "other race" are also disproportionately identified with learning disabilities. Our findings

are similar to past research on disproportionality when we employ bivariate analyses.

Conventional Markers of Disproportionality: Multivariate Analyses

Racial/ethnic minorities. Table 2 presents odds ratios from hierarchical logistic regression models predicting having an IEP for a learning disability in the 10th grade. In Model 1, we use only gender and race/ethnicity to predict being identified. Consistent with the bivariate analysis and general perceptions, the odds of identification with a learning disability are 1.43 times greater for African Americans and 1.49 times greater for Hispanics compared to Whites (the reference category), controlling for gender (Model 1). The odds are also 1.56 times greater for Native Americans and 1.42 times greater for students of any other race (Model 1); the former effect is not significant and the latter is only marginally so, but this may be because of the smaller numbers of these students in our analytic sample ($n = 99$ and $n = 511$, respectively). In contrast, the odds of identification for an Asian student are 49% [$100(\text{Exp}(B) - 1)\%$] lower than those of a White student of the same gender (Model 1).

Strikingly, all of the significant race/ethnicity effects are explained once we account for the systematic differences in SES between these groups by including controls for highest parental education level and family income (Model 2). The one exception is that the odds of being identified for an Asian student are 54% lower than for a White of comparable SES. In fact, once we account for other covariates of SES and academic and language-immigration history, the odds of identification for a African American student are significantly lower (28%) than a White student of comparable background (Model 5). Taking account of all systematic differences in background characteristics, there are no significant race differences in the odds of identification except for Asian students' lower odds (Model 6). Overall, although the bivariate results suggested that race was a key predictor of disproportionality in the identification of learning disabilities, the multivariate analyses illuminate that disproportionate identification is actually being driven by differences in SES, a correlate of race in the United States. In addition to making evident the importance of accounting for systematic differences between sociodemographic status groups by employing multivariate analyses, this distinction between race and SES is also very important for both policy implications and future research.

Language minorities. Language status and immigration history are also important considerations for understanding the associations among identification, race/ethnicity, and SES. Counter to the bivariate results, being a nonnative English speaker is not significantly associated with increased odds of identification with a learning disability once

sociodemographic characteristics are considered (Model 5). In contrast, the odds of identification for a student who reported having ever participated in ESL are 1.55 times higher than for a student who reported otherwise, net of all other controls (Model 5). It is unclear why ESL placement should be associated with identification with a learning disability. It is important to note that we cannot assume temporal order insofar as placement in ESL versus placement in special education. Assuming students placed in ESL struggled with English proficiency at some point in their school career and that exit from ESL is not always an indication of English proficiency (Callahan, 2005), it is probable that their linguistic struggles may have been mistaken at some point by educators as a learning disability. Alternatively, ESL placement may limit learning opportunities for the student (Callahan, Wilkinson, & Muller, 2010; Callahan, Wilkinson, Muller, & Frisco, 2009), resulting in lower achievement that is later interpreted as a learning disability. It is also possible that placement in ESL brought the student to the attention of educators in the school, thus increasing the odds of dual identification. And finally, schools with a stronger infrastructure may have well-developed ESL and special education programs that, intentionally or not, feed into one another. Last, the odds of identification for a student whose parent's native language is not English is 57% lower than counterparts, net of all controls (Model 5).

In contrast to students who started in U.S. schools by kindergarten, the odds of identification are 96% less for students who started in U.S. schools between Grades 6 and 10, net of all controls. This again suggests a tension between being identified as LEP and the student's learning difficulties being attributed to a learning disability. A lack of English proficiency may be more evident to educators for a recent immigrant than for a language minority student born in the United States or one who immigrated at a young age. In addition, students who entered the U.S. school system at a later age have simply not experienced the same degree of exposure to risk of identification with a learning disability. In Model 6, having been in ESL remains a significant positive predictor and having a nonnative-English-speaking parent remains a significant negative predictor of identification. In addition, once we account for the recent immigrant's lesser likelihood of identification, lack of current English proficiency becomes a significant predictor, increasing the odds of identification by 11% for every one-unit increase on the scale of limited proficiency. Overall, net of all controls, significant positive predictors of identification include having ever been in ESL or currently lacking in English proficiency, whereas having a parent who is not a native English speaker or having started in U.S. schools any time after the early elementary grades persist as significant negative predictors.

Table 2. Odds Ratios From Hierarchical Logistic Regression Models Predicting Having Been Identified with a Learning Disability

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	Exp(B)	SE	Exp(B)	SE	Exp(B)	SE	Exp(B)	SE	Exp(B)	SE	Exp(B)	SE
<u>Race/ethnicity and gender</u>												
Male	2.14	(0.09)****										
Race												
White (ref)	—		—		—		—		—		—	
Black	1.43	(0.13)***	1.12	(0.13)	0.77	(0.14)*	0.75	(0.15)*	0.72	(0.16)**	0.73	(0.16)*
Hispanic	1.49	(0.14)***	1.15	(0.14)	0.91	(0.14)	0.94	(0.15)	1.13	(0.16)	1.12	(0.17)
Asian	0.51	(0.22)***	0.46	(0.22)***	0.39	(0.22)***	0.42	(0.23)***	0.47	(0.26)***	0.45	(0.27)***
American Indian or Alaska Native	1.56	(0.40)	1.27	(0.39)	0.99	(0.39)	1.03	(0.44)	1.03	(0.45)	1.00	(0.46)
Other race ^a	1.42	(0.19)*	1.30	(0.19)	1.15	(0.20)	1.17	(0.21)	1.20	(0.21)	1.20	(0.21)
<u>Basic measures of SES</u>												
Family income			0.89	(0.02)***	0.92	(0.02)***	0.94	(0.02)***	0.94	(0.02)***	0.93	(0.02)***
Highest parental education level												
High school degree or less			1.17	(0.10)	1.10	(0.11)	1.05	(0.11)	1.06	(0.11)	1.05	(0.11)
Some college (ref)			—		—		—		—		—	
Bachelor's degree or higher			0.76	(0.12)**	0.82	(0.12)*	0.84	(0.12)	0.86	(0.13)	0.87	(0.13)
<u>Covariates of SES</u>												
Bio mom and bio dad in household					0.91	(0.10)	0.93	(0.10)	0.95	(0.11)	0.95	(0.11)
Siblings					1.09	(0.03)***	1.06	(0.03)*	1.07	(0.03)*	1.06	(0.03)*
Material resources in household					1.02	(0.05)	1.02	(0.05)	1.02	(0.05)	1.02	(0.05)
Cognitive resources in household					0.87	(0.05)***	0.90	(0.05)**	0.89	(0.05)**	0.89	(0.05)**
Participated in Head Start					1.60	(0.13)***	1.58	(0.13)***	1.58	(0.14)***	1.52	(0.14)***
Participated in preschool					1.01	(0.11)	1.07	(0.11)	1.03	(0.11)	1.02	(0.12)
<u>Academic history</u>												
Age					1.24	(0.08)***	1.24	(0.08)***	1.22	(0.08)***	1.23	(0.08)***
Repeated 1 or more grades between:												
K and 2nd grade					4.37	(0.13)***	4.37	(0.13)***	4.16	(0.13)***	4.05	(0.14)***
3rd and 5th grade					2.46	(0.25)***	2.46	(0.25)***	2.55	(0.26)***	2.65	(0.26)***
6th and 10th grade					1.30	(0.24)	1.30	(0.24)	1.30	(0.24)	1.36	(0.25)
<u>Language-immigration history</u>												
Not a native English speaker									1.08	(0.18)	1.09	(0.18)
Lack of current English proficiency									1.06	(0.05)	1.11	(0.05)**
Ever been in an ESL program									1.55	(0.15)***	1.71	(0.15)***
Parent nonnative English speaker									0.43	(0.22)***	0.54	(0.23)***
Started U.S. school:												
In kindergarten (ref)									—		—	
Between 1st and 2nd grades									1.12	(0.48)		
Between 3rd and 5th grades									0.40	(0.70)		
Between 6th and 10th grades									0.04	(1.27)**		
N (students used of 10,847 total)	10,426		10,426		10,426		10,426		10,426		10,426	
N (schools used of 546 total)	546		546		546		546		546		546	
<u>Variance components</u>												
School level (INTRCPT 1)	0.367***		0.380***		0.401***		0.408***		0.394***		0.405***	
SD	0.606		0.616		0.634		0.639		0.628		0.636	

Note: SES = socioeconomic status; ESL = English as a Second Language.

^a“More than one race” or “Native Hawaiian/Pacific Islander.”

* $p < .10$. ** $p < .05$. *** $p < .01$. **** $p < .001$.

Other Sociodemographic Predictors of Identification

We conclude our analysis with an examination of other significant predictors of identification. Net of all controls, the odds of a male student being identified with a learning disability are almost double those of a comparable female (1.85 times greater net of all controls). In contrast to highest parental education level, which is rendered insignificant once measures of covariates of SES and academic history are held constant, family income is consistently negatively associated with identification. Net of all controls, the odds of a student's identification increase by 6% with each additional sibling and decrease by 11% for every one-unit increase in cognitive resources present in the household (Model 6). Grade retention and being older than peers in the 10th grade are significantly associated with increased odds of identification with a learning disability. Likewise, the odds of identification are 52% higher for a student who participated in Head Start than they are for a comparable student who did not, net of all controls. In addition to the support authorized by the Handicapped Children's Early Education Assistance Act of 1968 and the Economic Opportunities Amendments of 1972 for increased Head Start enrollment for young children with disabilities (OSEP, n.d.), the Early Childhood Learning & Knowledge Center (2009), a division of the U.S. Department of Health and Human Services, specifically describes the process for identifying 3-, 4-, and 5-year-olds in Head Start with learning disabilities. The persistent significant associations between identification and these characteristics suggest that identification with a learning disability is not socially neutral but rather related to structural features of the education system and students' academic histories.

Discussion

Overall, the major findings of this study are that (a) the disproportionate identification of African American and Hispanic students with learning disabilities is accounted for by the lower average SES of these racial/ethnic subgroups, (b) identification with a learning disability is associated with a student's sex, sociodemographic (noncognitive) characteristics, and academic history, and (c) aspects of being a language minority appear to play a role in a student's likelihood of identification with a learning disability. The fact that identification with a learning disability is correlated with sociodemographic characteristics suggests that identification of learning problems may reflect social differences rather than learning differences, and the solution to some "biological" issues may lie in addressing social problems, such as socioeconomic inequality or the way that socioeconomic inequality is reproduced in schools. As researchers in psychology and medicine work toward more comprehensive understandings of what constitutes a learning

disability, attempts are being made at the federal, state, district, and school levels to standardize the process of identifying children with disability. The first major finding, regarding the confounding role of SES in the disproportionate identification of racial/ethnic minorities, exemplifies an important subsidiary conclusion of this study: multivariate, multilevel modeling of national data, that includes student-level measures of identification SES, other sociodemographic characteristics, and academic history, is essential. Furthermore, although medical evidence exists to suggest linkages between childhood poverty and difficulties with learning, no research exists indicating that language minorities should have a higher prevalence of learning disabilities. Poor and inappropriate diagnostic procedures and/or discrimination may play a role in the disproportionate identification of certain students.

Although some racial/ethnic minorities may in fact experience learning disability identification because of cultural misunderstanding or direct discrimination, our results suggest that the overrepresentation of African American and Hispanic students is entirely explained by their lower average SES. Previous research confirms that resources in the home during early childhood positively contribute to the development of both cognitive and learning ability (Shonkoff & Phillips, 2000). Negative perceptions of disproportionality are based on an assumption that learning disabilities *should* be proportionately distributed throughout the population, but the fact is that other medical conditions, such as cardiovascular disease (Galobardes, Smith, and Lynch, 2006; Karlamangla et al., 2005), arthritis, and diabetes (Blackwell, Hayward, & Crimmins, 2001), are disproportionately distributed according to sociodemographic characteristics. Furthermore, MacMillan and Reschly (1998) point out that African Americans are disproportionately represented in intervention programs (e.g., Head Start, Chapter 1, Follow Through), just as they are overrepresented in special education programs. Attempts to limit disproportionality may in fact result in the denial of services to students who need them (Hallahan, 1992; MacMillan & Reschly, 1998). Rather than attempting to achieve proportionate diagnoses, future research should consider the reformation of procedures and policy to address the underlying factors and mechanisms that contribute to "disproportionality" (Hallahan, 1992; MacMillan & Reschly, 1998; Rueda & Windmueller, 2006), such as alleviating poverty and providing the resources that build learning ability to children who may not have them at home.

Accordingly, the disjunction between the findings from bivariate and multivariate analyses of disproportionality (that differences in SES underlie the disproportionate identification of racial/ethnic minorities) highlights the necessity of employing sophisticated methods that account for systematic differences between status groups. Bivariate analyses, in contrast to multivariate analyses, depend on the implicit assumption

that the average backgrounds of different groups of people are similar and unrelated to the outcome of interest. Research solely focusing on bivariate analyses inadvertently neglects a myriad of possible explanatory factors and ultimately may result in misguided directions for future research and policy making.

It is important to note, however, that our findings confirm the disproportionate representation of language minorities, at least for those who have ever been in ESL or who report a lack of English proficiency in the 10th grade. Not only do federal regulations specify that neither cultural differences nor limited English proficiency should be associated with identification with a learning disability, but also differences in SES or family background fail to account for the disproportionate representation of these students. With current diagnostic methods, it can be difficult to distinguish between a lack of English language proficiency and a learning disability (Artiles et al., 2005; Klingner & Harry, 2006). The finding that participation in ESL is significantly associated with disproportionate identification, though, suggests the role of specific structural mechanisms within schools as well. It is argued that data from a multitude of sources must be incorporated to more accurately identify language minority students with a learning disability (Rueda & Windmueller, 2006; Wilkinson et al., 2006).

Although the use of a data set such as ELS—large and nationally representative of students receiving both special and regular education—is a strength of this study, some inherent limitations merit discussion. Our results would be bolstered by a more nuanced measure of the type of learning disability. In addition, a large number of schools did not report IEP status for any students. Although our results do suggest the role of sociodemographic factors in learning disability identification, because of data constraints we cannot thoroughly illuminate the mechanisms whereby this may occur. For example, although SES is significantly associated with identification with a learning disability, it is unclear whether this is because of environmental or prenatal factors, both of which affect childhood development (Natriello, McDill, & Pallas, 1990; Shonkoff & Phillips, 2000), or the way that schools treat students depending on their socioeconomic background. It is also important to keep in mind that this study focuses on a subgroup of students identified with learning disabilities because it is likely that there were students in our sample who were identified in elementary school but then exited from special education before the 10th grade; furthermore, the disproportionate identification evident by the 10th grade may in part be a function of certain status groups being more likely to be exited from special education earlier on. Despite these limitations, by utilizing a large national data set and employing sophisticated research methods, our findings present a substantial contribution to research on disproportionality.

An attempt to address variable and inaccurate diagnostic practices occurred with the 2004 reauthorization of IDEA, via a specific “disproportionality amendment” and the incorporation of a new choice of diagnostic model, RTI (Bradley, Danielson, & Doolittle, 2007; Harris-Murri, King, & Rostenberg, 2006; Shinn, 2007). Although both a criticism and a supplement for the three more traditional models—the ability-achievement discrepancy, low-achievement, and intra-individual discrepancy models—a specific intent of RTI is to reduce disproportionality. Bradley et al. (2007) describe the three tiers of RTI as (a) the receipt of research-based instruction by all students, (b) observation of all students for response to instruction, and (c) “individualized and intensive interventions and services” for those students who need it. RTI is thought to better account for “interpersonal and institutional factors” affecting the student and to improve practices on a schoolwide basis (Bradley et al., 2007; Harris-Murri et al., 2006). Despite the issuance of an IDEA regulatory guide in 2006, the process of RTI is still somewhat ambiguous, and its effect has not been thoroughly researched (Bradley et al., 2007). Data from ELS, however, were collected prior to the implementation of RTI; consequently, our findings must be interpreted separately from the RTI approach to identification.

In all, the findings from this study suggest exciting new possibilities and questions for studying special education research and policy. Future research should explore the mechanisms that contribute to disproportionate identification of low SES and male students with the goal of either addressing root causes or improving potential responses. Furthermore, it is important to determine the processes within our education system that contribute to disproportionate identification of some language minorities.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interests with respect to the authorship and/or publication of this article.

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Note

1. "Specific learning disabilities" is also an optional response to a question on the base year parent survey: "In your opinion, which of these disabilities does your tenth grader have?" We use only the school report because there was a lack of consistency between the two measures, and it is not clear whether the parent report is based on a diagnosis by a psychologist nor whether the student has been identified as with disability by the school. There are no other measures of having been identified with a learning disability in the database.

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