Research Article

A Decade of Disproportionality: A State-Level Analysis of African American Students Enrolled in the Primary Disability Category of Speech or Language Impairment

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Purpose: This study aimed to determine if African American students were disproportionately represented between the years of 2004 and 2014 in the primary disability category of Speech or Language Impairment (S/LI) under the 2004 reauthorized Individuals with Disabilities Education Improvement Act.
Method: S/LI enrollment data from the Office of Special Education Programs and general enrollment data from the National Center for Education Statistics were analyzed to compare the risk of primary S/LI category enrollment of African American students to that of all other students. Risk ratios with 99% confidence intervals were calculated for each state across the 10 years studied.
Results: An average of 75% of states disproportionately represented African American students in the S/LI category each year; on average, 62% underrepresented African American students, and 14% overrepresented them. A post

hoc analysis of the relationship between African American student representation and population densities revealed that states with high African American population densities almost exclusively underrepresented African American students and states with low densities tended toward a proportionate representation.
Conclusions: African American students were largely underrepresented in the category of S/LI in the years studied. These findings, alongside historic and chronic overrepresentation in other categories of special education, are discussed in the context of the fragmented harm theory (Payne, 1984; Voulgarides, 2018; Voulgarides, Zwerger, & Noguera, 2013) and the disability rights and critical race theory (Annamma, Connor, & Ferri, 2013).
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Disproportionate representation of African American students in special education has been a consistent concern since the Department of Education's Office for Civil Rights (OCR) first monitored enrollment data in 1968 (U.S. Department of Education, 2016a). This annual monitoring was facilitated by the Individuals with Disabilities Education Improvement Act (IDEA) of 2004, which required states to track and report demographic data related to special education placements and determine

if racial/ethnic disproportionality is present. Concern about racial disproportionality has largely centered on the primary disability classifications of (a) Intellectual Disability (ID), (b) Specific Learning Disability (SLD), and (c) Emotional Disturbance (ED). Only a few researchers have investigated disproportionality in the primary disability category of Speech or Language Impairment (S/LI, not to be confused with specific language impairment, commonly abbreviated as SLI).

Despite consistent evidence of African American over-representation in the primary disability categories of ID, ED, and, to a lesser degree, SLD, several studies have reported proportionate or underrepresentation of African American students in the primary category of S/LI (Chinn & Hughes, 1987; De Valenzuela, Copeland, Qi, & Park, 2006; Heller, Holtzman, & Messick, 1982; Morgan et al., 2015; Skiba, Poloni-Staudinger, Gallini, Simmons, & Feggins-Azziz, 2006). The findings of underrepresentation and proportionate representation of African American students in

S/LI in these studies contrast with the U.S. Department of Education's *38th Annual Report to Congress on the Implementation of the IDEA* (U.S. Department of Education's Office of Special Education Programs [OSEP], 2016a), which indicated that African American students were slightly overrepresented in the category of S/LI.

Purpose

The purpose of this study was to investigate whether African American students were disproportionately represented in S/LI within a 10-year period of government data and to discover potential trends in S/LI representation of African American students in the U.S. public schools found in state-level data. The data analysis covers the 10-year period between 2004 and 2014 and includes the number of students reported to be enrolled by every school district in the United States and those placed in the primary special education classification of S/LI. These numbers were collected each school year by the Department of Education immediately after the most recent iteration of the IDEA (2004).

Importance of Disproportionality Studies Examining S/LI

Disproportionality studies are vital tools for anyone concerned with monitoring equity and integrity in the special education process. Significant racial/ethnic disproportionality serves as a kind of "canary [in] the coal mine" (p. 29) of the larger educational system, warning educators and policymakers of imbalances that need to be addressed to ensure fair and least restricted access to education (Waitoller, Artiles, & Cheney, 2010). The fragmented harm theory (Payne, 1984; Voulgarides, 2018; Voulgarides, Zwerger, & Noguera, 2013) suggests that the sources of disproportionality are multifaceted and situated within the educational system itself. They exist from the coalescence of numerous relatively unintentionally harmful choices made by individuals within the system. Because they are unintentionally harmful, the individuals within the system do not recognize their role in perpetuating the harm, thus making it more important that the signs of disproportionality be monitored and analyzed by an entity outside the local and state schools to ensure accurate identification and least restrictive educational environment for all children in special education placements.

Disproportionality studies in the IDEA category of S/LI may serve as practical indicators of how well speech-language pathologists (SLPs) and other certified professionals are overriding implicit and explicit biases. With the understanding that placement of a child in special education is often an interprofessional collaboration, studies examining disproportionality in S/LI may help in the understanding of how disproportionality in other categories compare and interact with one another.

Disproportionality Terminology and Its Implications
Possible Disproportionality Outcomes

Disproportionality outcomes are broadly (a) overrepresentation or (b) underrepresentation. The null hypothesis is proportionate representation.

Proportionate representation means that individuals of one race/ethnicity are represented in a category at the same rate as other students. For example, if 4% of non–African American students are primarily enrolled in S/LI, then proportionate representation (i.e., the null hypothesis) would indicate that 4% of African American students are also enrolled in S/LI.

Overrepresentation occurs when a specific population is represented in a category at a higher rate compared to other populations. This condition is of special interest to the OCR because it implies that this population is experiencing (a) increased social risk factors (Morgan et al., 2015), (b) lack of access to preventative programs or educational opportunities (Voulgarides et al., 2013), and/or (c) excessive false-positive diagnoses, that is, more students are being identified for a special education category than should be (Munk, O'Hara, & Sulzberger, 2017) due to a host of other racial inequities embedded within the system of education (Voulgarides et al., 2013).

Underrepresentation occurs when people of a specific race/ethnicity are represented in a category at a lower rate, compared to students of all other races/ethnicities. In terms of special education, this determination indicates that some students have not been placed in a disability category as frequently as other students. This also may be due to numerous factors within the educational system, as mentioned in the fragmented harm theory (Voulgarides et al., 2013).

Relative Stigma in Special Education

In the scope of the special education system, some students may be placed in a category due to professionals being influenced by their assumptions about the students' race/ethnicity or dialect instead of, or in addition to, a disability. There is arguably significant overlap in the behavioral and academic profiles of S/LI, ID, SLD, and ED, yet the social and academic stigma of getting placed in the category of ID, SLD, or ED may be quite different from that of being placed in S/LI (Robinson, Hunt, Silva, & Harris, 2016). The stigmatizing of disabilities is called *ableism* (Hehir, 2005). Being in special education may be stigmatizing for students. However, being placed in the category of ID may be more stigmatizing than being placed in S/LI (Robinson et al., 2016).

According to the disability rights and critical race (DisCrit) theory (Annamma et al., 2013), ableism and racism are often interdependent constructs. In essence, race may be viewed as a kind of disability and afforded a stigma similar to that of a disability in society. Saaticioglu and Skrtic (2012) suggested that stigmatizing categories often overrepresent historically oppressed racial/ethnic groups. Historically, African Americans in the United States are

overrepresented in many stigmatizing categories within society, such as those of poverty, low-paying jobs, prisons, expulsions from school, and placement in special education categories (Braddock & McPartland, 1989; Clark, Anderson, Clark, & Williams, 1999; Darensbourg, Perez, & Blake, 2010; Major & O'Brien, 2005; Quillian, 2012). One might suspect that, within the spectrum of categories across special education, there exist variations in stigma (Robinson et al., 2016). Following this logic, an African American student with a language impairment might not be placed under the primary disability category of S/LI but rather in a more stigmatizing category, such as ID.

Primary Versus Secondary Disability

The data published annually by the U.S. Department of Education only reflects primary disability categories (U.S. Department of Education, 2016b). For example, a student may have autism and a language disorder. That child might be given the primary category of autism and a secondary category of S/LI, yet the student would only be included in the data associated with autism, not in the S/LI data. Furthermore, numerous factors may go into the assigning of primary versus secondary categories that have little to do with etiology. For instance, some parents may actively advocate for their child to be primarily classified in a category they view as less stigmatizing (e.g., being placed in the primary category of S/LI rather than in the primary category of autism due to the perception that S/LI is less stigmatizing than autism).

S/LI as an IDEA Disability Category

The fact that the S/LI category encompasses a variety of disorders, including speech, fluency, voice, and language impairments, also precludes viewing enrollment in S/LI as the prevalence of general S/LIs in any given group of people, because various types of disabilities are grouped together in one category. In fact, enrollment data concerning any IDEA category, including S/LI, should not be used to draw conclusions about the prevalence of a disorder/disease within any population due to the unique way in which students are assigned to one of 13 categories under IDEA concerning how their specific condition is affecting their educational performance.

Previous Studies Investigating Racial/Ethnic Disproportionality in Special Education

Numerous studies investigating disproportionality of African American students in special education have been conducted. Below is a summary of disproportionality studies that are considered key research in special education and/or that included the category of S/LI in their analyses.

Early Studies Investigating Racial Ethnic Disproportionality

In 1978, the Office of Civil Rights conducted a survey of 6,040 school districts, involving 54,082 schools. This sample represented one third of the school districts in the United States. The survey asked questions concerning students enrolled in the various special education categories, which at that time were called as follows: Educable Mental Retardation (EMR), Trainable Mental Retardation (TMR), Severe ED (SED), SLD, and Speech Impairment (SI). They compared proportions of minority students versus White students in the five different categories. Heller et al. (1982) and Finn (1982) further analyzed the data. Minority students were overrepresented in the categories of EMR, TMR, and SED. They were proportionately represented in the category of SLD, whereas there was slight underrepresentation of African American students in the category of SI.

Based on 1978 OCR data, Finn (1982) examined patterns in African American versus White placement in the category of EMR and other special education placements. He found correlations between demographic data and placement, including the variables of (a) region of the United States, (b) African American versus White enrollment proportions, (c) size of special education programs, (d) size of district, and (e) socioeconomic status of students. This study revealed higher percentages of poor White students in EMR than that of upper class White students, but African American student percentages were still higher than those associated with White students when socioeconomic status was accounted for. That is, the variable of socioeconomic status had more impact on White students than on African American students. Upper class African American students were still overrepresented in EMR and other stigmatizing categories compared to upper class White students. Finn also demonstrated that, in regions or districts where minority EMR placements were exceptionally lower than national rates, they were sometimes substantially higher in other categories, such as SLD. Furthermore, Finn found a pattern of ID representation among African American students according to school district size and density of African American student population in that school district. District-level analysis demonstrated that minority (i.e., non-White students) disproportionality increased in any school district as their enrollment increased up to 50%.

Chinn and Hughes (1987) analyzed four OCR surveys between 1980 and 1986. They found continued overrepresentation of African American students in the categories of EMR, TMR, and SED. In the category of SI, they found underrepresentation of African American students and a slight overrepresentation of White students. That is to say, White students were much less likely to be classified under EMR, TMR, or SED than African American students and slightly more likely to be classified under SI.

In 2002, Losen and Orfield edited a book called *Racial Inequity in Special Education* in which they offered a comprehensive analysis of disproportionality using data from the Office of Civil Rights for the 1994–1995 school year. The authors primarily examined data related to mental retardation (i.e., ID), SED, and SLD. Although Losen and Orfield did not specifically examine the category of S/LI, their work showed significant overrepresentation of African American students across all special education categories studied.

Recent Studies Investigating Racial Ethnic Disproportionality

De Valenzuela et al. (2006) investigated disproportionality in a large school district in the southwestern United States. They found African American students to be overrepresented in the categories of SLD and ED and proportionately represented under the category of S/LI. The vast majority of students, regardless of race/ethnicity, were only assigned one special education category; however, African American students were labeled with significantly more categories than White students. White students, on the other hand, were overrepresented in the primary category of S/LI.

Skiba et al. (2006) examined disproportionality of African American students compared to all other students in all public schools in Indiana. They found African American students to be placed in the ED category at the rate of 3.26 times that of non–African American students and placed in the "mild mental retardation" category at 3.29 times the rate of other students. Similar to Chinn and Hughes (1987), Skiba et al. (2006) found underrepresentation of African American students in the S/LI category.

Sullivan and Bal (2013) investigated disproportionality in an urban school district in the midwestern United States. Their analysis examined the role that different factors played in special education enrollment. Race/ethnicity was the primary factor that contributed to overrepresentation in special education, followed by gender and socioeconomic status. They found that one quarter of African American students were enrolled in special education and one of three African American boys were placed in special education. African Americans were 2.8 times more likely to be enrolled under the categories of SLD and ED and 2.5 times more likely to be enrolled under the category of ID compared to other students. They were also overrepresented in the categories of S/LI and Otherwise Health-Impaired. Interestingly, in this study, African American students were found to be underrepresented in the low-incidence categories that are typically more objectively diagnosed (e.g., Hearing Impairment, Visual Impairment, Orthopedic Impairment).

Morgan et al. (2015) conducted a study in which they concluded that minority students are underrepresented across the categories of SLD, S/LI, ID, and Otherwise Health-Impaired. Their analysis included data from the Early Childhood Longitudinal Study Kindergarten Class of 1998–1999 (Tourangeau, Nord, Lê, Sorongon, & Najarian, 2009), a longitudinal study involving racially diverse schools using student assessments and parental interviews. They weighted their results by risk factors, such as low birth weight and poverty. A total of 8,809 parents participated in the interviews. According to their analysis, when risk factors were taken into account, school-aged African American students were underrepresented in the categories of SLD, S/LI, ID, and Otherwise Health-Impaired. Expressed in other terms, African American student overrepresentation in populations at risk outweighed overrepresentation of African Americans in special education. Their somewhat controversial conclusion was that more African American students should be categorized within special education, not less.

Skiba, Artiles, Kozleski, Losen, and Harry (2016) criticized the conclusions drawn by Morgan et al. (2015). The Morgan et al. study involved a population sample. Most special education disproportionality studies analyze real population counts, because those data sets either are publically available or can be obtained from the local education agencies. Skiba et al. claimed that the Early Childhood Longitudinal Study Kindergarten Class of 1998–1999 sample did not mirror the actual population counts presented in federal special education enrollment data sets, thus claiming that the sample was not representative of the national data. They also claimed that the authors' conclusions were too far reaching. Just because a population has a higher prevalence of risk factors does not mean that the null hypothesis should be altered to suggest that they should have a higher enrollment in special education. Skiba et al. were quick to point out that disproportionality studies including socioeconomic variables using a sample of the population often have different findings from those that include socioeconomic factors using actual population counts. That is to say that, when actual population counts are included, socioeconomic factors have no effect on special education disproportionality rates.

Every year, the U.S. Department of Education presents to Congress a summary of how IDEA is working. It is typical that disproportionality in race/ethnicity and disability classification is included in the presentation. The *38th Annual Report to Congress on the Implementation of the IDEA* (U.S. Department of Education's OSEP, 2016a) compared the numbers of students enrolled in the various IDEA categories to the number of school-aged children reflected in the census data. They found that African American students were overrepresented in S/LI, ID, SLD, and ED, among other categories. Although the overrepresentation of African Americans in the S/LI category was slight (risk ratio [RR] = 1.02), it was significant. It should be mentioned, however, that other studies in disproportionality generally compare the numbers of children served under IDEA with the enrollment numbers, not the census data. The reason for this is that IDEA generally serves those students enrolled in public schools. Using the census data as a comparison may be inaccurate, due to the overrepresentation of White children enrolled in private schools and corresponding overrepresentation of African American students in public schools (Southern Education Foundation, 2016; Yun & Reardon, 2005).

Summary of Previous Studies

In summary, most disproportionality studies in the United States have found African American students to be at a higher risk for placement in ID and sometimes ED and SLD compared to other students. However, U.S. studies that have included the S/LI category have demonstrated inconsistent conclusions about representation, including (a) underrepresentation (Chinn & Hughes, 1987; Heller et al.,

1982; Morgan et al., 2015; Skiba et al., 2006), proportionate representation (De Valenzuela et al., 2006), or overrepresentation (U.S. Department of Education, 2016a).

Methods of Determining Disproportionality

Although IDEA (2004) mandates that states measure disproportionality, it leaves the methods and criteria up to the individual states (and Washington, DC). Therefore, the methods used across different states vary considerably. In a survey of methods used by states to determine disproportionality, Markowitz (2002) found the most common to be either the odds ratio or RR. The most common criteria involved percentage point deviations and significance testing.

The OSEP, a branch of the U.S. Department of Education, publishes data related to enrollment in special education each year and organizes it by state (U.S. Department of Education, 2016b). Westat, a third-party statistical analysis organization, leads the data analysis. In 2014, the Data Accountability Center, a center devoted to helping school districts collect and analyze data associated with IDEA, revised their technical assistance guide to help states measure disproportionality in special education. The use of RRs was described by the Data Accountability Center (2014) as one of the preferred methods for assessing disproportionality.

In the study of African American disproportionality in special education disability categories, the RR is determined by comparing the risk of being placed into a given disability category for African American students with that of all other students. *Risk* is calculated by deriving the percentage of African American students who have been enrolled in S/LI as a primary category divided by the percentage of African American students enrolled in public schools:

$$\frac{\%\text{African American students}_{\text{primarily enrolled in S/LI}}}{\%\text{African American students}_{\text{total enrollment}}} =$$

African American risk of enrollment in S/LI as a primary category

(1)

RRs are obtained by dividing the risk of African American students being primarily enrolled in S/LI by the risk of all other students being placed in S/LI:

$$\frac{\text{African American risk}_{\text{primary S/LI category}}}{\text{Non-African American risk}_{\text{primary S/LI category}}} = \text{Risk Ratio}$$

(2)

If both of the groups have the same risk, then the RR would be 1.0. In essence, the students would be proportionately represented in the S/LI category (the null hypothesis). An RR greater than 1.0 would mean that African American students were at a greater risk of being placed in the primary category of S/LI than students who were not African American, meaning African American students would be overrepresented. Conversely, if the risk

of non–African American students were greater than the risk of African American students, then the RR would be less than 1.0 (underrepresentation).

The magnitude of difference in risk can be derived by subtracting 1.0 from the RR. For example, an African American RR of 1.50 in the S/LI category would mean that students who are African American had a 50% greater risk of being primarily enrolled in the S/LI category than students who are not African American. Conversely, an RR of 0.60 would indicate that students who are African American had a 40% less chance of being primarily enrolled in the S/LI category than students who are not African American.

Although this analysis provides an estimate of the magnitude of disproportionality, it does not provide criteria for significance, which varies considerably according to population differences across states. Markowitz (2002) found that there were also a variety of criteria used by states to determine if significant disproportionality exists. Some states used probability tests, such as *p* values or confidence intervals.

Current Study

This study aimed to answer the question: Were African American students disproportionately represented at the state level in the category of S/LI in the U.S. public schools between 2004 and 2014? The independent variables in the study were as follows: state (including Washington, DC) and race/ethnicity (African American compared to all other students). The dependent variable was S/LI category enrollment. RRs with 99% confidence intervals were used in the data analysis. Any confidence interval that did not include 1.0 was considered as either significant overrepresentation or underrepresentation. See the analysis plan flow chart in Figure 1.

This study also considered the following subquestion: Were the representation patterns consistent across the states from 2004 to 2014? For the purposes of this study, *consistent representation* is defined as any state that had only one deviation (difference in representation) across the 10-year period.

A post hoc analysis was also done to answer the question: Do disproportionality patterns differ for states with high African American student population densities compared to those with low population densities of African American students? This analysis compared the representation patterns across the 10 states with the highest percentage of African American students to the ones with the lowest percentage for each year studied.

Method

The following methodology was designed to determine the rate of disproportionality for 6- to 21-year-old African American students receiving services due to primary enrollment in the S/LI category under Part B of the IDEA (2004). The data were derived from online federal

Figure 1. Analysis plan for determining the presence and direction of state-level disproportionality among African American students primarily classified under Speech or Language Impairment (S/LI) across 10 years.

Data Collation

IDEA Enrollment Data for 10 years (2004-2005 to 2013-2014) for ages 6-21 S/LI classification by race and state.
https://www2.ed.gov/programs/osepidea/618-data/state-level-data-files/index.html#part-b-menu

General Enrollment Data for 10 years for k-12 enrollment by race and state for each year:
https://nces.ed.gov/ccd/elsi/

Classification of Data

a. **African Americans S/LI:** Obtain the number of African Americans classified under S/LI for each state.
b. **Non African Americans S/LI:** Subtract this number from the total number of students served under S/LI to generate the frequency count for all other students served under S/LI for each state.
c. **African American Total Enrollment:** Obtain the number of African American students enrolled in K-12 for each state.
d. **Non African American Total Enrollment:** Subtract the above number from the total number of students enrolled in K-12 to generate the enrollment count for all other students for each state.

Further Calculations
(reference itemized letters above)
1. **Percent African American Enrollment:** $c \div (c+d)$
2. **Risk Ratio:** $(a \div b) \div (c \div d)$
3. **99% Confidence Intervals:** Using the natural log of the risk ratio, the standard error of the risk ratio, and the z score associated with an alpha of .01.

Interpretation

1. States with 99% confidence intervals below 1.0 were classified as *Underrepresentation*.
2. States with 99% confidence intervals above 1.0 were classified as *Overrepresentation*.
3. States with 99% confidence intervals including 1.0 were classified as *Proportionate*.

educational databases from OSEP and the National Center for Education Statistics (NCES; see Figure 1) and analyzed across 10 years on a state-by-state basis. Separate RRs were calculated for each state. The use of RR alone does not take into account the various population sizes for each state. Therefore, a 99% confidence interval was included in the analyses to account for different population sizes. RRs were considered significant if they did not include 1.0.

This study used databases from OSEP and NCES. These databases include every student reported to be enrolled in the public school system. This study does not involve participants, per se, but frequency counts of students provided by publically available databases. Therefore, in lieu of a description of the participant demographics, the sources for data will be described. A chart that includes the number of African American and non–African American students is in Supplemental Material S1 organized according to year, state, and S/LI classification.

Data Sources

The data used in this study were obtained from two websites: (a) https://www2.ed.gov/programs/osepidea/618-data/state-level-data-files/index.html#part-b-menu (U.S. Department of Education, 2016b) and (b) https://nces.ed.gov/ccd/elsi/ (NCES [2016] Elementary/Secondary Information System [ElSI]). The former was used to obtain data specific to student demographics among those included under the category of S/LI ages 6–21 years. The latter was used to obtain demographics of students enrolled in public schools in each state for kindergarten through 12th grade.

The data representing S/LI categorization were derived from the U.S. Department of Education's (2016b) database at https://www2.ed.gov/programs/osepidea/618-data/state-level-data-files/index.html#part-b-menu. It is important to note that the data reported in the various disability categories pertain only to a student's primary disability. Therefore, the data reported in this study do not account

forall of the students on SLPs' caseloads. For instance, some students may be receiving speech or language intervention, but because their primary enrollment is in the SLD category, those students' secondary S/LI category enrollment is not accessible from the OSEP website. This means that the data for students with secondary categorization in the S/LI category are not included in this study. However, the vast majority of students only have one special education category associated with them (De Valenzuela et al., 2006).

The Department of Education's NCES (2016) ElSI website (https://nces.ed.gov/ccd/elsi/) was accessed to gather data regarding the number of students enrolled in public schools in kindergarten through 12th grade. Data were categorized by African American and non–African American for each state and Washington, DC. Data were analyzed for 10 school years beginning with 2004–2005 and ending with 2013–2014. For the purposes of this study, only the data associated with the 50 states and Washington, DC, were analyzed. For efficiency in reporting, Washington, DC, will henceforth be referred to as a state in this article. The following types of data were obtained:

1. The number of students aged 6–21 years of age enrolled in Part B services and classified in S/LI as a primary category. Data were organized by two variables: (a) state and (b) race/ethnicity (African American and non–African American).

2. The number of students enrolled in kindergarten through 12th grade. Data were organized by (a) state and (b) race/ethnicity (African American and non–African American).

The raw data from the OSEP and NCES ElSI databases were entered into Excel, and an RR with a confidence interval of 99% was used to analyze disproportionality (see Figure 1). To clarify, the frequency counts included all students enrolled in every public school in the United States. A chart listing the frequency counts for each state and category is included in the Supplemental Material S1 linked to this article. The RR analysis compared the percentage of African American students who were enrolled in S/LI as a primary category with the percentages of non–African American students who were primarily diagnosed with S/LI.

Classification of Race/Ethnicity

The federal categories of race/ethnicity used to classify students were modified in 2008 (National Forum on Education Statistics, Race/Ethnicity Data Implementation Task Force, 2008). The categories used between 2004 and 2008 were American Indian, Asian or Pacific Islander, Black or African American, White, and Hispanic or Latino. In the redefined categories, American Indian, Black or African American, and White remained unchanged. Asian or Pacific Islander was split into two categories: (a) Asian and (b) Native Hawaiian or Pacific Islander. Hispanic or Latino was listed as an ethnicity choice: (a) Hispanic or Latino and (b) not Hispanic or Latino. If the former option is selected, then race was not included. If the latter option was selected,

then the student was classified according to one or more of the race categories. The students were allowed to be classified into more than one race category. If more than one category was selected for a student, then they were classified into another category called *More than One Race*.

In both the previous version and more recent version of the guidelines, the students or parents were asked to self-identify racial/ethnic categories. If the students or parents decline to identify or the data on race/ethnicity are missing for any other reason, school officials were required to assign the race/ethnicity categories as they perceived them applying to those students.

Results

Significant Disproportionality

The research question was: Were African American students disproportionately represented at the state level in the category of S/LI in the U.S. public schools between 2004 and 2014? The Appendix displays the RRs and confidence intervals as they relate to the states for the 10 years analyzed. Supplemental Material S1 reports the frequency counts collected from the databases used in the analyses. These data indicate that, on average, over three quarters of states (75.3%, $M = 38.4$ states, $SD = 1.90$) exhibited African American representation that was significantly disproportionate (underrepresentation or overrepresentation) at a 99% confidence level. An average of 31.4 states ($SD = 2.07$, 61.6%) underrepresented African American students among those primarily enrolled in the S/LI category. An average of seven states ($SD = 2.05$, 13.7%) overrepresented African American students among those primarily enrolled in the S/LI category. An average of 11.4 states ($SD = 2.01$, 22.4%) were proportionately representing African American students in the S/LI category. The results across the 10 years are summarized in Figure 2.

Stability of Representation Over Time

The subquestion was: Were the representations consistent for the states across the years? Of 51 states, 34 (67%) were consistent in their representation of African American students primarily enrolled in the S/LI category across the years investigated. Of these 34 states, five consistently overrepresented African American students, six proportionately represented African American students, and 23 consistently underrepresented African American students. These data suggest that the states were largely consistent in how they represented African American children over the 10 years analyzed.

Representation as Related to Population Density of African American Students

The post hoc question was: Do disproportionality patterns differ for states with high African American population density compared to those with a low population density of African American students? To answer this question, the data were manipulated through three steps: (1) For each

Figure 2. Number of states classified according to proportionality of African American students primarily enrolled in the S/LI category across 10 years. Over = overrepresentation of African American students; Proportionate = proportionate representation of African American students; Under = underrepresentation of African American students.
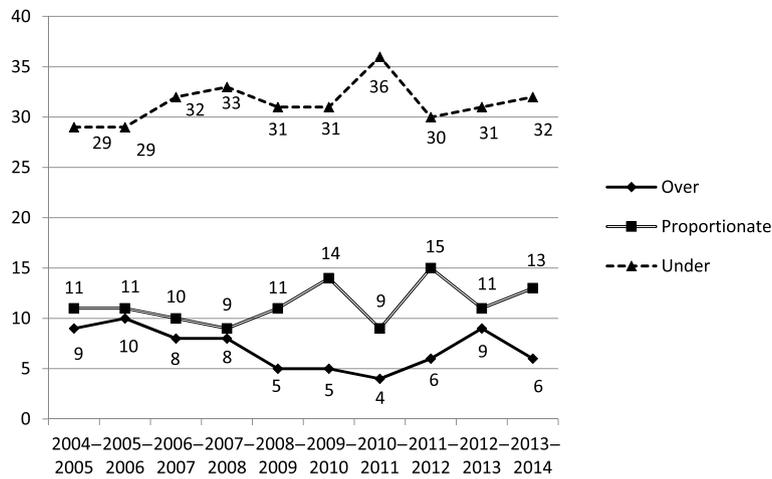
year, the states were ranked according to percentage of African American students enrolled in public schools. (2) Only the 10 states with the greatest concentration of African American students (high African American density) and the 10 states with the least concentration of African American students (low African American density) were included in the analysis. (3) The frequency of states pertaining to two independent variables, (a) proportion of the student population considered African American (high and low) and (b) representation of African American students primarily enrolled in the S/LI category (Over, Proportionate, and Under), was inserted into 2 × 3 contingency tables (see Table 1) for each of the years studied (Top 10 and Bottom 10 refers to the 10 states with the greatest percentage of African American students and the 10 states with
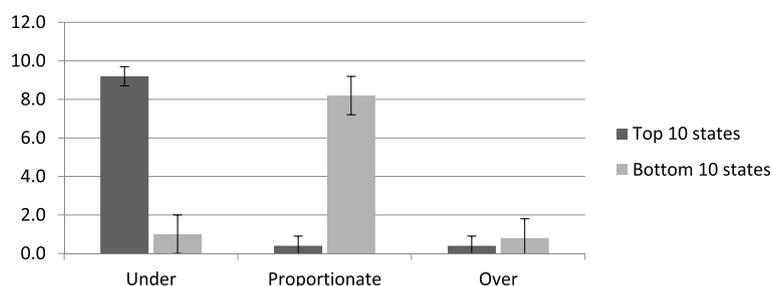
the least percentage of African American students, respectively). A graphic representation of the data conflated across all years is presented in Figure 3 using the 10-year averages for the proportionality categories.

The states included in the high-density category did not vary across the 10 years. States included in the low-density category varied somewhat. The high-density states were as follows: Washington, DC; Mississippi; Louisiana; South Carolina; Maryland; Georgia; Alabama; Delaware; North Carolina; and Virginia. The mean percentage of African American students in these states was 41.35% (range: 22.97%–85%). Six states were included in the low-density category across all 10 years: Montana, Idaho, Utah, New Hampshire, South Dakota, and New Mexico. Six other states included in this list were Oregon, Wyoming, Hawaii, Maine, Vermont, and

Table 1. Proportionality of African American students according to African American school population density.

2004–2005				2009–2010			
Categories	Under	Proportionate	Over	Categories	Under	Proportionate	Over
Top 10 states	8	1	1	Top 10 states	10	0	0
Bottom 10 states	2	7	1	Bottom 10 states	0	10	0
2005–2006				**2010–2011**			
Categories	Under	Proportionate	Over	Categories	Under	Proportionate	Over
Top 10 states	8	1	1	Top 10 states	10	0	0
Bottom 10 states	0	8	2	Bottom 10 states	2	8	0
2006–2007				**2011–2012**			
Categories	Under	Proportionate	Over	Categories	Under	Proportionate	Over
Top 10 states	9	0	1	Top 10 states	9	1	0
Bottom 10 states	0	10	0	Bottom 10 states	0	9	1
2007–2008				**2012–2013**			
Categories	Under	Proportionate	Over	Categories	Under	Proportionate	Over
Top 10 states	10	0	0	Top 10 states	9	0	1
Bottom 10 states	1	8	1	Bottom 10 states	2	6	2
2008–2009				**2013–2014**			
Categories	Under	Proportionate	Over	Categories	Under	Proportionate	Over
Top 10 states	10	0	0	Top 10 states	9	1	0
Bottom 10 states	1	9	0	Bottom 10 states	2	7	1

Figure 3. Ten-year average (with standard deviations) of the number of states included in proportionality categories corresponding to the relative density of African American student population. Over = overrepresentation of African American students; Proportionate = proportionate representation of African American students; Under = underrepresentation of African American students.

North Dakota. The mean percentage of African American students in these states was 1.74 (range: 0.8%–3.15%).

This analysis revealed that, in all of the years studied, states that had the least dense populations of African American students tended toward proportionate representation, whereas those with the greatest concentration of African American students tended toward underrepresentation. In 4 of 10 years, all of the states with the greatest concentration of African American students underrepresented them among those primarily enrolled in the S/LI category. In all of the years studied, the majority of states with the least concentration of African American students proportionately represented those students.

Discussion

The main research question of this study was: Were African American students disproportionately represented at the state level in the category of S/LI in the U.S. public schools between 2004 and 2014? The data in this study led the investigators to reject the null hypothesis that there is no difference between the classification of African American students and other students in the S/LI category and conclude that African American students were disproportionately represented in the category of S/LI across most of the states. In fact, they were disproportionately represented in over 75% of the states on average, and this trend remained relatively consistent across the 10 years studied. African American students were overrepresented in only 14% of the states and were found to be underrepresented in 62% of the states. In the 10 years studied, African American students most frequently represented in the primary category of S/LI at a significantly lower rate than what would be expected given the proportions of the student population that were African American.

The Trend of Disproportionality as Related to African American Population Density

Similar to Finn's (1982) findings, the current study's analysis of disproportionality data revealed a relationship between African American S/LI category enrollment and density of the African American school population. Across

the 5 years studied, those states with proportionate representation in the S/LI category had the least African American student density, almost exclusively. The 10 states with the greatest African American student density almost exclusively underrepresented African American students in the S/LI category. The states with African American overrepresentation in the S/LI category did not appear to demonstrate any relationship between African American student population density and African American representation in the S/LI category.

It should be noted that the states with the least dense African American populations were also the states with the fewest students. These comparatively low numbers of students resulted in wider confidence intervals, which may have led to a reduced chance of disproportionality in those states compared to ones with a larger population. The wider confidence interval may have led to a greater chance of proportionate representation. However, Finn's (1982) findings were similar to the current study. Finn suggested that, within a school district population, as African American population increases, so does ID placement of African American students, in increasingly disproportionate ratios, at least until the African American population reaches 50% of the total population. However, where Finn showed overrepresentation for ID at the district level, this study found underrepresentation for the S/LI category at the state level. Finn's analyses of OCR data demonstrated patterns of disproportionality that point to race/ethnicity as major factors in ID disability placement of African American students in the schools. Race/ethnicity effects in disability placement are why the OCR monitors and sanctions states with significant disproportionality of any student group in disability categories as a violation of students' civil rights.

Possible Reasons for the Underrepresentation of African American Students in S/LI

Our findings also demonstrate that race/ethnicity may be a significant factor in the placement of students in S/LI as a primary category. However, where one might expect to see greater rates of overrepresentation among African American students as are often found in ID, SLD, and

ED, this study revealed an overwhelming majority of states underrepresenting African American students in the S/LI category. Racial/ethnic disproportionality in any direction may be a concern for students. Racial/ethnic disproportionality is evidence that the race/ethnicity of students may be having more of an influence in their special education placement than the actual presence of a disability. In the case of overrepresentation, students may be erroneously placed in the special education system and suffer from restrictive environments. In the case of underrepresentation, students may not receive services they need or may be receiving services under a more stigmatizing category than they would be if they were of another race/ethnicity. With these scenarios in mind, underrepresentation of African American students in the S/LI category is an outcome that continues to point to possible civil rights violations of African American students in this category.

What could explain the differences in African American representation across these special education categories, given that all of these disability designations involve subjective interpretation of behaviors and school performance? One possible explanation is that African American students who primarily have speech or language disorders are more likely to be classified in a stigmatized IDEA category (i.e., ID, SLD, or ED; Robinson et al., 2016) than children who are not African American.

Saaticioglu and Skrtic (2012) demonstrated that low status groups are often assigned to less prestigious categories and superior status groups are associated with more prestigious categories. In fact, African American students in the schools are overrepresented in other stigmatizing school conditions, namely, expulsions, restricted education settings, and the likelihood that they will return to the mainstream educational system after being placed in special education (Chinn & Hughes, 1987; Darensbourg et al., 2010; De Valenzuela et al., 2006; Losen & Orfield, 2002). Concurrently, they are underrepresented in prestigious categories, such as graduations and gifted and talented education (Ford, 1998; Heckman & LaFontaine, 2010). Such patterns may indicate two sociological phenomena at work: ableism and racism.

DisCrit theory (Annamma et al., 2013) posits that ableism and racism are interdependent constructs. The fact that disabilities are stigmatized at all is troublesome. The fact that some are more stigmatized than others may be just as troublesome as the fact that some races are stigmatized more than others. Considering DisCrit theory, systemic racism and ableism may coalesce into the disproportionality patterns seen in the special education system.

If the pattern of African American representation in special education seems to mirror relative stigma across IDEA categories, who is responsible for the misclassification based on race/ethnicity? The aforementioned fragmented harm theory as discussed by Voulgarides et al. (2013) suggests that the source of racial/ethnic disproportionality is the result of potentially unconscious, nevertheless harmful, choices made by countless individuals distributed across eight areas: (a) discipline policies and practices, (b) interviews and referrals, (c) instruction and assessment, (d) differential access to educational opportunities, (e) family and community partnerships, (f) teacher expectations and misconceptions, (g) cultural dissonance, and (h) district demographics.

Clinical Implications

Considering the fragmented harm theory, the individuals involved (e.g., SLPs, special educators, teachers) need to realize how their individual choices perpetuate the racism and ableism present in the system, if the patterns of racial disproportionality are going to diminish. For example, if the demographics of teachers do not match the student demographics, there may be frequent misunderstandings and conflicts, at an individual level. These conflicts may result in disciplinary issues that affect minority students more than others, and disciplinary issues may lead to racially disproportionate referrals to special education. Conversely, if SLPs and other educational professionals are mindful of these issues, they may serve to prevent misclassification one student at a time. Under the Voulgarides et al. (2013) model, this mismatch would apply to the sources of discipline, teacher expectations and misconceptions, district sociodemographics, and cultural dissonance.

The cases of assessment, differential access to educational opportunities, and family and community partnerships are likewise related. These issues speak to the need for SLPs not just to be knowledgeable about testing bias but also to truly understand how culture interacts with assessment of communication. This understanding involves creating relationships with the families to provide access to educational opportunities but also to gain an understanding of communication styles that may be present within families and not just rely on general information about dialect features learned during workshops or graduate school.

Additionally, SLPs and other educational professionals need to be active in combatting not only implicit and explicit racism present within the educational system but also ableism. All professionals within the schools should provide active programming to help manifest respect for our students in the special education system. Programs that encourage integration of students with disabilities with students in general education may do more to prevent racial disproportionality than initially thought. The fact that the disproportionality rates for African American students in special education mirror the relative social stigma of the IDEA categories should be viewed as a need for education and increased awareness of how individual choices affect placement patterns in special education for African American students.

Limitations

One important limitation of this study is that it analyzed state-level data, which can average out specific and variable data from individual school districts and individual schools. The disproportionality rates might be significantly different in the different regions of each state studied. Therefore, the calculation of RRs might not represent all

areas of the states studied. However, state-level analyses are more finely tuned than national-level analyses, which is what many previous studies have used.

Another limitation is that the IDEA data used in this study only provide analysis of primary category enrollment data. S/LI is often considered a secondary characteristic of many of the other IDEA categories, so there could be important aspects to this problem hidden from view.

This study used a quantitative analysis, so it is not contextualized by direct observations that might provide important insights into causal connections. Another important limitation of this study is that it only investigated data concerning students who were identified as African American. Children who identified as having multiple races/ethnicities were classified in a separate category. It is likely that many of those students were African American plus another race/ethnicity. Such students would not have been counted in the data for African Americans but would have been included in the comparison group.

Another limitation of this study is that the data could not be disaggregated to analyze effects of gender, age, or socioeconomic status. Further study involving disproportionality using actual population counts should include analysis of other social and biological factors, which might shed light on the disproportionality of African Americans in special education and, particularly, S/LI. Such analysis, unfortunately, could not be done using the publically available federal data sets. However, such studies may be done within states or districts.

Future Research

This study investigated 10 years of state-level IDEA data regarding the S/LI category. Little change in disproportionality occurred across those years. Future research might investigate the data from 15, 20, or even 30 years ago to see if trends tend to correspond to policy changes in the American Speech-Language-Hearing Association's (1983) position statement on "Social Dialects," the mandated infusion of multicultural information into communication disorders curricula (American Speech-Language-Hearing Association Council on Professional Standards in Speech-Language Pathology and Audiology, 2000), policy changes made by other disciplines in general and special education, or amendments to the IDEA (e.g., penalties for racial/ethnic disproportionality in special education in 2004). Additionally, research could investigate the diverse methods and criteria used by various states in determining which school districts are disproportionate in their racial/ethnic representation in special education and how those methods accentuate or diminish S/LI category disproportionality in those individual states.

The results of this study raise questions regarding the accuracy and fairness of the whole special education system, not just the S/LI category. The special education assessment process in most school districts is a multidisciplinary one. It has long been suspected that ethnic and linguistic diversity is often a predominant factor that elicits referrals to special education assessment for African American students. However, SLPs are not the only professionals involved in the assessment process. The S/LI category data used in this study juxtaposed with the long-standing overrepresentation of African American students documented in the categories of ID, SLD, and ED from other studies suggest that the underrepresentation of African American students in the S/LI category may still be yet another indicator of bias within the special education system. To truly solve or even understand the disproportionality puzzle, research in this area needs to be interdisciplinary.

Future research also needs to investigate how SLPs and other professionals in the school system determine the common processes of evaluating African American students for the S/LI category as well as ID, ED, and SLD. Attitudes and perceptions of African American English by SLPs and other professionals involved in special education referrals and evaluations are central to differential category placement. Future research needs to include qualitative methods, as qualitative data can greatly assist our understanding of the individual processes that SLPs and other professionals use to enroll African American students in special education.

Future research also needs to involve the study of disproportionality at the local education agency or district level. Many of the states are very large, and much of the regional differences within states could be overlooked while examining data representing the entire state.

This study investigated disproportionate representation by students who are African American; however, significant disproportionality of students in other racial/ethnic groups may exist as well. It would be beneficial to study similar interactions between disability placement, ethnicity, and population density ratios for other races/ethnicities in particular regions of the United States. For example, one could investigate S/LI category disproportionality among Native Americans in southwestern or midwestern states where they are the main ethnic minority. Further research could consider studies including Alaskan Natives in Alaska and Latino/Hispanic students in the Southwest or Florida, for example. Such research may help form a general theory regarding how students from historically oppressed minority groups are considered in the determination of public school special education categories.

Primary and secondary enrollment in the S/LI category could be examined and compared at the state or district level, because the nationally reported IDEA data only include primary categorizations. This information is relevant because clients who are diagnosed with many other primary diagnoses are likely to receive services from SLPs in the schools as well.

Future studies should investigate the processes included in the fragmented harm theory (Voulgarides et al., 2013), particularly using them as a framework to determine which factors might be responsible for inequities more than others. Furthermore, the use of the fragmented harm model framework might be investigated as a tool to

help school districts reduce racial/ethnic biases within their system.

Finally, it is time to begin investigation within the schools of how interconnected constructs of ableism and racism might influence the systems outlined in the fragmented harm model and also why those factors seem more active in places with high African American population densities. Little work has been done to illuminate this somewhat hidden source of disparity present within our profession and others involved in providing education and health care to people with disabilities.

Conclusions

This study may be the first to specifically address the question of disproportionality among African American students primarily enrolled in the S/LI category in the U.S. public schools. A majority of states demonstrated underrepresentation instead of overrepresentation. The data analysis also demonstrates a relationship between ethnic population density and S/LI category placement. This study found that African American students are less likely to be primarily enrolled in the S/LI category than students from other ethnic groups. The authors considered the context of the history of African American disproportionality across other IDEA diagnoses; the subjective nature of determining placement in the categories of S/LI, ID, ED, and SLD; and a pattern of more restricted placement of African American students in special education as important factors to contextualize the results of this study. Therefore, it is concluded that a major factor in underrepresentation data for African American students in the S/LI category may be the primary classification of African American students in other disability categories, such as ID, SLD, and ED.

Acknowledgments

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Risk ratios and 99% confidence intervals (in parentheses) for each year studied comparing the risk of primary enrollment in the S/LI category for African American students with that of all other students. *Significant underrepresentation. **Significant overrepresentation.

State	2004–2005	2005–2006	2006–2007	2007–2008	2008–2009	2009–2010	2010–2011	2011–2012	2012–2013	2013–2014
AL	0.98	1.00	0.94*	0.94*	0.92*	0.88*	0.80*	0.82*	0.83*	0.81*
	(0.96–1.01)	(0.97–1.02)	(0.92–0.97)	(0.91–0.96)	(0.89–0.94)	(0.85–0.91)	(0.78–0.83)	(0.79–0.85)	(0.80–0.85)	(0.78–0.84)
AK	1.19	1.08	0.73*	0.93	—	0.90	0.86	0.78	0.79	0.70*
	(0.99–1.42)	(0.89–1.31)	(0.57–0.95)	(0.71–1.22)		(0.69–1.18)	(0.65–1.15)	(0.57–1.06)	(0.58–1.08)	(0.50–0.99)
AZ	0.87*	0.92	0.87*	0.89*	0.87*	0.86*	0.83*	0.79*	0.80*	0.78*
	(0.79–0.95)	(0.85–1.00)	(0.80–0.94)	(0.82–0.96)	(0.80–0.94)	(0.80–0.93)	(0.76–0.90)	(0.72–0.86)	(0.73–0.88)	(0.71–0.86)
AR	0.85*	0.86*	0.88*	0.93*	0.96	0.94*	0.88*	.98	1.05	1.03
	(0.81–0.90)	(0.82–0.90)	(0.84–0.92)	(0.88–0.97)	(0.92–1.00)	(0.90–0.98)	(0.84–0.92)	(0.94–1.03)	(1.01–1.10)	(0.99–1.08)
CA	0.90*	0.89*	0.93*	0.94*	.95*	0.93*	0.85*	0.92*	0.93*	0.94
	(0.88–0.92)	(0.87–0.91)	(0.90–0.95)	(0.91–0.96)	(0.84–0.89)	(0.90–0.96)	(0.83–0.88)	(0.89–0.95)	(0.91–0.96)	(0.82–1.01)
CO	1.15**	1.18**	1.19**	1.15**	1.17**	1.08	0.83*	1.01	0.95	0.91
	(1.07–1.25)	(1.09–1.27)	(1.11–1.29)	(1.07–1.25)	(1.08–1.27)	(0.99–1.17)	(0.76–0.92)	(0.91–1.12)	(0.86–1.06)	(0.82–1.01)
CN	1.05	1.14**	1.13**	1.15**	1.14**	1.21**	1.20**	1.26**	1.26**	1.27**
	(0.99–1.11)	(1.08–1.20)	(1.07–1.20)	(1.09–1.22)	(1.08–1.21)	(1.14–1.28)	(1.13–1.27)	(1.19–1.34)	(1.19–1.34)	(1.19–1.35)
DE	0.60*	0.61*	0.59*	0.59*	.59*	0.61*	0.65*	0.68*	0.59*	0.63*
	(0.53–0.67)	.54–0.68	(0.53–0.67)	(0.53–0.66)	(0.52–0.67)	(0.54–0.69)	(0.57–0.73)	(0.61–0.77)	(0.52–0.67)	(0.56–0.71)
DC	1.14**	1.19**	2.34**	0.82*	0.81*	0.91*	0.71*	.99	1.06**	0.99
	(1.11–1.18)	(1.15–1.23)	(2.28–2.40)	(0.79–0.85)	(0.77–0.85)	(0.87–0.96)	(0.68–0.75)	(0.94–1.04)	(1.01–1.12)	(0.94–1.04)
FL	1.08**	1.05**	1.08**	1.09**	1.01	1.02	.94*	1.03**	1.06**	1.06**
	(1.06–1.09)	(1.04–1.07)	(1.06–1.10)	(1.07–1.11)	(1.00–1.03)	(1.00–1.03)	(0.93–0.96)	(1.02–1.05)	(1.04–1.08)	(1.04–1.08)
GA	0.77*	0.78*	0.78*	0.84*	0.80*	0.85*	.74*	0.78*	0.76*	0.76*
	(0.76–0.79)	(0.77–0.80)	(0.77–0.80)	(0.82–0.86)	(0.79–0.82)	(0.83–0.87)	(0.73–0.76)	(0.76–0.80)	(0.74–0.78)	(0.74–0.78)
HI	1.77**	1.67**	—	1.67**	1.49	1.39	—	1.56	2.28**	1.50
	(1.21–2.59)	(1.08–2.56)		(1.03–2.73)	(0.88–2.45)	(0.77–2.49)		(0.88–2.75)	(1.40–3.70)	(0.78–2.89)
ID	0.82	.86	1.08	1.13	0.97	.99	0.96	1.23	1.21	1.01
	(0.54–1.25)	(0.58–1.26)	(0.77–1.52)	(0.82–1.56)	(0.70–1.34)	(0.71–1.39)	(0.69–1.32)	(0.89–1.70)	(0.87–1.68)	(0.71–1.43)
IL	0.71*	0.71*	0.72*	0.70*	0.71*	0.74*	0.64*	0.70*	0.73*	0.72*
	(0.69–0.73)	(0.69–0.73)	(70–0.74)	(0.69–0.72)	(0.69–0.73)	(0.72–0.76)	(0.62–0.66)	(0.68–0.72)	(0.71–0.76)	(0.70–0.75)
IN	0.62*	0.64*	0.67*	0.67*	0.66*	0.67*	0.68*	0.73*	0.69*	0.73*
	(0.59–0.65)	(0.61–0.66)	(0.64–0.70)	(0.64–0.70)	(0.63–0.69)	(0.65–0.71)	(0.65–0.71)	(0.69–0.76)	(0.66–0.73)	(0.70–0.76)
IA	1.39**	1.45**	1.71**	1.58**	1.70**	1.88**	1.59**	1.80**	1.79**	1.75**
	(1.24–1.56)	(1.30–1.62)	(1.55–1.90)	(1.42–1.75)	(1.52–1.90)	(1.68–2.11)	(1.42–1.78)	(1.60–2.02)	(1.59–2.01)	(1.56–1.97)
KS	0.88*	0.85*	0.82*	0.80*	0.77*	0.69*	0.56*	0.68*	0.70*	0.71*
	(0.80–0.96)	(0.78–0.94)	(0.75–0.90)	(0.72–0.88)	(0.69–0.85)	(0.61–0.78)	(0.50–0.63)	(0.60–0.76)	(0.62–0.78)	(0.63–0.80)
KY	0.84*	0.85*	0.82*	0.81*	0.75*	0.78*	0.77*	0.79*	0.79*	0.74*
	(0.79–0.89)	(0.80–0.90)	(0.77–0.87)	(0.76–0.86)	(0.71–0.80)	(0.74–0.83)	(0.72–0.82)	(0.74–0.83)	(0.74–0.84)	(0.70–0.79)
LA	0.76*	0.75*	0.70*	0.71*	0.71*	0.76*	0.77*	0.80*	0.80*	0.89*
	(0.75–0.78)	(0.73–0.77)	(0.68–0.72)	(0.69–0.72)	(0.70–0.73)	(0.74–0.77)	(0.75–0.78)	(0.78–0.82)	(0.78–0.82)	(0.87–0.92)
ME	0.65*	0.85	.81	0.81	0.88	0.95	0.89	0.65*	0.70*	0.72*
	(0.46–0.85)	(0.67–1.07)	(0.65–1.02)	(0.65–1.02)	(0.70–1.10)	(0.76–1.18)	(0.70–1.13)	(0.51–0.87)	(0.54–0.91)	(0.56–0.93)
MD	0.83*	0.84*	0.85*	0.84*	0.86*	0.89*	0.81*	0.90*	0.91*	0.92*
	(0.81–0.85)	(0.82–0.86)	(0.82–0.87)	(0.82–0.87)	(0.83–0.88)	(0.87–0.92)	(0.78–0.83)	(0.87–0.93)	(0.88–0.94)	(0.89–0.95)
MA	1.09**	1.11**	1.14**	1.16**	—	1.14**	1.15**	1.15**	1.17**	1.18**
	(1.03–1.15)	(1.05–1.18)	(1.07–1.20)	(1.1–1.22)		(1.08–1.20)	(1.09–1.21)	(1.09–1.21)	(1.11–1.23)	(1.12–1.24)

Risk ratios and 99% confidence intervals (in parentheses) for each year studied comparing the risk of primary enrollment in the S/LI category for African American students with that of all other students. *Significant underrepresentation. **Significant overrepresentation.

State	2004–2005	2005–2006	2006–2007	2007–2008	2008–2009	2009–2010	2010–2011	2011–2012	2012–2013	2013–2014
MI	0.81*	0.80*	0.85*	0.82*	0.81*	0.83*	0.76*	0.84*	0.89*	0.88*
	(0.79–0.93)	(0.78–0.83)	(0.82–0.87)	(0.79–0.84)	(0.78–0.83)	(0.80–0.85)	(0.73–0.78)	(0.82–0.87)	(0.86–0.92)	(0.85–0.90)
MN	0.90*	0.86*	0.80*	0.82*	0.82*	0.81*	0.76*	0.90*	0.73*	0.71*
	(0.84–0.97)	(0.80–0.92)	(0.75–0.86)	(0.77–0.88)	(0.77–0.88)	(0.75–0.87)	(0.71–0.82)	(0.71–0.82)	(0.79–0.86)	(0.66–0.76)
MS	0.62*	0.61*	0.60*	0.61*	0.59*	0.59*	0.58*	0.63*	0.64*	0.65*
	(0.61–0.64)	(0.59–0.63)	(0.59–0.62)	(0.59–0.62)	(0.57–0.60)	(0.58–0.61)	(0.56–0.60)	(0.61–0.65)	(0.62–0.65)	(0.63–0.66)
MO	0.75*	0.74*	0.75*	0.78*	0.82*	0.83*	0.79*	0.83*	0.88*	0.91*
	(0.72–0.78)	(0.71–0.76)	(0.73–0.78)	(0.75–0.80)	(0.79–0.85)	(0.81–0.87)	(0.76–0.82)	(0.80–0.86)	(0.85–0.91)	(0.87–0.94)
MT	1.33	1.65**	1.30	1.06	0.99	0.84	0.82	0.69	0.79	0.65
	(0.87–2.04)	(1.15–2.36)	(0.87–1.94)	(0.67–1.67)	(0.63–1.55)	(0.53–1.32)	(0.50–1.35)	(0.39–1.23)	(0.46–1.35)	(0.36–1.21)
NE	0.9*	0.83*	0.82*	0.79*	0.80*	0.89*	0.76*	0.93	0.93	0.94
	(0.82–0.99)	(0.75–0.91)	(0.74–0.90)	(0.72–0.88)	(0.72–0.88)	(0.81–0.98)	(0.69–0.84)	(0.84–1.03)	(0.84–1.03)	(0.85–1.04)
NV	—	0.83*	0.80*	0.81*	0.76*	0.75*	0.76*	0.84*	0.87*	0.91
		(0.75–0.91)	(0.73–0.89)	(0.73–0.89)	(0.69–0.85)	(0.68–0.84)	(0.68–0.84)	(0.76–0.94)	(0.79–0.97)	(0.82–1.01)
NH	0.81	0.84	.92	1.1	.94	1.09	0.98	1.07	1.08	1.08
	(0.58–1.12)	(0.61–1.15)	(0.69–1.24)	(0.85–1.43)	(0.70–1.26)	(0.83–1.44)	(0.74–1.31)	(0.79–1.44)	(0.79–1.46)	(0.79–1.48)
NJ	0.65*	0.68*	0.69*	0.71*	—	0.75*	0.73*	0.84*	0.80*	0.84*
	(0.63–0.68)	(0.66–0.70)	(0.67–0.71)	(0.69–0.73)		(0.73–0.78)	(0.71–0.75)	(0.82–0.87)	(0.78–0.83)	(0.82–0.87)
NM	0.94	.95	1.00	1.01	1.03	1.11	0.75*	0.92	0.96	0.96
	(0.78–1.13)	(0.79–1.14)	(0.84–1.19)	(0.86–1.2)	(0.88–1.22)	(0.93–1.33)	(0.62–0.90)	(0.76–1.11)	(0.79–1.17)	(0.78–1.19)
NY	1.07**	1.07**	1.15**	1.16**	1.18**	1.19**	1.14**	1.21**	1.20**	1.21**
	(1.05–1.10)	(1.05–1.09)	(1.13–1.17)	(1.14–1.18)	(1.16–1.20)	(1.17–1.21)	(1.12–1.16)	(1.19–1.23)	(1.17–1.22)	(1.19–1.23)
NC	0.79*	0.78*	0.88*	0.90*	0.74*	0.80*	0.71*	0.85*	0.85*	0.86*
	(0.77–0.81)	(0.76–0.80)	(0.86–0.90)	(0.88–0.92)	(0.72–0.76)	(0.78–0.82)	(0.69–0.73)	(0.83–0.88)	(0.82–0.87)	(0.84–0.89)
ND	0.82	.80	.99	0.9	1.14	1.07	1.16	.83	1.02	.92
	(0.53–1.26)	(0.54–1.20)	(0.70–1.39)	(0.64–1.27)	(0.84–1.55)	(0.78–1.47)	(0.84–1.60)	(0.58–1.19)	(0.74–1.39)	(0.66–1.27)
OH	1.26**	0.79*	.78*	0.79*	0.73*	0.74*	0.69*	0.73*	0.75*	0.71*
	(1.22–1.29)	(0.76–0.81)	(0.76–0.81)	(0.77–0.82)	(0.70–0.76)	(0.71–0.77)	(0.66–0.72)	(0.70–0.76)	(0.72–0.79)	(0.68–0.74)
OK	0.78*	0.79*	0.79*	0.81*	0.83*	0.77*	0.75*	0.77*	0.72*	0.78*
	(0.72–0.84)	(0.73–0.86)	(0.73–0.86)	(0.75–0.87)	(0.76–0.90)	(0.71–0.84)	(0.68–0.81)	(0.71–0.85)	(0.69–0.83)	(0.71–0.86)
OR	1.13**	1.16**	1.33**	1.36**	1.26**	1.44**	1.03	1.26**	1.25**	1.20**
	(1.01–1.26)	(1.04–1.29)	(1.20–1.48)	(1.23–1.51)	(1.13–1.39)	(1.30–1.60)	(0.92–1.15)	(1.13–1.41)	(1.11–1.41)	(1.06–1.36)
PA	0.67*	0.66*	0.72*	0.73*	0.72*	0.74*	0.70*	0.71*	0.69*	0.70*
	(0.64–0.69)	(0.64–0.69)	(0.69–0.74)	(0.70–0.75)	(0.69–0.74)	(0.72–0.77)	(0.68–0.83)	(0.68–0.74)	(0.66–0.72)	(0.67–0.72)
RI	0.56*	0.67*	0.70*	0.81*	0.86*	0.86	0.84*	0.89	0.84	0.80*
	(0.48–0.65)	(0.58–0.77)	(0.61–0.81)	(0.71–0.92)	(0.75–0.98)	(0.75–1.00)	(0.72–0.98)	(0.76–1.06)	(0.70–1.00)	(0.67–0.97)
SC	0.95*	0.92*	0.92*	0.90*	0.87*	0.86*	0.80*	0.91*	0.92*	0.90*
	(0.93–0.97)	(0.90–0.94)	(0.89–0.94)	(0.88–0.93)	(0.85–0.89)	(0.83–0.88)	(0.78–0.82)	(0.88–0.94)	(0.89–0.95)	(0.88–0.93)
SD	0.54*	0.87	.80	0.65*	0.68*	0.76	0.63*	0.51*	0.48*	0.50*
	(0.34–0.87)	(0.59–1.27)	(0.55–1.16)	(0.44–0.95)	(0.49–0.96)	(0.56–1.04)	(0.44–0.89)	(0.34–0.75)	(0.32–0.71)	(0.34–0.75)
TN	0.78*	0.80*	0.76*	0.82*	0.82*	0.82*	0.78*	0.83*	0.85*	0.83*
	(0.76–0.81)	(0.78–0.83)	(0.73–0.78)	(0.79–0.85)	(0.79–0.85)	(0.79–0.84)	(0.76–0.81)	(0.80–0.86)	(0.82–0.88)	(0.80–0.85)

Appendix (p. 3 of 3)

Risk ratios and 99% confidence intervals (in parentheses) for each year studied comparing the risk of primary enrollment in the S/LI category for African American students with that of all other students. *Significant underrepresentation. **Significant overrepresentation.

State	2004–2005	2005–2006	2006–2007	2007–2008	2008–2009	2009–2010	2010–2011	2011–2012	2012–2013	2013–2014
TX	0.87* (0.85–0.90)	0.87* (0.85–0.89)	0.87* (0.85–0.89)	0.88* (0.85–0.90)	0.87* (0.85–0.90)	0.86* (0.84–0.88)	0.76* (0.74–0.79)	0.83* (0.81–0.86)	0.86* (0.83–0.88)	0.83* (0.81–0.86)
UT	1.11 (0.89–1.38)	1.13 (0.91–1.32)	0.84 (0.66–1.06)	0.81 (0.65–1.00)	.94 (0.77–1.15)	1.06 (0.87–1.28)	0.90 (0.73–1.09)	0.85 (0.69–1.05)	0.79* (0.64–0.98)	0.76* (0.60–0.94)
VT	—	—	1.00 (0.60–1.66)	—	—	1.16 (0.72–1.86)	1.45 (0.93–2.25)	1.30 (0.84–0.2.02)	1.17 (0.73–1.89)	1.20 (0.75–1.94)
VA	0.92* (0.89–0.94)	0.91* (0.88–0.94)	0.94* (0.91–0.97)	0.93* (0.90–0.96)	0.90* (0.87–0.92)	0.93* (0.90–0.96)	0.83* (0.80–0.85)	0.93* (0.90–0.96)	0.93* (0.90–0.96)	0.89* (0.86–0.92)
WA	0.92 (0.84–1.00)	0.87* (0.80–0.95)	0.85* (0.77–0.92)	0.83* (0.76–0.91)	0.79* (0.72–0.87)	0.75* (0.69–0.83)	0.80* (0.73–0.88)	0.81* (0.73–0.89)	0.80* (0.72–0.88)	0.84* (0.76–0.93)
WV	0.80* (0.70–0.90)	0.73* (0.65–0.83)	0.77* (0.69–0.87)	0.79* (0.71–0.89)	0.71* (0.63–0.80)	0.73* (0.65–0.83)	0.63* (0.56–0.72)	0.67* (0.59–0.77)	0.60* (0.52–0.70)	0.58* (0.50–0.68)
WI	0.90* (0.85–0.96)	0.92* (0.87–0.97)	0.84* (0.79–0.89)	0.83* (0.79–0.88)	0.86* (0.81–0.91)	0.91* (0.87–0.97)	0.80* (0.75–0.84)	0.87* (0.82–0.92)	0.90* (0.85–0.96)	0.91* (0.86–0.97)
WY	1.05 (0.70–1.57)	1.10 (0.75–1.61)	1.00 (0.68–1.49)	0.95 (0.64–1.40)	1.00 (0.69–1.46)	.92 (0.59–1.44)	—	0.68 (0.40–1.18)	0.59 (0.34–1.04)	.63 (0.37–1.05)