Language and Special Education Status: 2009-2019 Tennessee Trends

Introduction

U.S. children from a non-English language background (NELB)—the formal school-designated term—represent a growing share of the school-age population across the nation, with the largest growth concentrated in the American South, such as Tennessee (Romo et al., 2018). NELB students may be English-proficient bilinguals (EPB) or current English learners (Current ELs). EPBs enter schools proficient in English or are reclassified as English-proficient after receiving EL services, while Current ELs are receiving EL services to support second language acquisition in English. EPBs and native English speakers (NES) are English-proficient, while EPBs and Current ELs speak or are exposed to a language other than English at home.

Achievement gaps between NES students and their NELB peers (namely Current ELs) persist, given that English proficiency is a requisite for academic success in the U.S. (National Academies of Sciences, 2017). But it is essential to underscore that socioeconomic disadvantage—not bilingualism itself—is an established risk factor for compromised academic achievement, and it is a risk factor to which NELB students are disproportionally vulnerable (Romo et al., 2018). Additionally, Current ELs may require specialized services to best support their English academic achievement, but their representation in special education (SPED) remains highly contentious (Counts et al., 2018). Disproportionality—under-, over-, or shifting representation—in SPED affects students' likelihood of educational success compared to their peers, making it an issue of educational equity and warranting further research on the intersection of language and SPED status (National Academies of Sciences, Engineering, & Medicine, 2017).

SPED disproportionality constitutes part of the equity requirements (i.e., disproportionate representation, significant discrepancy, and significant disproportionality) under the 2016 Equity in Individuals with Disabilities Education Act (IDEA) Regulation (O'Hara & Bollmer, 2017). Under this regulation, states are required to examine if significant disproportionality exists in its school districts by utilizing a standard methodology for disproportionality analysis, to promote educational equity by identifying and preventing educational disparities. Specifically, states must set a threshold above which disproportionality is determined for the resultant unadjusted risk ratios. To be clear, unadjusted risk ratios result from bivariate analyses that, by definition, do not account for covariates that may relate to SPED identification. Most importantly for informing policy efforts, unadjusted risk ratios are used for federal and state determinations of disproportionality (Office of Special Education Programs, 2017). However, as it currently stands, equity expectations in IDEA concern disproportionality between racial and ethnic groups but has yet to extend this expectation to linguistically diverse groups despite their continued growth.

The *current* federal and state focus on disproportionality by race and ethnicity does not preclude the expansion of research to other demographic subgroups in the nation that have been historically underserved, such as NELB students who are also predominantly from minority racial and ethnic backgrounds and from economically disadvantaged homes. Indeed, it is especially imperative to examine disproportionality in states that have experienced unprecedented growth in the school-age Current EL population—such as Tennessee, where there has been a 45% growth from 2011 to 2017 (Tennessee Department of Education [TDOE], 2018a)—and where Current EL growth is projected to continue. Shifts in state-level school-age demographics can be expected to have important educational policy and practice implications. Educational decisions must be based on contextualized evidence rather than solely extrapolated

from national trends (Artiles & Trent, 1994; Skiba et al., 2016), even if the state-level demographic characteristics of Current ELs mirror national trends. Indeed, as is the case nationally, the majority of Current ELs in Tennessee are U.S.-born, of Hispanic background, and from low-income homes. Yet, little is known about the intersection of language and SPED status in Tennessee, limiting Tennessee-specific efforts aimed at supporting the educational achievement of all students.

Present Study and Data Source

Using Tennessee state-level data collected annually by the TDOE and made available through the Tennessee Education Research Alliance, this study reports SPED trends from 2009-2019 for students in grades 3-8 by language (i.e., NES, EPB, Current EL) and income status (i.e., free or reduced-price lunch eligibility, economically disadvantaged status). The cross-sectional analytic sample included 812,783 students, with a yearly average of 285,900 students (*SD* = 6,387) from 28 districts that met the risk-ratio threshold set by the state (see below for details). Importantly, EPBs and Current ELs represented the majority (87%) of all EPBs and Current ELs in Tennessee. Further, as is the case nationally, the majority of EPBs and Current ELs were U.S.-born (73%) and Hispanic (63%). Finally, approximately half of all students in the sample were from low-income homes (49%). However, and again as is the case nationally, this varied by language background: NES = 47%, EPB = 61%, and Current EL = 67%.

Unadjusted Risk Ratio Calculation. Under the IDEA of 2004, states are required to measure disproportionality based on the methods and criteria set by the individual states. As noted, unadjusted risk ratios are used for federal and state determinations of disproportionality (Office of Special Education Programs, 2017), and we thus calculated unadjusted risk ratios by each language status (i.e., NES, EPB, Current EL) according to the standards set by the federal

government and adopted by the TDOE. The unadjusted risk ratio is the likelihood or risk of a particular group (e.g., NES) receiving a certain identification (e.g., SPED), where each language group's risk ratio is generated in comparison to all other language groups. That is, with NES as the risk group, the "other" language groups would be EPBs and Current ELs; with EPBs as the risk group, the "other" language groups would be NES and Current ELs; and with Current ELs as the risk group, the "other" language groups would be NES and EPBs. The unadjusted risk ratio calculation requires minimum cell size and n-size for the "risk" group (e.g., NES students) and the "other" group (e.g., non-NES students). Tennessee uses the minimum cell size of 10 and n-size of 30, as set by the federal government (TDOE, 2018). The unadjusted risk ratios for each language status (i.e., NES, EPB, Current EL) were compared to Tennessee's risk ratio threshold of 3.0. For example, if NES students had a risk ratio of 4.0 in the 2009-2010 academic year, that would indicate that NES students were 4.0 times more likely to be identified for SPED services, compared to all other language-status groups in that year. Furthermore, if risk ratios of a group met or exceeded the threshold of 3.0 for three consecutive years, significant disproportionality was determined according to Tennessee's established threshold. For example, if NES students' risk ratios across three consecutive academic years (e.g., 2009-2010, 2010-2011, 2011-2012) exceeded 3.0, NES students would be determined to be significantly overrepresented in Tennessee. Also known as multi-year flexibility, this method is utilized by the TDOE to identify a systemic trend—rather than a one-year aberration—that warrants further investigation (TDOE, 2018). See Supporting Online Material for additional Methods details.

Results

The cross-sectional unadjusted risk ratios revealed considerable stability in patterns of SPED proportionality in Tennessee over the past decade (2009-2019) by language status. EPBs

and Current ELs were less likely than NES to be in SPED, but none of the language groups evidenced significant disproportionality based on Tennessee's threshold of a risk ratio of 3.0 for three consecutive years (Figure 1). However, except for EPBs who consistently evidenced the lowest risk ratios, income and language status interacted in risk ratios of NES and Current ELs (Figure 2). Among Current ELs, *higher* risk ratios were observed for those from lower income homes. In contrast, among NES, *lower* risk ratios were observed for those from lower income homes. See Supporting Online Material, Tables S1-3, for more details. Additionally, district-level risk ratios from the 28 target districts also revealed a trend similar to state-level trends (see Figure S1 in the Supporting Online Material). That is, while we found no evidence of disproportionality (i.e., district-level risk ratios did not exceed 3.0 for three consecutive years between 2009 and 2019) across all language status, NES showed the highest risk ratios, followed by Current ELs and EPBs.

Discussion

Disproportionate SPED placement decisions are an issue of educational equity for all learners, as the services provided should match instructional needs. Our cross-sectional findings on unadjusted risk ratios across a 10-year span using Tennessee state-level data does not reveal evidence of significant disproportionality in terms of over-representation by language status. To the contrary, results suggest that EPBs and Current ELs may be under-represented in SPED. This is especially concerning among Current ELs, given the well-documented achievement gaps reported at the national level. It may be that only Current ELs with the most severe disabilities are identified, leaving Current ELs with less severe—but nonetheless existing—difficulties without the necessary instructional support. To be clear, this is not to suggest that more EPBs and Current ELs *should be* identified for SPED services. Rather, our findings suggest that

Tennessee, as well as other states with more nascent experience educating linguistically diverse learners, should examine how Current ELs qualify for dual services (EL and SPED). Arguably more importantly, our results point to the urgent need for research that examines whether Current ELs' instructional placement supports their academic achievement.

Additionally, social factors associated with ELs in the U.S.—such as limited English proficiency and economic disadvantage—should not contribute to SPED risk ratios as per IDEA. Yet, language and income status appear to interact and contribute to SPED risk ratios: Current ELs from low-income homes have a higher probability of being in SPED while EPBs are less likely to be in SPED, independent of income status. Other studies, though focused on racial and ethnic minorities, similarly report economic disadvantage to be associated with higher rates of SPED identification (e.g., Coutinho, et al., 2002; Grindal et al., 2019). Our results based on unadjusted risk ratios underscore that *English proficiency* appears to be associated with SPED identification. Furthermore, the Equity Regulations in IDEA only establish a system for identifying significant disproportionality in terms of overrepresentation, not underrepresentation. This means that, currently, there is no policy or research guidance on what constitutes disproportionality in terms of potential underrepresentation (Office of Special Education Programs, 2017). This is a major concern, as all students should receive the educational services that match their learning needs. We echo the national call to strengthen the referral process for Current ELs and to attend to their low rates of representation (National Academies of Sciences, Engineering, & Medicine, 2017).

Our focus on unadjusted analyses represents a necessary first step to directly inform policy efforts. An organic next step in this critical line of research is to adjust for covariates (e.g., attendance rates, student-level achievement) that are hypothesized to be associated with SPED

identification. Although adjusted analyses do not currently guide federal and state determinations of disproportionality, such analyses can likely offer additional insight and nuance into the question of proportionality. That is, adjusted analyses could provide insight into whether similarly situated students (e.g., similar student-level academic achievement) that differ by language status are differentially identified in SPED, which could specifically inform disproportionality research in terms of potential under-identification. Indeed, extant mixed and contentious findings on the question of disproportionality by race and ethnicity largely stem from differences in terms of whether unadjusted or adjusted analyses are generated. To a greater extent than unadjusted analyses, adjusted analyses typically point to under-representation (Hibel et al., 2010; Morgan et al., 2017). However, even *without* adjusting for student- and district-level factors hypothesized to be associated with SPED identification, our results point to under-representation by language status, mirroring Morgan's (2021) recent findings of under-identification of Black and Latino students. Ultimately, we argue that the central issue is *misrepresentation*. The educational costs of inappropriate placement are too significant to overlook. Our findings strongly warrant further investigation into potential under-representation of NELB students, both at the national level and especially at the state level, given the wide variation in disproportionality that has been reported across states (Parrish, 2002; Welner & Skiba, 2016).

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Supporting Online Material - Methods

Language Status

Language status was based on official school records and was grouped as follows: Native English Speaker (NES), English proficient bilingual (EPB), and Current English learner (EL). NES are those who use English as their primary language. EPBs include non-English language background students who were 1) proficient in English upon school entry or 2) formerly identified as ELs but attained proficiency in English and exited EL services. Current ELs are those who are eligible for and receiving EL services in their schools.

Income Status

Income status of students' households was also based on official school records and was proxied by their eligibility for free or reduced-price lunch for all or part of the school year (1 = eligible; 0 = not eligible). Of note, this variable applies to academic years between 2009 and 2017. From 2017 and onwards, income status was proxied by students' economically disadvantaged status for all or part of the school year (1 = economically disadvantaged; 0 = not economically disadvantaged). Prior to 2017, students took home a form for parents to self-reported their annual income, and based on that the student did or did not qualify for free/reduced lunch. Beginning in 2017, student records are algorithmically matched to other public records through the interagency state longitudinal data system, in alignment with the definition of economically disadvantaged used by the Tennessee Department of Education for federal accountability subgroup reporting. If the student's family qualified for certain public services, then the student is flagged as economically disadvantaged. The new 2017 standards are considered more rigorous, such that fewer students are considered economically disadvantaged than was the case via parent self-reported annual income. Although income status measurement

changed between 2009-2017 and 2017-2019 and the measures are not directly comparable, our cross-sectional findings reveal considerable consistency across both periods. Indeed, the correlation between academic years 2016-2017 and 2017-2018 is significant and positive (r = 0.63, $p < .001$).

Unadjusted Risk Ratio Calculation

A minimum cell size is a minimum number of students experiencing a particular outcome (e.g., SPED identification). It is applied as the numerator when calculating the likelihoods for a risk group (e.g., NES students identified for SPED services) and its comparison group (e.g., total number of non-NES students identified for SPED services) in a state or a school system. Further, a minimum n-size is a minimum total number of students in a risk group (e.g., NES students), including those experiencing and not experiencing a particular outcome in a state or a school system. It is applied as the denominator when calculating the likelihoods for a risk group (e.g., total number of NES students) and its comparison group (e.g., total number of non-NES students). If a risk group (e.g., NES students) meets the minimum cell and n-size thresholds, its cell size is divided by n-size. This generates the likelihood of the risk group (e.g., NES) receiving a certain identification (e.g., SPED):

$$\frac{\text{NES}_{\text{SPED}}}{\text{NES}_{\text{Total (SPED + Not SPED)}}} = \text{Likelihood of SPED identification for NES Students in Tennessee} \quad (1)$$

Likewise, if its comparison group (e.g., non-NES students) met the minimum cell and n-size thresholds, its cell size was divided by n-size. This generated the likelihood of the comparison group (e.g., non-NES students) receiving a certain identification (e.g., SPED):

$$\frac{\text{non-NES}_{\text{SPED}}}{\text{non-NES}_{\text{Total (SPED + Not SPED)}}} = \text{Likelihood of SPED identification for non-NES Students in Tennessee} \quad (2)$$

Afterwards, a risk ratio is obtained by dividing the likelihood of the risk group being identified for a certain identification (equation 1) by the likelihood of all other students being identified for a certain condition (equation 2):

$$\frac{\text{NES}_{\text{Likelihood of SPED}}}{\text{Non-NES}_{\text{Likelihood of SPED}}} = \text{Risk ratio of SPED identification for NES Students in Tennessee} \quad (3)$$

Following the risk ratio calculation thresholds in Tennessee, we explored cross-sectional, unadjusted risk ratios by language status (i.e., NES, EPB, Current EL) and also by income status (i.e., eligible or not eligible for free or reduced-price lunch).

Testing for Between-Year Differences in Unadjusted Risk Ratios

Tables S1 and S2 provide detailed between-year comparisons of risk ratios, by language status and income status. Each table corresponds to Figures 1 and 2 in the main manuscript, respectively. We did not find any significant between-year differences, suggesting no significant differences in risk ratios across each study year by language status and income status.

Table S1

Supplementary table for Figure 1 in main manuscript: Between-year comparisons for cross-sectional risk ratios by language status

Academic Year	NES	EPB	Current EL
	Estimate (*SE*)		
09/10 vs. 10/11	.00 (.12)	.04 (.06)	-.10 (.12)
10/11 vs. 11/12	.00 (.12)	.03 (.06)	-.10 (.12)
11/12 vs. 12/13	.00 (.11)	.02 (.06)	-.08 (.12)
12/13 vs. 13/14	.03 (.11)	-.02 (.06)	-.02 (.12)
13/14 vs. 14/15	.00 (.11)	.00 (.06)	.09 (.12)
14/15 vs. 15/16	-.07 (.11)	.02 (.06)	.14 (.11)
15/16 vs. 16/17	-.04 (.11)	.04 (.06)	.04 (.11)
16/17 vs. 17/18	.03 (.11)	.04 (.06)	-.12 (.11)
17/18 vs. 18/19	.00 (.11)	.00 (.06)	-.05 (.11)

Note. All comparisons were conducted using the Bonferroni adjusted alpha. None of the comparisons were significant.

Table S2

Supplementary Table for Figure 2 in Main Manuscript: Between-Year Comparisons for Cross-Sectional Risk Ratios by Income and Language Status

Academic Year	Lower Income Status			Higher Income Status		
	NES	EPB	Current EL	NES	EPB	Current EL
	Estimate (*SE*)					
09/10 vs. 10/11	.37 (.33)	-.07 (.33)	-.48 (.33)	-.17 (.75)	.12 (.75)	.03 (.75)
10/11 vs. 11/12	.04 (.30)	.02 (.30)	-.03 (.30)	.40 (.67)	.06 (.67)	-.05 (.67)
11/12 vs. 12/13	.08 (.29)	-.06 (.29)	-.41 (.30)	.46 (.64)	-.10 (.64)	-.09 (.64)
12/13 vs. 13/14	-.03 (.29)	.06 (.29)	-.08 (.29)	-.10 (.64)	.07 (.64)	-.05 (.64)
13/14 vs. 14/15	.03 (.28)	-.04 (.28)	.10 (.28)	.14 (.62)	.11 (.62)	-.06 (.62)
14/15 vs. 15/16	-.08 (.28)	.11 (.28)	.28 (.28)	-.03 (.62)	-.03 (.62)	.10 (.62)
15/16 vs. 16/17	.02 (.30)	-.01 (.30)	.02 (.30)	.52 (.67)	-.02 (.67)	-.05 (.67)
16/17 vs. 17/18	-.03 (.24)	.11 (.27)	.11 (.27)	.48 (.54)	.03 (.60)	-.27 (.60)
17/18 vs. 18/19	.01 (.18)	-.03 (.21)	-.11 (.21)	.03 (.40)	-1.26 (.48)	-.14 (.48)

Note. $*p < .001$. All comparisons were conducted using the Bonferroni adjusted alpha.

Contextualizing Potential Under-Identification

Finally, in Table S3, we present the number of EPBs and Current ELs identified for SPED from 2009 to 2019. Table S3 includes 1) the total number of EPBs and Current ELs (i.e., from both lower and higher-income families) and 2) Current ELs identified for SPED from higher-income families (i.e., the income status group under-identified in SPED). By doing so, we aim to contextualize the observed low risk-ratios of EPBs and Current ELs. To be clear, this is not to suggest that more EPBs and Current ELs *should be* identified for SPED services. Rather, this is to simply contextualize the low risk-ratios of total EPBs and Current ELs and higher-income household Current ELs compared to the risk ratio of 1.0 (i.e., proportionate representation). To note, as shown in Figure 2 in the main manuscript, Current ELs from lower-income homes were generally proportionately identified for SPED (i.e., risk ratios around 1.0) and thus were not included in the table below. Likewise, given that EPBs from both levels of

income status were similarly potentially under-identified in SPED, we only include their data for the total EPB sample.

Table S3

Observed Number of EPBs and Current ELs Identified in SPED and Additional Number of EPBs and Current ELs that Would be Needed for Proportional SPED identification, by Full Sample and Higher-Income Status

Academic Year	Total				Higher Income Status	
	EPBs identified for SPED	Additional EPBs Needed for 1.0 Risk Ratio	Current ELs identified for SPED	Additional Current ELs Needed for 1.0 Risk Ratio	Current ELs identified for SPED	Additional Current ELs Needed for 1.0 Risk Ratio
09/10	1,500	2,357	1,124	607	188	636
10/11	1,631	2,960	1,343	440	198	624
11/12	1,792	3,558	1,641	225	174	652
12/13	2,061	4,134	1,875	112	196	672
13/14	2,332	4,821	2,195	46	185	772
14/15	2,307	4,731	2,344	162	318	805
15/16	2,321	4,514	2,593	479	328	984
16/17	1,981	4,301	2,807	455	568	811
17/18	2,036	4,540	2,983	205	1,248	701
18/19	2,148	4,878	3,034	9	1,279	525

Figure S1

Yearly District-Level Risk Ratios by Language Status for 28 Target Districts