Title

The Impact of Screen-Free Zones in an Undergraduate Psychology Classroom: Assessing Exam Performance and Instructor Evaluations in Two Quasi-Experiments

Journal

Teaching of Psychology, 49(4)

ISSN

0098-6283

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Publication Date

2022-10-01

DOI

10.1177/00986283211017443

Learning Disabilities Research & Practice, *0*(0), 1–10

DOI: 10.1111/ldrp.12316

LEARNING DISABILITIES
RESEARCH & PRACTICE

English Learners' Performance on a Measure of Dyslexia Risk

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Many schools now screen students for dyslexia in early grades. However, there are valid concerns that these screeners may be biased or ineffective at screening students who are not yet proficient in English (i.e., English Learners; ELs). The present study examined the performance of 54 first graders on a dyslexia screener. Results showed that students who were ELs performed similarly to their peers who were proficient in English on many literacy subskills. Additionally, we found that EL students were not significantly more likely to be "flagged" as at risk for dyslexia. These findings have practical implications for using universal screeners to identify students, including students who are designated ELs, as being at risk for learning disabilities, including dyslexia.

Dyslexia is a learning disability with a neurobiological origin that effects reading (Lyon et al., 2003). Although it is difficult to determine the exact prevalence of dyslexia (see Wagner et al., 2020), it reportedly affects anywhere from 5% to almost 20% of students (Shaywitz et al., 1992; Wagner et al., 2020). Students with dyslexia struggle with word recognition, spelling, reading fluency, and/or reading comprehension (Lyon et al., 2003; Miciak & Fletcher, 2020) and may experience secondary attentional and affective sequela of their reading challenge (e.g., Haft et al., 2019). Typically, students are not identified with dyslexia until later in elementary school, after they have repeatedly failed to learn to read. Yet, reading interventions in kindergarten and first grade are more effective than reading interventions in later grades (Lovett et al., 2017; Wanzek et al., 2016). This leads to a "dyslexia paradox" where students must struggle for years before they are given help for their dyslexia (Ozernov-Palchik & Gaab, 2016). Given this paradox, there is a push to have students identified earlier as at risk of, or with, dyslexia.

Most states now have legislation related to early universal screening of students for dyslexia (National Center on Improving Literacy, 2022; Petscher et al., 2019). By definition, universal screening requires that all students participate in this screening. However, there is an ongoing debate around if English Learners (ELs), or students who are not yet proficient in English, should be screened for dyslexia in English. On the one hand, it makes sense to wait on screening until the school deems these students fluent in English, so that any identified reading challenges are not confounded by their English proficiency. On the other hand, there are valid concerns that failing to screen these students may mean that students who are ELs who also have dyslexia miss out on the window to receive the most effective reading interventions. In states like California, where approximately 18% of students are English Learners (California Department of Education, 2021), the debate around screening ELs for dyslexia is especially relevant and increasingly contentious.

When discussing dyslexia in the context of schools, it is important to point out that, traditionally, schools do not identify students with dyslexia. Rather, students who have dyslexia may be found eligible for special education services if they have a diagnosed learning disability (LD), which includes an LD like dyslexia (Individuals With Disabilities Education Act, 2004). Although there have been some concerns that universal screening for dyslexia will overwhelm schools' special education programs, this does not seem to be the case. Phillips and Odegard (2017), for example, found that in states with laws that require screening for dyslexia, schools are not identifying more students with LD for special education services. Further, for the couple of states that collect data on dyslexia identification in schools, rates of students identified with dyslexia are only around 5%, suggesting that students with dyslexia may currently be under-identified in public schools (Phillips & Odegard, 2017). Taken together, early screeners for dyslexia are necessary, but they are simply the first step in a complex process to determine whether a student does, in fact, have dyslexia. Ultimately, the results of a screener serve to inform teachers of the *probability* that a child will develop dyslexia (see Catts & Petscher, 2022), as well as help teachers provide early help to any struggling reader.

Screening for Risk of Dyslexia

To address the so-called dyslexia paradox, a number of screeners have been developed to specifically screen young students for dyslexia, and many of these screeners are created for use in a classroom/school set-

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ting (see https://www.gaablab.com/screening-for-reading-impairments). Screeners typically collect information on students' performance on a number of academic and literacy skills. Many dyslexia screeners include subtests that measure students' phonological awareness (PA). Broadly, PA refers to the ability to identify, blend, and manipulate the sounds within words (Anthony & Francis, 2005). This skill is related to reading ability, and students' performance on a measure of PA can predict their reading performance, especially their word reading accuracy, even before students begin to read (Carroll et al., 2016; Hogan et al., 2005; Powell & Atkinson 2021; Snowling et al., 2019). Importantly, research has shown that many students with dyslexia struggle with PA (Fletcher et al., 1994; Ozernov-Palchik & Gaab, 2016; Snowling et al., 2019).

Another precursor to students' reading ability is their performance on a measure of Rapid Automatized Reading (RAN), and some dyslexia screeners measure students' performance on RAN. How quickly a child can name a variety of objects, letters, numbers, or colors on a RAN assessment has been shown to be uniquely related to and predictive of their reading performance, especially their reading fluency performance (Denckla & Cutting, 1999; Georgiou et al., 2013; Norton & Wolf, 2012). Moreover, RAN is predictive of reading ability, even after controlling for students' PA skills (McWeeny et al., 2022). RAN requires rapid connections between and among some of the same visual and linguistic processes used in early reading, so this task is well suited for identifying risk of dyslexia.

Early in elementary school, students' knowledge of letters and their knowledge of the sounds the letters represent is predictive of their reading skills several years later (Catts et al., 2001; Hulme et al., 2012; Pennington & Lefly, 2001). In addition, once students begin to read, a measure of how well students read words in isolation is a good indicator of their reading ability, since struggling to decode single words, especially nonsense or unfamiliar words, is a sign of dyslexia (Lyon et al., 2003). To summarize, a screener for dyslexia should consist of multiple measures, including some of the measures described here.

Other Factors Associated with Risk of Dyslexia Identification

In addition to reading and literacy skills, students' sociodemographic characteristics (i.e., race, ethnicity, family income, and home language) can also impact their chance of being identified with dyslexia. In the United States, these factors can influence the type of health care students have access to, which may be necessary for obtaining a dyslexia diagnosis. These factors can also determine the demographic characteristics of the school a student attends (i.e., racial and economic makeup of that school), and school context matters for identification of disabilities, including LD (Hibel et al., 2010).

Similarly, parents' socioeconomic status (SES) can affect the likelihood a student is identified with dyslexia. A report on parents of children with dyslexia found that 75% had a bachelor's degree or higher (Denton et al., 2022). Additionally, most (60%) of these parents reported that schools did not adequately respond to their requests for dyslexia evaluation, so they paid for a costly, private evaluation.

The current push for dyslexia screening and identification in public schools may allow more families from lower SES backgrounds to access a dyslexia diagnosis and related supports for their child. There is some evidence for this shift. A recent study on thousands of children in one state showed that parent SES, as measured by student eligibility for free or reduced-price lunch, was not a significant factor in predicting which students were identified for dyslexia once universal screening for dyslexia was implemented (Odegard et al., 2020).

Less is known about the rates of EL students with dyslexia, although research on ELs with LD may be relevant here. Studies have shown that students who are ELs have been both underrepresented and overrepresented in special education with LD (Artiles et al., 2005; Morgan et al., 2018; Sullivan, 2011). This phenomenon could be at least partially due to the fact that ELs are less likely to be in special education in younger grades and, therefore, may miss out on early interventions, and then are more likely to be in special education with an identified LD in higher grades (Samson & Lesaux, 2009; Yamasaki & Luk, 2018). One study that looked specifically at ELs at risk for dyslexia found that by third and fourth grade, students who are identified both as ELs and at risk for dyslexia have considerable academic challenges that require intense interventions (Miciak et al., 2022). These studies highlight the need for improved screening and early intervention for ELs at risk for dyslexia.

Dyslexia and English Learners

Dyslexia occurs in all studied languages (Peterson & Pennington, 2012), yet the prevalence of dyslexia in a given language depends on orthographic transparency, or how closely and consistently letters or symbols map on to sounds (Borleffs et al., 2019). English is known to be orthographically opaque, making it difficult to "sound out" unfamiliar words. This inconsistency also makes it difficult for individuals who are learning English as a second language to map what they already know in their first language onto this new, sometimes more inconsistent, language than their first language.

Due to this challenge, some teachers are hesitant to screen ELs for dyslexia because they are concerned these students will be overidentified as being at risk for dyslexia simply because they are unfamiliar with English (Stavely, 2022). Waiting until ELs become reclassified as proficient in English, which generally happens in the first few years of schooling (Slama, 2014), may prevent some of these students from being incorrectly labeled as at risk for dyslexia (i.e., false positives captured by the screener). However, this delay could also prevent ELs who do in fact have dyslexia (i.e., true positives captured by the screener) from receiving the most effective reading interventions for students with dyslexia. Further, a nontrivial number of students remain classified as ELs beyond elementary school (Rhinehart et al., 2022), and screening should not be delayed to that extent in a child's schooling.

Some research on screening ELs for LDs like dyslexia suggests that students should be assessed on their reading skills in their first language. Klinger et al. (2006), for example, recommend that students who are ELs be evaluated in their first language, in addition to English. In response to these recommendations and concerns, dyslexia screeners are being developed for US students in languages other than English, including Spanish and Mandarin (e.g., Berthold, 2022). Screening students in a language other than English is especially relevant for the growing number of students who participate in dual-language immersion programs. Students in these immersion programs often learn to read in more than one language, and these programs have been shown to be highly effective for ELs (Collier & Thomas, 2004).

For Spanish-speaking ELs, which are the majority of ELs in the United States, there is some evidence that English assessments are useful. For kindergarten bilingual students, their PA skills in Spanish, for instance, are related to their PA skills in English (Branum-Martin et al., 2006). Additionally, Youman and Mather (2020) found that English assessments (i.e., PA and RAN) for Spanish-speaking ELs are predictive of their reading achievement in English. Still, other studies have suggested that some measures on screeners may overidentify ELs at risk. Linklater et al. (2009) compared EL and "English Only" kindergarten students' performance on several measures of phonemic awareness (i.e., initial sound fluency, phoneme segmentation fluency, and a phoneme segmentation task) in English. They found EL status was not associated with initial performance on two of the three skills, but ELs showed lower performance on the initial sound fluency task. These findings suggest that ELs in kindergarten could be overidentified as at risk for reading challenges if certain skills, especially phonemic awareness skills that may rely more on English vocabulary knowledge, are included in a screener. Taken together, these studies suggest that English assessments and screeners may be meaningful for young students who are ELs, yet this is an area that needs more research.

Research Questions

The dramatic rise in the use of screeners for dyslexia, coupled with the lack of research on the appropriateness of these screeners for students who are ELs, motivated this study. Our goal was to explore whether students designated as ELs perform differently on a dyslexia screener, so that teachers, school administrators, and policymakers may have additional information when deciding whether and how to screen ELs for risk of dyslexia in English.

Specifically, we asked the following two research questions: (1) To what extent do students identified as ELs perform differently on dyslexia assessments than students who are not identified as ELs? (2) Compared to their classmates, are students who are designated ELs more likely to be flagged as at risk of dyslexia by a screener? In answering these questions, we aimed to help researchers, policy makers, and especially practitioners use and interpret information from dyslexia screeners more appropriately.

METHODS

Participants and Procedures

Participants were first-grade students ($N = 54$; 57% girls), who attended a public elementary school in a large urban area in California. In the entire school, 99.8% of students were classified as "economically disadvantaged," and 40.6% were designated ELs. The majority of students in this school, about 95%, identify as Latinx.

In all grades, the school offers families the option to enroll their child in a Spanish Dual-Language Two-Way Immersion Program. Students in this program receive literacy and content-area instruction in Spanish for at least 50% of the school day. Roughly, 29% of students in the school participate in this program.

The school provided the research team with administrative data on students' home language and language skills. These data included students' English Language Proficiency (ELP) designation. For students in this school, there are four options under the ELP category: English Only (EO), Limited English Proficient (LEP), Initially Fluent English Proficient (IFEP), or Reclassified Fluent English Proficient (RFEP). In this state, IFEP students are students whose performance on the state-adopted English language development test shows they have "well developed" listening, speaking, reading, and writing skills in English; RFEP students are former LEP students who have met the criteria to be reclassified as English proficient.

The majority of students in our sample were EO ($n = 25$) or LEP ($n = 23$). A few students were classified as IFEP ($n = 4$) or RFEP ($n = 2$). Because these students are considered "proficient" in English, we combined students who were designated either IFEP or RFEP with students in the EO group. We operationalized ELs as students designated by the school as LEP.

Children whose parents consented to the study and who provided verbal assent were screened using a digital dyslexia screener in the spring of their first-grade year. Participating students also took two traditional reading assessments on the same day. It took students about 40 minutes to complete the screener and the two additional assessments. Testing took place over one week.

Measures

Digital Dyslexia Screener

Eight measures were administered as part of the EarlyBird digital assessment battery. This screener is a gamified app that identifies students at risk of reading challenges or dyslexia (Gaab & Petscher, 2021). Once students engage with the app, they are paired with a cartoon-like animal figure that guides them through the games (i.e., subtests) and demonstrates how to complete each task. Students receive a prize within the app upon completion of each game (regardless of performance level), and completing each game helps the animal figure toward its goal of playing in a park. Students appeared to enjoy interacting with the app.

Students completed the EarlyBird measures on an iPad using headphones with an attached microphone. Six tasks were administered in a group setting with trained testers observing. For two tasks (i.e., nonword repetition and blending), trained testers observed the students completing these tests one on one to ensure students responded verbally to the stimuli and spoke into the microphone. The digital assessments used computer adaptive algorithms, based on item response theory, such that students' responses to initial questions determined the difficulty and number of subsequent questions they were asked (see Gaab & Petscher, 2021).

Letter Names. In this task students heard the name of a letter and then identified the letter by selecting the correct one, out of four options displayed in a 2 × 2 grid.

Letter Sound Knowledge. Students heard the sound of a letter or a digraph (e.g., \b\, \ch\). Students then selected the letter or digraph that matched the sound, out of four options displayed in a 2 × 2 grid.

Vocabulary. Students heard a vocabulary word and then were prompted to select an image, out of four images in a 2 × 2 grid, that best represented the vocabulary word.

Phonological Awareness, Blending. In this task, each child heard two or more sounds or parts of a word and blended them together to make a real word. When the child said the word, their response was recorded and automatically scored by the app using voice analysis software.

Phonological Awareness, Rhyming. Students were presented with three pictures (e.g., a duck, a man, and a fan) on the screen. Students then heard the word associated with each picture. Next, they were instructed to select the two pictures that rhyme by tapping the pictures on the screen.

Nonword Repetition. On this subtest, students heard a word, and they repeated back what they heard. The words were nonsense words (e.g., "*tav*") comprised of one to five syllables. Similar to the blending task, this task relied on software that recorded the student and quickly scored their response as correct or incorrect.

Follow Directions. In this task, students saw an assortment of objects on the screen, and they were prompted to touch specific objects, often in a particular order. As the task progressed, students saw more objects and heard more complicated directions.

Oral Sentence Comprehension. Students listened to a sentence or a series of sentences often describing an event or series of events. They then chose an image, out of four options, that best represented what they heard.

EarlyBird Dyslexia Flag. The EarlyBird assessment "flags" students who are at risk for dyslexia. Whether or not a first grader is flagged is based on their performance on subtests that are most predictive of "severe word reading difficulties" (i.e., dyslexia), based on research done by the developers of EarlyBird (Gaab & Petscher, 2021). At the time of our testing, for first graders, the three subtests that comprised the score that resulted in a potential dyslexia flag were as follows: follow directions, rhyming, and nonword repetition. Information on the analyses used to determine the three subtests that comprised the dyslexia risk flag, along with the proportion of students who were ELs in the validation sample is available in the Technical Manual (Gaab & Petcher, 2021).

Traditional Paper-and-Pencil Tasks

Rapid automatized naming (RAN). We measured students' performance on the letter RAN. In this task, after a practice task, children named an array of 50 letters on a page, 5 rows of 10 letters, as quickly and accurately as possible. The letter RAN is a test from the rapid automatized naming/rapid alternating stimulus (RAN/RAS) tests (Wolf & Denckla, 2005). This assessment was given one on one with a trained assessor who timed the students on this task.

Sight word efficiency (SWE) and phonemic decoding efficiency (PDE). Two subtests from the Test of Word Reading Efficiency (TOWRE-2; Torgesen et al., 1999) were used. In the SWE assessment, students read real words from a list as quickly as they can within 45 seconds. In the PDE task, students read as many nonwords as they could within 45 seconds. On both lists, words start out simple and short and get progressively more challenging. This test was administered one on one to students and immediately scored by a trained tester.

Analysis Methods

To answer our first research question, students who were designated LEP ($n = 23$) were compared to students who were EO ($n = 31$) using *t*-tests on all subtests. Next, to determine if there was an association between our two categorical variables: ELP status (EO or LEP) and dyslexia risk flag (yes or no), we performed a chi-square test of independence (see Franke et al., 2012). In doing so, we compared our observed frequencies to the frequencies we would expect, if there were no association between these variables.

RESULTS

Differences in Subtest Performance by ELD Group

Table 1 shows descriptive statistics, including mean theta scores, on each subtest of the screener for LEP students and EO students, respectively. The distributions of the LEP and the EO students on all outcomes of interest, other than letter knowledge, were sufficiently normal for the purposes of conducting a *t*-test (i.e., $-0.77 >$ skew < 1.24 and $-2.00 >$ kurtosis < 3.50; Schmider et al., 2010). For students identified as LEP, letter knowledge was nonnormally distributed with skewness of -3.14 ($SE = 0.48$) and kurtosis of 8.61 ($SE = 0.94$); for students identified as EO, letter knowledge was nonnormally distributed with skewness of -2.33 ($SE = 0.42$) and kurtosis of 3.65 ($SE = 0.82$).

We conducted *t*-tests with all measures, including letter knowledge, because of the robustness of the *t*-test, the relatively small deviations from normality, and the moderately large sample size. The assumption of homogeneity of variance was tested for all outcomes of interest. It was satisfied via Levene's *F*-test for letter knowledge, letter sound knowledge, vocabulary, nonword repetition, oral sentence

TABLE 1
Descriptive Statistics of Literacy Skills by Participants' English Learner Status ($N = 54$)

Measure	*Limited English Proficient* (n = 23)			*English Only* (n = 31)		
	M	SD	*Range*	M	SD	*Range*
Letter names	4.50	1.65	–0.78 to 5	4.26	1.95	–0.78 to 5
Letter sounds	1.99	2.25	0.02 to 5	3.04	2.34	0.01 to 5
Vocabulary	–0.12	1.16	–1.95 to 2.65	1.10	1.67	–1.3 to 5
Blending	0.44	0.76	–1.19 to 1.77	0.94	1.77	–2.39 to 5
Nonword repetition	0.17	0.77	–1.06 to 1.6	0.54	0.92	–1.06 to 2.38
Rhyming	0.00	0.71	–1.51 to 1.05	1.20	2.19	–1.18 to 5
Oral sentence comp.	–0.02	0.97	–1.52 to 2.64	0.78	1.26	–1.93 to 5
Follow directions	–2.03	1.75	–5 to 0.34	–1.58	1.68	–5 to 1.2
RAN (seconds)	37.26	8.14	26 to 57	40.26	14.59	26 to 90
Real word reading	28.35	15.44	5 to 60	30.94	22.03	0 to 70
Nonsense word reading	11.52	6.92	2 to 25	14.13	9.71	0 to 43

RAN = rapid automatized naming; oral sentence comp. = oral sentence comprehension.

TABLE 2
Results of *t*-Tests Comparing Reading Subtest Performance by English Language Development Status

Measure	t	df	*Sig. (2-Tailed)*
Letter names	–0.47	52	0.64
Letter sounds	1.66	52	0.10
Vocabulary	3.01	52	0.004**
Blending	1.42	43.13	0.16
Nonword repetition	1.54	52	0.13
Rhyming	2.85	38.07	0.01*
Oral sentence comprehension	2.54	52	0.01*
Follow directions	0.95	52	0.35
RAN (seconds)	0.96	48.76	0.63
Real word reading	0.51	51.87	0.61
Nonsense word reading	1.10	52	0.28

Note. Equal variance not assumed for test of blending, rhyming, RAN, and real word reading.
RAN = rapid automatized naming.
*$p < .05$.
**$p < .01$.

comprehension, following directions, and reading nonsense words, all $F(52) > 0.2$, all ps $> .17$. However, the assumption of homogeneity of variance was not satisfied for blending, $F(52) = 4.02$, $p = .05$; rhyming, $F(52) = 17.75$, $p < .001$; RAN, $F(52) = 5.63$, $p = .02$; or real word reading, $F(52) = 4.31$, $p = .04$. The subsequent *t*-tests were conducted with equal variances not assumed.

No significant differences were found as a function of ELD status on performance of the following measures: letter knowledge, letter sound knowledge, blending, nonword repetition, following directions, RAN, real word reading, and nonsense word reading, all ps $\geq .1$ (see Table 2). Students designated as EO performed better than students designated as LEP on vocabulary, rhyming, and oral sentence comprehension, all ps $\leq .01$. Cohen's d for each of these measures was estimated at 0.85, 0.74, and 0.71 respectively, indicating a moderately large effect (Cohen, 1992).

Dyslexia Flag Results

Overall, 33% of students in our sample were flagged as being at risk for dyslexia. Twenty-six percent of EOs were flagged, and 43% of ELs were flagged (see Figure 1). To answer our second research question, we used a chi-square test to look for evidence against our null hypothesis (i.e., ELP status and dyslexia risk flag are independent). Results from the chi-square analysis showed there was not a statistically significant relationship between the two variables (i.e., ELP status and dyslexia risk flag), X^2 $(1, N = 54) = 1.15$, $p = .28$.

DISCUSSION AND IMPLICATIONS

Addressing the dyslexia paradox requires early screening for dyslexia risk, but there are practical and equity concerns about screening ELs, which research has not fully addressed. To investigate how students who are ELs perform on a dyslexia screener, we analyzed data from a digital dyslexia screener given to first-grade students, approximately half of whom were ELs. First, we looked for differences between the groups on their performance on multiple measures related to reading. Next, we looked for differences in rates of dyslexia risk identification between the groups. We discuss our key findings below, which have practical implications for students, teachers, and policymakers.

ELs Performed Similarly to EOs on Multiple Measures

Students' scores on the dyslexia screening subtests did not significantly differ as a function of ELD status for most subtests, including letter knowledge, letter sound knowledge, blending, nonword repetition, following directions, RAN, real word reading, and nonsense word reading. This suggests students who are ELs are performing similarly to their non-EL peers on a number of critical skills related to reading achievement and dyslexia (i.e., phonological awareness and

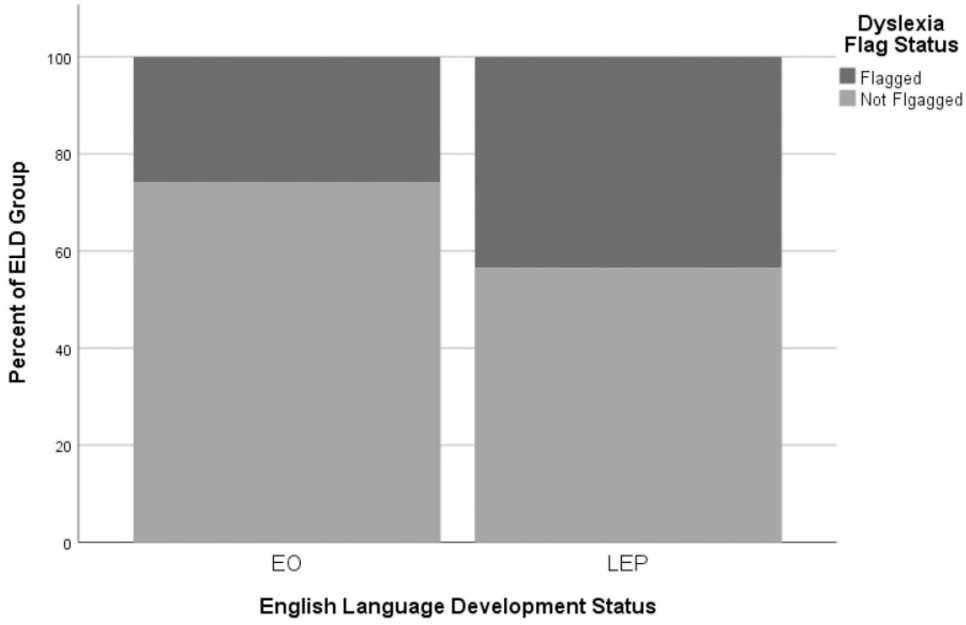

FIGURE 1 Percent of students in each English language development group flagged for dyslexia risk.
Note. EO = English Only; LEP = Limited English Proficient; ELD = English Language Development.

RAN; Wolf & Bowers, 1999). This finding may be related to the context (i.e., similarities between students in the one school we observed). More specifically, it could be related to the dual-language program at the participating school. Dual-language and bilingual programs have been shown to be especially helpful for improving ELs' reading and language skills (Collier & Thomas, 2004; Durán et al., 2010).

Although ELs performed similarly on most subtests, there were significant differences between these groups on three subtests. We found that the EL students in our study struggled with rhyming, compared to their non-EL peers. The ability to identify words that rhyme is a PA skill, and students with dyslexia tend to struggle with this skill (Farris et al., 2016; Høien et al., 1995; Shaywitz & Shaywitz, 2005). It is unclear why ELs struggled on the rhyming task but not on the other tasks that tap phonological skills (i.e., blending and nonword repetition). However, since students' ability to identify words that rhyme is related to and predictive of proficient word reading (Høien et al., 1995), and rhyming was one of the subskills that contributed to the dyslexia risk flag in the screener we used (Gaab & Petscher, 2021), instruction and interventions on rhyming skills are important. Fortunately, phonological skills like rhyming are amenable to intervention (Farris et al., 2016), and school-based interventions in both English and Spanish have been shown to improve Spanish-speaking ELs' phonological awareness skills and reading performance (Quiroga et al., 2002; Vaughn et al., 2006).

Our finding that EL students struggled on oral language in English (i.e., receptive vocabulary and oral sentence comprehension), compared to their EO peers, is consistent with the results of other studies showing that young ELs have lower vocabulary scores than their non-EL peers and that this performance is predictive of their later literacy skills in English (August et al., 2005; Grimm et al., 2018). This is not surprising, given that ELs' language and vocabulary knowledge is spread across two languages, and that these students are still learning English.

From a theoretical view, the simple view of reading (Gough & Tunmer, 1986), which has shown that both decoding and oral language comprehension are required for successful reading comprehension, is relevant here. The "simple view" suggests that even when ELs are successful at decoding, they still need to develop strong oral language comprehension in order to be able to read proficiently. Although there are other elaborations of the simple view (e.g., Kim, 2017), there is empirical evidence for this view even for students who are ELs (Cho et al., 2019; Grimm et al., 2018). Thus, improving ELs' vocabulary skills in English should be a priority. There are a number of effective strategies that teachers can use to help young ELs grow their oral skills in English (e.g., leveraging and developing their first language; August et al., 2005; Lugo-Neris et al., 2010). Similar to literacy interventions, these language interventions are most effective in the early grades, further highlighting the importance of dyslexia screeners and follow-up interventions linked to students' results on these screeners.

Dyslexia Risk Did Not Differ by EL Status

One third of the students in our study were flagged for risk of dyslexia. Although this may seem high, given that the range of students with dyslexia is usually from 5% to 20%, not all students who are at risk of dyslexia will develop

dyslexia. That is, early screeners identify many "false positives," which includes students who do not have dyslexia but who simply need additional and perhaps more targeted reading instruction (Catts et al., 2009). Screeners can identify which students need additional reading instruction. When screeners are used this way, subsequent instruction and intervention can prevent students from developing some forms of reading disabilities (Catts & Hogan, 2020) and ameliorate the effects of dyslexia. Thus, early screening for dyslexia is a necessary part of a preventive program.

Once students are identified as at risk for dyslexia, these students would benefit from targeted instruction within a response to intervention (RTI) or multitiered systems of support (MTSS) program. Traditionally, RTI/MTSS programs have been used with students, including ELs, who are at risk of LD (Brown & Doolittle, 2008). Broadly, these programs attempt to replace "wait to fail" models by ensuring that all students receive solid, evidence-based reading instruction in Tier 1. Students who do not meet predetermined goals in a traditional setting receive interventions in a small group or Tier 2 setting or, if necessary, in an even more intensive Tier 3 setting. Data collected during all three tiers of the MTSS/RTI process can be used to determine if a student has dyslexia. In these models, the screener is simply the first step in a multistep process that aims to tease apart "dyslexia" from "at risk of dyslexia," while simultaneously reducing the chances that students develop dyslexia or that students with dyslexia develop more severe and intractable reading challenges.

Our study has implications for including ELs in early RTI/MTSS programs because our results suggest that literacy screeners may not overidentify ELs as at risk of dyslexia. There is strong evidence supporting kindergarten and first-grade intervention for struggling readers (Lovett et al., 2017; Wanzek et al., 2016), and dyslexia screening can help students access helpful literacy resources, while not necessarily having implications for involvement in special education. Further, O'Connor et al. (2013) found that an RTI/MTSS program in Grades 1–4 reduced disproportionate representation of ELs in special education with learning disabilities, suggesting that students who are ELs can benefit from participating in tiered literacy support programs, which often begin with screening.

Given these findings and our finding that there was not a statistical difference in rate of identification, the screening of all students, including ELs, for dyslexia risk is likely to be a net positive. However, while we do not find evidence of a statistical difference between EO and ELs in likelihood of being identified as at risk for dyslexia, our finding that 17% more students who are ELs are flagged for dyslexia is still of concern in a practical sense, even if not statistically. In light of this, we suggest that practitioners interpret results of dyslexia flagging for ELs within the broader context of a student's individual assets, needs, and circumstances (i.e., their level of dyslexia risk and resilience; Catts & Petscher, 2022).

Additionally, our results may have implications for reducing bias in dyslexia screening and eventual special education services for reading disabilities, which has been shown to under-identify students who are Latinx or ELs in the United States (Morgan et al., 2018; Odegard et al., 2020; Samson & Lesaux, 2009). More than 75% of ELs in the United States are Latinx, and nearly 30% of Latinx students are ELs (US Department of Education, 2019), so our results, which have implications for ELs, may also have implications for improving the academic achievement of students who identify as Latinx. Historically, an achievement gap in reading has existed between students who are Latinx and students who are White. While this gap has shrunk in the last few decades, more work needs to be done to close it. Early and accurate identification of dyslexia, or risk of dyslexia, for students who are ELs may contribute to shrinking the achievement gap between students who are Latinx and students who are White even further.

Our study also has implications for closing the EL reading achievement gap (US Department of Education, 2012) because our results suggest that it is possible to equitably screen EL and non-EL students in first grade. Screening can allow for evidence-based reading interventions for EL students at risk of experiencing reading challenge (see Solari et al., 2022), which could target this achievement gap. This chasm could be the result, in part, of decisions in earlier grades not to provide intensive reading intervention to EL students, even when they are at risk of experiencing reading challenge (separate from their proficiency in English; Samson & Lesaux, 2009).

Limitations and Future Directions

Our study has notable strengths. In particular, it adds to the limited and much-needed research on dyslexia screening of students who are designated ELs. In light of the sensitivity of this issue, the dearth of research, and the rapid rollout of early universal screening legislation across the United States, the focus of this study is timely and important. Additionally, the study features a relatively large EL population for a single first-grade class and the use of an adaptive digital literacy screener. Nevertheless, the limitations are several and set the stage for further investigations by us and others.

First, we only tested students in one school. This school had a large EL population, and the home language of these ELs and many non-ELs in the school was Spanish. Results may be different for students attending schools with fewer ELs or with a more heterogeneously mix of home languages. That said, our results are relevant for ELs who attend schools with many other ELs, which is common in the United States, where most ELs attend schools where more than 20% of students are ELs (US Department of Education, 2015). Relatedly, given that we examined only one school, our sample size was relatively small. Although our sample size was large enough to conduct the analysis used here, future studies should analyze the association between ELs' and EOs' performance using larger and more diverse samples. While a larger sample size would aid the generalizability of our findings, given that many ELs are already being assessed by dyslexia screeners, it was essential to begin this line of inquiry, as we have done here. Second, we did not look at "newcomers," or students with very limited exposure to English. We only assessed students whose teachers reported

that they understood English. At the participating school, there was only one student who did not meet this criterion. Finally, dyslexia screening is complex, and some screeners evaluate different subskills than the screener we used, and/or use different methods to determine which students are at risk (e.g., Burns et al., 2022). For this reason, we administered the RAN and TOWRE tests, both of which are backed by extensive research indicating their prediction power. Thus, these findings should be viewed as relevant for the assessments used here and are not generalizable to all dyslexia screeners. Future studies using other dyslexia screeners are underway by us and others and are needed to determine if dyslexia screeners are generally appropriate for students who are ELs.

More work is needed to follow longitudinally the reading and social-emotional outcomes for ELs who have had early screening and, if called for, early intervention for reading challenges. Such work would add to our understanding of the relative costs and benefits of screening ELs. In light of recent state legislation encouraging or requiring schools to screen all students in early grades for dyslexia, many schools across the United States are beginning to do so. Indeed, in California, the state with the largest EL student population, early universal screening legislation has not yet become law at the time we conducted this study but is being intensely debated. This presents a high-stakes natural experiment of the effects on students of early screening, which research should examine.

CONCLUSION

Dyslexia is a prevalent learning disability that, like many learning disabilities, can greatly affect students' school experience, well-being, and self-concept (Haft et al., 2019; Lackaye et al., 2006; McArthur et al., 2020). Reading challenges associated with dyslexia, and the accompanying negative sequelae, can be avoided or greatly reduced with early intervention. However, ELs often do not receive early reading intervention because concerns about their limited English abilities means that they are never screened for reading challenges or their reading challenges are seen as less important than improving their English proficiency. Given our results suggesting that ELs are not statistically more likely than EOs to be identified as at risk for dyslexia, educators, and policymakers should move toward early literacy screening of ELs to reduce their chance of experiencing reading struggle. Doing so will help support the academic growth and reading development of the many young people who are designated ELs.

Acknowledgments

We wish to thank Maryanne Wolf for her helpful feedback on the manuscript. We would also like to thank the following individuals who helped with data collection: Amy Akiba, HyeYoung Kim, Trang Nguyen, and Veronica Pedroza. Funding for this project was provided by a grant from the Office of Special Education Programs.

Conflict of Interest

We have no known conflicts of interest to disclose.

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