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Oral Reading Fluency Development for Children with Emotional Disturbance or Learning Disabilities

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Abstract

This study used a large state-wide database to examine the oral reading fluency development of second and third grade students with emotional disturbance or learning disabilities and their general education peers. Oral reading fluency measures were administered to 185,367 students without disabilities (general education), 2,146 students identified with an emotional disturbance, and 10,339 students with a learning disability. Student status and growth trends were examined in a piecewise model at each grade level for the full sample as well as for a subsample with reading difficulties. Data suggested students with disabilities performed significantly below students without disabilities in initial status and growth. Gender was also examined as a moderator of outcomes for each of the study groups.

Keywords

learning disabilities; emotional disturbance; reading

Understanding the reading development of students who begin their school careers with weak reading, including students with disabilities, is critical. Beyond the obvious academic difficulties associated with poor reading are important social, emotional, and behavioral issues including a higher risk for high school dropout (Alliance for Excellent Education, 2002), delinquency (Center on Crime, Communities, and Culture, 1997), and future unemployment (National Center on Education Statistics, 2005). Research has shown that some reading difficulties may be intractable (Francis, Shaywitz, Stuebing, Shaywitz, & Fletcher, 1996; Torgesen & Burgess, 1998). Francis and colleagues reported that reading growth for both students with learning disabilities and typically developing students decelerated over time, and described this finding as being consistent with a deficit model of reading development rather than with a lag model in which poor readers catch up over time. The gap existed at initial assessment and was stable over time. Other research consistent with this deficit model has shown that once first graders are well behind their peers in word reading, they rarely catch up (Juel, 1988) because this initial gap between poor and strong reading widens over the elementary years (Cunningham & Stanovich, 1997), and becomes increasingly difficult to close (Fletcher & Foorman, 1994). Nevertheless, findings from some, more recent studies are consistent with the lag model, showing accelerated growth

when students were provided early intervention (e.g., Phillips, Norris, Osmond, & Maynard, 2002; Skibbe et al., 2008).

Reading Growth of Students in Special Education

Reading difficulties, historically, have been the most common reason students receive special education under the specific learning disability (SLD) category (Fletcher, Lyon, Fuchs, & Barnes, 2007), and the number of students classified as having SLD has nearly tripled since 1970 (Swanson & Carson, 1996). Nearly half of all students receiving special education services through the *Individuals with Disabilities Education Act* (IDEA, 2004) do so under the SLD category. The incidence of students identified with emotional disturbance (ED) has also increased, making the size of the ED category the fourth largest among disabilities (U.S. Department of Education, 2011). Like students with SLD, students with ED commonly demonstrate reading deficits (Benner, Nelson, Ralston, & Mooney, 2010; Rice & Yen, 2010).

Students identified with ED or SLD have access to special education services to assist in improving their academic learning outcomes. As educational policies increasingly focus on accountability for growth for all children and, specifically require comparison of special education outcomes to general education outcomes, the question is whether it is actually realistic to expect that special education can “normalize” the reading levels of all or most students with disabilities by altering their reading trajectories and accelerating learning to allow them to reach grade level expectations. Hanushek, Kain, and Rivkin (1998), reported that across grades 3–6, the reading standard scores of students who received special education rose by an average of 0.04 standard deviations per year. Extrapolating their findings suggests that with special education services, if a third grader with a disability was reading at the 20th percentile, s/he would likely enter high school reading below the 25th percentile.

Another technical report used the Special Education Elementary Longitudinal Study (SEELS) data to compare the reading performance of students with SLD who were receiving reading instruction in either general education or special education settings (Schiller, Sanford, & Blackorby, 2008). In general, oral reading fluency rates were higher for students receiving instruction in general education, but regardless of setting, students with SLD did not make gains relative to national norms in reading comprehension. Judge and Bell (2011) examined the Early Childhood Longitudinal Study (ECLS) – Kindergarten cohort database and found a similar achievement deficit for students with SLD. The authors noted depressed reading achievement from the beginning of school (kindergarten) even prior to identification with SLD. In addition, smaller gains in reading achievement were noted through the grade levels for students with SLD in comparison to students without SLD on measures of early literacy skills and comprehension. Morgan, Farkas, and Wu (2011) also examined the ECLS data. They found statistically significant differences in levels of performance at kindergarten between students with SLD and typically developing students, but no differences in slope over the next five years.

Reviews of the literature describing the efficacy of interventions for students with ED or SLD have not demonstrated that student growth in effective interventions has resulted in normalized reading on standardized tests or reaching grade level benchmarks on criterion referenced tests (e.g., Reid, Gonzalez, Nordness, Trout, & Epstein, 2004; Rivera, Al Otaiba, & Koorland, 2006; Swanson & Carson, 1996). Swanson and Carson (1996) conducted a synthesis of the literature to identify effective interventions for students with SLD. The large average effect sizes for strategy instruction (1.07) and direct instruction (.91) suggested that students receiving these interventions performed about one standard deviation higher than

peers who did not receive these interventions, but the authors could not provide evidence that growth was accelerated enough to begin reaching grade level expectations.

Similarly, Rivera and colleagues (2006) reviewed the literature to describe the efficacy of early reading interventions provided to students with ED. Although effect sizes could not be calculated, a consistent trend emerged indicating that students with ED who received the reading instruction did improve their reading ability from pretest to posttest. Again, the review noted that there was little evidence these interventions helped students with ED reach grade level expectations in terms of: increased standard scores, standard score outcomes within the “normal range”, or oral reading fluency rates that met expected grade level benchmarks. Other literature reviews related to the academic performance of students with ED have found that students’ reading performance did not appear to improve over time (e.g., Reid et al., 2004).

Some cross-sectional research has compared the performance of students with SLD or ED and suggested that students with ED showed greater academic performance than students with SLD on several reading measures including word reading and comprehension (e.g., Epstein & Cullinan, 1983; Luebke, Epstein, & Cullinan, 1989). However, only two longitudinal studies, to our knowledge, directly compared reading achievement of students with ED to students with SLD. In the first study, a sample of elementary students with ED or SLD was examined (Anderson, Kutash, & Duchnowski, 2001). The study authors reported that standardized scores for reading achievement only improved for students with SLD, with average standard score improvement from 80.32 to 87.97 over four years. By contrast, students with ED remained at a standard score of about 85 over this same time frame, maintaining growth relative to grade level peers. Wei, Blackorby, and Schiller (2011) used data from the SEELS to examine reading growth trajectories in word reading and comprehension for students in 11 federal disability categories. The findings supported a deficit model as they showed a decelerating quadratic trend. Although reading growth rates were similar across the disability categories, word reading and comprehension was significantly higher for students with ED than students with SLD.

Gender as a Moderator of Reading Growth

Another recent study of SEELS data examined reading growth for students with ED and the findings indicated that gender may be an important moderator (Rice & Yen, 2010). Although no gender differences for students with ED were reported in initial reading level, males with ED grew significantly faster than females with ED, on measures of letter word identification and passage comprehension. However, the authors suggested this difference in reading rate might be due to the severity of learning problems among girls with ED in light of the underidentification of girls with this designation (Cullinan, Osbourne & Epstein, 2004).

Other studies have investigated the gender gap in populations of students with and without disabilities. For example, the Center on Education Policy recently examined trends on the national and state tests from 2005–2009; they reported that girls’ reading performance was higher than boys in elementary, middle, and high school (Kober, Chudowsky, & Chudowsky, 2010). Furthermore, evidence from several large-scale international studies have also reported gender differences in reading performance favoring girls (e.g., Lynn & Mikk, 2009), particularly among poor readers (Wheldall & Limbrick, 2010).

Given the previous research on reading growth and gender differences, we were interested in examining the level and growth in reading longitudinally for students with ED or SLD and their general education peers. Specifically we theorized that growth for students with disabilities might be more consistent with a deficit or gap model rather than a lag model,

and, given previous findings related to gender differences, we sought to evaluate whether gender was an important moderator. We examined the growth trajectories across two grade levels for all students in these groups as well as the subgroup of students demonstrating deficits in reading.

Using Oral Reading Fluency to Understand Reading Growth

Oral reading fluency is a critically important area to consider because the number of words students read per minute is a metric of reading competence and because it strongly predicts reading comprehension (Fuchs, Fuchs, Hosp & Jenkins, 2001). Oral reading fluency rates can reliably distinguish between students with SLD and their peers with speech and language delays (Puranik, Petscher, Al Otaiba, Catts, & Lonigan, 2008) and between students with differing levels of English Proficiency with and without SLD (Al Otaiba et al., 2009). Both oral reading fluency level and rate of growth have been shown to predict current (Roehrig, Petscher, Nettles, Hudson & Torgesen, 2008) and later (Baker et al., 2008; Wanzek et al., 2010) reading performance on statewide tests.

There is a rich history of curriculum-based measures used to track reading performance in order to learn whether growth is sufficient or insufficient to meet grade level expectations. For example, Deno and colleagues (Deno, Fuchs, Marston, & Shin, 2001) examined oral reading fluency growth rates for 324 students with SLD in grades 1–6. While students without SLD were growing at rates of 1.01–1.8 words correct per minute per week in grades 1–4, the students with SLD grew at rates of .57–.83, with only first grade growth reaching levels above .58 words correct per week. Although, a review of the research on effective reading interventions indicated students with SLD may be able to increase growth to rates of 1.39 words correct per minute per week (Deno et al., 2001). There is also evidence that oral reading fluency growth may not be linear (Christ, Silberglitt, Yeo, & Cormier, 2010). The linear and non-linear development of oral reading fluency for students with ED or SLD and the extent to which these students demonstrate accelerated learning in comparison to students in general education has not been examined.

The purpose of this study was to examine the oral reading fluency development of students receiving special education for ED or SLD and their general education counterparts in second and third grade. Primarily, we wished to learn whether, consistent with a lag model, students in special education accelerate their oral reading fluency rates in the early grades compensating for initial low levels of reading, or whether, consistent with a deficit model, students would demonstrate low initial levels of reading along with insufficient growth to catch up to grade level expectations. We also examined whether gender was a moderator of reading achievement in these groups of students.

We hypothesized that students in general education would show higher initial levels of oral reading fluency and growth commensurate with expected benchmarks for the grade level, and students with SLD would show the lowest initial levels of reading fluency given their primary disability related to achievement. Despite receiving special education services, we anticipated our findings would support a deficit rather than a lag model, with students with ED or SLD demonstrating insufficient growth to catch up to expected grade level achievement in oral reading fluency. Given the preponderance of research on the importance of gender differences favoring girls in reading achievement, we hypothesized that gender would moderate outcomes and that across all three groups, females would outperform males.

Method

Participants

Students for the present study were selected from the Progress Monitoring and Reporting Network database, the data management and storage database of more than 1.2 million students in *Reading First* schools in the state of Florida. Data use was approved by the Institutional Review Board. All students with 2 years of data who began second grade in the school years 2003–2008 were included if they were identified with no disability (general education), a primary disability of ED (Florida category of emotional/behavioral disability), or a primary disability of SLD. Across the five cohorts, a total of 197,852 students were identified for the study with 185,367 general education students, 2,146 identified with ED, and 10,339 identified with SLD. No practically important differences were estimated across the five cohorts of students with regard to initial oral reading fluency status ($d = .09$). At the time of data collection, students in Florida were identified with emotional/ behavioral disability if persistent and consistent emotional or behavioral responses that could not be attributed to age, gender, culture, or ethnicity, adversely affected educational performance. According to state guidelines when the data were collected, students were identified with SLD if there was a discrepancy between the student's IQ and academic achievement. Table 1 provides demographic data for each of the 3 study groups.

To specifically examine students with reading difficulties, we also selected a subsample of students all students in each study group that were performing below the 20%ile on the comprehension subtest of the tenth edition of the Stanford Achievement Test (SAT-10; Harcourt Educational Measurement, 2003) at the end of first grade. A total of 38,763 students performed below the 20%ile at the end of first grade, 31,691 students in the general education group (17%), 1,137 students in the ED group (53%), and 5,935 students in the SLD group (57%).

Measures

Oral reading fluency—The oral reading fluency (ORF) subtest of the Dynamic Indicators of Early Literacy Skills (DIBELS; Good & Kaminski, 2002) is a test of accuracy and fluency on grade-level connected text. At the time of the study, the DIBELS were selected by the state of Florida to monitor reading progress four times per year (September, December, February, April). Trained district and school level teams were responsible for testing and entering scores into the Progress Monitoring and Reporting Network with state teams following up on testing procedures to ensure inter-rater reliability.

Student performance on the ORF is measured by having students read three grade-level passages aloud for one minute. Words omitted, substituted, and hesitations of more than three seconds are scored as errors. The number of correct words per minute from the passage is the oral reading fluency rate. The median score of the three passages is reported. Speece and Case (2001) reported a parallel forms reliability coefficient of .94, and strong predictive validity of reading comprehension has been consistently reported (Roehrig et al., 2008).

Stanford Achievement Test, 10th Edition—(SAT-10; Harcourt Educational Measurement, 2003). The SAT-10 is a group-administered, norm-referenced test. In this study, data from the reading comprehension subtest administered at the end of first grade was used to select students with current reading difficulties in the study groups. The reading comprehension subtest requires the student to read passages and answer multiple-choice questions. The reliability coefficient for internal consistency is .91 for the reading comprehension subtest at Grade 1.

Data Analyses

Examining student trends in oral reading fluency across second and third grade is complicated by the increasing difficulty of passages. Thus, oral reading fluency growth is not a continuous trajectory across grades. As such, an extension of traditional multilevel growth models, known as piecewise growth curve models, was used to estimate students' oral reading fluency development allowing for the simultaneous estimation of a two-rate model for ORF growth in second and third grade. Two important components in the application of this methodology are worth noting. First, because students were assessed four times per year on ORF each year, both linear and non-linear growth trends were tested. A significant quadratic trend changes the interpretation of the linear term, such that overall growth is described by the extent to which there are periods where learning rates are accelerating (positive quadratic term) or decelerating (negative quadratic term). Second, the data were centered at the first testing time of the second grade year (i.e., September); therefore, the intercept in the model represented the grand mean ORF rate at the beginning of second grade.

A set of four models were systematically tested, starting with an unconditional means model to test the extent to which variability existed in ORF scores across the eight total time points, then adding in time-coded covariates (linear and non-linear). Results from the $-2 \log$ likelihood test suggested that the addition of the non-linear parameter improved the description of the growth model ($p < 0.01$). This model was followed by the inclusion of the ED and SLD indicators, and the final model included gender as a moderator of the relationships. Nonsignificant variance components at any portion of modeling were fixed to achieve greater power in model estimation. This set of models was then used to describe growth processes for students in each of the study groups (general education, ED, SLD) as well as those who were identified with reading difficulties in each of the groups (below 20%ile).

An examination of the proportion of missing data revealed that 7% of the data were missing at time 1, 5% at time 2, 3% at time 3, 7% at time 4, 2% at time 5, 5% at time 6, 5% at time 7, and 8% at time 8. Despite a low prevalence of missingness, to be conservative, Little's test of data missing completely at random was conducted (Little, 1988). Across all time points, the chisquare test indicated that data were not missing completely at random. Because data were missing more predominantly for students eligible for free or reduced price lunch and minority students, multiple imputation was used to correct for an unbalanced design and potential biases in parameter estimation. Multiple imputation was conducted using SAS PROC MI with a Markov Chain Monte Carlo estimation with 10 imputations.

Results

Means and standard deviations on ORF for each of the three study groups are reported in Table 2. Fitted growth curves for the students in each group are presented in Figures 1 and 2 in order to demonstrate each group's estimated performance, as well as the expected benchmark performance at each time-point and grade-level. Table 3 provides the mean ORF scores, slope coefficients, and standard errors for each group. Rather than providing the mixed model coefficient estimates of intercepts and slopes, which often become burdensome to the reader as the model complexity increases, we summarize the output from the piecewise models as fitted means for each group. The fitted means can be interpreted as the actual predicted mean intercept and slope coefficients for each group rather than a fitted deflection from the grand mean.

ORF Status and Growth for Full Sample

Second grade—On average, students who did not have an identified disability correctly read a mean of 59 words correct per minute (wcpm) in the fall of second grade. This second grade fall mean is above the DIBELS ORF benchmark expectation of 44 wcpm, and well above the performance of the students identified with ED or SLD ($p < .001$). General education students grew positively over the school year (3.36 wcpm), and increased their rate of learning, evidenced by the positive nonlinear parameter (Grade 2 slope² = 0.14).

Students identified as ED began second grade with a mean oral reading fluency rate of 36 wcpm, or 8 wcpm below the second grade level benchmark, and 23 wcpm less than their general education peers ($p < .001$). Though these students with ED grew at a positive rate in second grade (2.26 wcpm), it was not as steep as the general education students ($p < .001$). However, the rate of acceleration for students with ED was not statistically distinguished from their general education peers (Grade 2 slope² = 0.15; $p = .408$) indicating that the rate of acquisition in fluency was similar for both students with ED and general education students. Thus, students with ED did not demonstrate a closing of the gap between their performance and the DIBELS ORF benchmark expectation. Although the benchmark to performance gap was 8 wcpm in the fall of second grade, this gap increased to 24 wcpm by the end of the second grade year.

The growth of students with SLD in second grade largely tracked that of the students with ED, and was only differentiated by their intercept levels. Similar to the students with ED, students with SLD grew at a significantly slower linear rate than the general education students in second grade ($p < .001$). In the fall of second grade, students with SLD read at a rate of 27 wcpm, compared to 36 wcpm students with ED ($p < .001$). This gap between the groups remained relatively constant throughout the year; although the students with ED maintained a stronger linear growth rate (2.26 wcpm) than the students with SLD (1.33 wcpm). The rate of acceleration for the students with SLD (Grade 2 slope² = .24) counterbalanced this weaker linear growth rate. Subsequently, Figure 1a demonstrates that the SLD and ED groups of students grew in a similar pattern, and the level of summer drop-off was identical (i.e., 6 wcpm).

Third grade—The fall of third grade mean for general education students was 79 wcpm, which was just above the DIBELS ORF fall benchmark of 77 wcpm. Comparatively, students with ED began third grade reading 52 wcpm, and students with SLD read 41 wcpm, both significantly lower than general education students ($p < .001$). Third grade linear growth for the general education students was estimated at 6.71 wcpm per month, with a negative quadratic coefficient of $-.42$.

For students with ED, the mean fall score was 25 wcpm below the DIBELS ORF benchmark and 27 wcpm less than general education student performance. By the end of third grade, the students with ED remained at a level of high risk in their oral reading fluency development, despite linear growth that was comparable to the general education students (5.53, $p = .720$), and a rate of deceleration less than the general education students (-0.26 ; $p < .001$). The mean ORF score for students with ED was 58 wcpm at the end of third grade.

Students with SLD demonstrated significantly slower linear growth than the general education students in third grade (5.55 wcpm, $p < .001$); however they also demonstrated a lower rate of deceleration (-0.25 ; $p < .001$). As with the patterns seen in second grade, students with SLD grew similarly to the students with ED in third grade, but were separated by their intercept levels ($p < .001$). The mean third grade fall performance for the students with SLD (41 wcpm) was 36 wcpm below the benchmark, expanding to a 41 wcpm gap by the spring.

Status and Growth on ORF for Students with Reading Difficulties

Second grade—General education students with reading difficulties began second grade reading at 33 wcpm, 25 wcpm less than the full general education sample and 11 wcpm below the expected DIBELS ORF benchmark. These students grew at a linear rate of 2.02 wcpm per month, but accelerated their rate of growth over time.

The students with ED who were also below the 20%ile in reading comprehension demonstrated a mean ORF score of 21 wcpm at the beginning of second grade, significantly lower than the general education students with reading difficulties ($p < .001$), and grew at a linear rate of 1.07 wcpm per month, which was half the linear rate of the general education students with reading difficulties ($p < .001$). This growth was associated with a 0.20 rate of acceleration, similar to the general education students ($p = .926$).

The students with SLD who were below the 20%ile on comprehension fared worse than the full group of students with SLD, reading at a rate of 17 wcpm at the beginning of second grade, and growing at a linear rate of 0.59 wcpm with a 0.23 rate of acceleration. The rate of linear growth was significantly slower than the students with reading difficulties in general education ($p < .001$). By the end of the second grade, the mean ORF rate was 32 wcpm, well below the DIBELS ORF benchmark.

Third grade—The general education students with reading difficulties began third grade at an average oral reading fluency level of 48 wcpm, well below the expected benchmark of 77 wcpm, and grew at a rate of approximately 7 wcpm per month, with a negative quadratic trend ($-.40$), indicating the rate of growth slowed over the course of the school year. By the end of third grade these high risk readers averaged 78 wcpm.

In the fall of third grade, the mean oral reading fluency rate for students with ED and reading difficulties was 32 wcpm. These students showed a linear growth rate in third grade (4.81 wcpm), that was less than the growth for the general education students ($p < .001$). They also demonstrated a deceleration in growth over the year (-0.14); however this estimate was not as large as the deceleration seen by the general education students with reading difficulties. Students with ED and reading difficulties ended third grade with a mean score of 60 wcpm.

The low readers in the SLD group began third grade with the lowest fluency rate (27 wcpm) of the three groups. Similar to the low readers in the ED group, the students with SLD demonstrated a linear growth rate (4.62 wcpm) significantly lower than the low readers in general education ($p < .001$). The students with SLD and reading difficulties ended third grade with a mean oral reading fluency level of 53 wcpm, 25 wcpm lower than the low readers in general education, and 57 wcpm below the DIBELS ORF expected benchmark.

Gender Moderation of Status and Growth

We also examined whether gender would moderate the relation between ORF initial status and growth for the study groups. Table 4 provides the mean ORF scores, slope coefficients, and standard errors for each group by gender for the full sample. Figure 2a displays the growth trajectories for the male and female students in each study group. On average, male and female students in general education performed at or above benchmark levels for most of second grade; however, levels of oral reading fluency were significantly lower for males ($p < .001$). Although female students' linear growth rate was also statistically faster than males ($p < .001$), no practically important growth differences between males and females were observed when comparing the actual fitted mean slopes between gender groups ($d = .11$). This pattern was replicated in third grade, with both gender groups in general education

remaining at or above benchmark, and males only being differentiated by the lower initial status ($p < .001$), and not slope. Males and females maintained similar oral reading fluency differences when considering ED or SLD designations. Reflecting the general trend displayed in Figure 1, students with ED had higher oral reading fluency rates than the students with SLD; however, males and females were only differentiated on level of oral reading fluency and not slope.

When considering only the students scoring below the 20%ile in reading comprehension, moderator effects were less present than in the full sample. Table 5 provides the mean ORF scores, slopes, and standard errors for each group by gender for the sample with reading difficulties. Figure 2b displays the growth trajectories for male and female students with reading difficulties in each group. Male and female students with reading difficulties exhibited differentiation in their oral reading fluency levels in both second ($p < .001$) and third grades ($p < .01$) with males' levels lower than females; however, no practically important differences were observed for males and females in the ED ($d = .12$) or SLD ($d = .07$) groups.

Discussion

The purpose of this study was to examine the oral reading fluency level and growth for second and third grade students without disabilities and students with ED or SLD. As we hypothesized in relation to a deficit model of reading development, the findings reveal the three groups were distinguished in oral reading fluency level at the beginning of second grade and maintained those distinctions throughout second and third grade with no overlap. Both students with ED and students with SLD performed significantly below students without disabilities in oral reading fluency. In addition, as anticipated, students with SLD performed significantly lower than students with ED. Linear growth rates indicated students with disabilities were also growing at significantly slower rates than students without disabilities in general education with the exception of students with ED in third grade. These data suggest that although the ED and SLD groups are making progress in their reading skills during second and third grade, their rate of growth would not allow them to meet grade level expectations in reading.

Due to the slower linear rates of growth for the students with ED or SLD, the differences in oral reading fluency levels between the students with and without disabilities increased with each grade level. The ED and SLD groups consistently demonstrated below level reading throughout second and third grade despite being in special education for both years. These data add to previous literature suggesting that current special education services do not routinely accelerate growth at a rate that allows students with disabilities to reach grade level expectations even when these services are provided in the early elementary grades (Hanusheck et al., 2008). By the end of third grade, 455 (21%) students with ED and 1182 (11%) students with SLD met the expected ORF grade level benchmarks. However, in most cases, the students with ED or SLD demonstrated acceleration in their growth that was superior to students without disabilities, but this acceleration was not enough to make up for the overall slower growth rates or for the weaker initial skill level. It is important to note that these data emphasize differences in reading achievement between students with disabilities (ED or SLD) and students without disabilities, and not differences between general education and special education instruction.

To better understand the reading growth of students with disabilities we examined the students in each of the groups that were demonstrating reading difficulties. Approximately 53% of the students with ED and 57% of the students with SLD were performing below the 20%ile in reading, in comparison to 17% of the students without disabilities. Even when

only the students with reading difficulties were examined, the students without disabilities performed at higher levels and grew at higher rates than the students with disabilities. Thus, among students struggling with reading, those with disabilities were not closing the gap with the students without disabilities in general education. However, all 3 groups of students with reading difficulties were below expected levels for their grade levels and growing at similar or slower rates than the full sample of students, indicating the trajectories of these students will continue to leave them below grade level expectations even for the students in general education, also consistent with the deficit model of development. The intercept data suggest that students with the most severe reading difficulties are in special education as would be expected. The special education services the students identified with ED or SLD were receiving was equally effective in increasing oral reading fluency (i.e., similar growth for both groups).

Gender Differences

Our findings indicate gender was a moderator of outcomes for all three groups. Ours is not the first study to find females performing higher than males in reading (Wheldall & Limbrick, 2010). Although we note that for students without disabilities, the means for both males and females were above the ORF benchmarks. For students with reading difficulties, the lower performance of males was only practically meaningful in the group of students without disabilities (general education). It does appear that schools identified more males than females for special education with 83% of the ED and 69% of the SLD group in our sample consisting of males. We also note the higher identification of Black students in the ED group, suggesting an overrepresentation of male, black students identified with ED consistent with the most recent IDEA report (2011). However, our data indicated ORF level and growth rate of males and females with reading difficulties in special education was practically similar. Therefore, although more males were identified with a disability in ED or SLD, once in special education males with reading difficulties demonstrated similar progress to the females.

Practical Considerations for Special Education and Oral Reading Fluency Growth

In considering the findings of this study, perhaps a larger question is whether it is appropriate to use typical development to measure the success of students with disabilities, who by definition have demonstrated atypical development (Buzick & Laitusis, 2010). In recent years, a focus on accountability has led to requirements for most students with ED and SLD to be measured against the same academic proficiency guidelines as their typically developing, non-disabled peers (e.g., No Child Left Behind, 2002). Previous research has noted that schools fail to make adequate yearly progress most often due to the disability subgroup (Eckes & Swando, 2009). It is difficult to judge whether our data suggest a problem with special education (i.e., the services provided were not strong enough to help students reach grade level) or a problem with expectations (i.e. students with disabilities have different growth trajectories than students without disabilities). It is clear that students with ED or SLD begin at lower levels than students without disabilities; one criterion for qualification for special education is underachievement in one or more academic areas. Thus, for students with disabilities to meet grade level standards they must grow at a faster rate than their peers without disabilities, despite the fact that the student's disability has been determined to impact their learning. Moreover, it is possible, that without special education the students in this study may have shown lower oral reading fluency levels and rates of growth, demonstrating the success of special education to meet student needs and raise achievement rather than suggesting special education was ineffective due to a lack of grade level achievement for the students with disabilities.

Clearly it is important to continue to monitor whether students with disabilities are reaching grade level expectations, particularly in relation to a student's continued need for special education; however, we suggest that monitoring the effectiveness of special education, and importantly, defining the success of students with disabilities requires alternative considerations as a primary focus. As a practical consideration, it is important for educators to ensure high standards and expectations are set for special education and students receive the most efficient and effective intervention in order to accelerate learning. As Deno and colleagues (Deno et al., 2001) have previously noted, to define expected development using normative data for a subgroup of special education students would only lead to acceptance of status quo and does not push special educators to improve instruction. However, it may also be inappropriate to define the success of students with disabilities as the ability to meet the same proficiency standards as students without disabilities. We agree with Deno and colleagues that examining student growth rates from current research on effective interventions for students with disabilities may be the most appropriate way to set high standards for special education. As we have noted, current research for students with ED and SLD does indicate that student learning can be accelerated beyond what these students achieve without intervention (e.g., Rivera et al., 2006; Swanson & Carson, 1996), but there is little evidence to date that researchers have identified instructional techniques or the intensity of interventions needed to allow most students with disabilities to achieve "normalized" outcomes. The bar for successful student outcomes should be raised first in research by continuing to examine interventions to increase outcomes for students with disabilities beyond current levels and then, in turn, providing practitioners with the resulting knowledge and tools to implement more effective interventions. Thus, the bar is raised in research before it is raised in practice to provide an evidence-based standard against which practitioners can evaluate the effectiveness of implementation.

Limitations and Future Research

The results of this study are restricted to oral reading fluency development. The patterns of development found in this study among general education, ED, and SLD groups may differ on other reading measures, such as vocabulary or comprehension, or in other content domains. In addition, we relied on school-based identification of ED and SLD to form the groups in this study. This could have increased the error in identification of students. The data were also collected prior to implementation of response to intervention methods in the state.

The data we present here are representative of schools that participated in Reading First, and therefore, should be interpreted with caution as the findings may not generalize to the full population of students. Reading First schools include relatively large numbers of students with low socioeconomic status. Previous research has noted students' socioeconomic status is moderately related to their academic achievement (Sirin, 2005).

We were unable to examine the special education interventions that students with ED or SLD received. Research examining characteristics of and interventions for students who are successful readers after special education in relation to students who demonstrate insufficient growth in special education is needed. Research in this area would also help to address questions related to the development of students with disabilities in various academic areas and better inform the findings of this study. We examined all students across all districts in one state and, thus, the data are representative of average growth across special education services and quality.

Summary

In this study we found that students with ED or SLD were making progress in their reading skills during second and third grade, but did not demonstrate rates of growth that would allow them to meet grade level expectations in reading, providing additional evidence for the deficit model of reading for students with ED or SLD. While we maintain that it is important to set goals and monitor student progress towards grade level expectations, it may be inappropriate to define student success, and therefore the success of special education, based only on students with disabilities meeting the proficiency levels set for students without disabilities. The onus for setting high standards in special education falls first on researchers who must identify instructional techniques that accelerate learning for students with disabilities, including under ideal conditions, and provide evidence of the effects and growth rates that can be expected in these interventions. We contend that it is this ongoing research that sets the standard for practitioners to judge the effectiveness of interventions implemented in special education, continually raising the bar for our students with disabilities in an evidence-based dynamic.

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(a)

(b)

Figure 1.
Growth trajectories by group for (a) full sample and (b) students with reading difficulties.

(a)

(b)

Figure 2.
Growth trajectories by group and gender for (a) full sample and (b) students with reading difficulties.

Table 1

Demographics by Study Group

Demographics	Gen Ed	ED	SLD
Males	50%	83%	69%
White	31%	31%	34%
Black	37%	53%	33%
Latino	27%	12%	29%
Asian	2%	<1%	<1%
Multicultural	4%	4%	3%
Native American	<1%	<1%	<1%
FRL	82%	91%	89%
ELL	20%	7%	23%

Note. Gen Ed = General Education. ED = Emotional Disturbance. SLD = Specific Learning Disability. FRL = Free or Reduced Price Lunch. ELL = English Language Learner.

Table 2

Oral Reading Fluency Means and Standard Deviations by Study Group.

Grade	Period	Gen Ed (n = 185,367)		ED (n = 2,146)		SLD (n = 10,339)		Gen-Ed - RD (n = 31,691)		ED - RD (n = 1,137)		SLD - RD (n = 5,935)	
		M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
2 nd	Fall	59.78	30.96	35.89	28.6	27.33	21.96	33.58	24.81	20.56	18.92	16.99	14.72
	Winter 1	73.36	32.87	45.97	32.98	35.13	25.86	41.24	27.11	26.64	21.32	22.04	17.46
	Winter 2	86.58	34.27	55.34	35.62	44.71	30.14	51.28	30.37	33.29	24.85	28.98	21.11
	Spring	90.75	33.77	62.3	37.48	48.68	30.13	53.28	28.86	38.58	24.77	32.56	21.22
3 rd	Fall	78.95	32.89	52.15	34.31	40.37	27.95	47.5	29.1	32.5	24.19	26.29	19.43
	Winter 1	98.95	33.12	68.5	37.9	57.06	33.08	67.43	32.86	46.86	29.5	40.52	26.23
	Winter 2	109.02	33.76	78.19	39.19	67.48	34.85	77.39	33.69	56.83	32.16	50.34	28.53
	Spring	110.55	32.71	78.76	36.23	65.6	31.8	74.06	31.06	58.4	29.34	50.3	25.45

Note. Gen Ed = General Education. ED = Emotional Disturbance. SLD = Specific Learning Disability. RD = Reading Difficulties.

Table 3

Oral Reading Fluency Slopes and Intercepts by Group

Effect	Grade 2				Grade 3			
	Estimate	S.E.	t-value	p-value	Estimate	S.E.	t-value	p-value
Full Sample								
Gen Ed Fall	58.94	0.07	792.05	<.001	78.76	0.04	480.40	<.001
Gen Ed Slope	3.36	0.02	210.04	<.001	6.71	0.02	147.66	<.001
Gen Ed Slope ²	0.14	0.00	64.86	<.001	-0.42	0.00	-155.00	<.001
ED Fall	35.55	0.63	-37.18	<.001	51.86	0.39	-9.00	<.001
ED*Slope	2.26	0.14	-8.01	<.001	5.53	0.20	-0.36	.720
ED*Slope ²	0.15	0.02	0.83	.408	-0.26	0.03	4.37	<.001
SLD	27.34	0.36	-88.80	<.001	40.67	0.17	-38.76	<.001
SLD*Slope	1.33	0.05	-37.35	<.001	5.55	0.08	10.25	<.001
SLD*Slope ²	0.24	0.01	13.49	<.001	-0.25	0.01	5.18	<.001
Reading Difficulties								
Gen Ed Fall	33.07	0.15	217.09	<.001	47.74	0.10	152.27	<.001
Gen Ed Slope	2.02	0.03	60.79	<.001	6.74	0.05	93.03	<.001
Gen Ed Slope ²	0.19	0.00	42.41	<.001	-0.40	0.01	-71.89	<.001
ED Fall	20.94	0.60	-20.19	<.001	32.47	0.45	-6.93	<.001
ED*Slope	1.07	0.15	-6.29	<.001	4.81	0.25	-3.92	<.001
ED*Slope ²	0.19	0.02	0.09	.926	-0.14	0.04	6.49	<.001
SLD	17.27	0.40	-39.36	<.001	26.83	0.23	-22.56	<.001
SLD*Slope	0.59	0.07	-20.03	<.001	4.62	0.11	-6.3	<.001
SLD*Slope ²	0.23	0.01	4.82	<.001	-0.14	0.02	12.08	<.001

Note. The estimate column in the table reflects the fitted group means, while the S.E., t-value, and p-value are presented model estimated coefficients. Gen Ed = General Education. ED = Emotional Disturbance. SLD = Specific Learning Disability.

Table 4
Oral Reading Fluency Slopes and Intercepts by Group and Gender for Full Sample

Effect	Grade 2				Grade 3			
	Estimate	S.E.	t-value	p-value	Estimate	S.E.	t-value	p-value
Gen Ed Fall - Girl	61.96	0.11	588.7	<.001	81.34	0.06	331.53	<.001
Gen Ed Slope - Girl	3.46	0.02	148.7	<.001	6.86	0.03	90.39	<.001
Gen Ed Slope ² - Girl	0.13	0.00	36.64	<.001	-0.42	0.01	-89.58	<.001
ED Fall - Girl	38.67	1.63	-14.24	<.001	53.71	0.94	-4.70	<.001
ED*Slope - Girl	2.55	0.35	-3.36	0.001	5.81	0.49	1.12	0.262
ED*Slope ² - Girl	0.13	0.05	0.85	0.395	-0.31	0.08	-0.27	0.790
SLD - Girl	29.82	0.56	-57.22	<.001	42.76	0.28	-22.91	<.001
SLD*Slope - Girl	1.57	0.10	-19.75	<.001	6.12	0.16	8.54	<.001
SLD*Slope ² - Girl	0.23	0.01	8.17	<.001	-0.31	0.03	-1.37	0.170
Gen Ed Fall - Boy	55.95	0.01	8.17	<.001	76.18	0.08	10.47	<.001
Gen Ed Slope - Boy	3.25	0.03	-5.83	<.001	6.56	0.05	-3.16	0.002
Gen Ed Slope ² - Boy	0.15	0.00	1.7	0.090	-0.41	0.01	2.20	0.028
ED Fall - Boy	34.91	1.77	1.2	0.230	51.49	1.04	0.83	0.406
ED*Slope - Boy	2.42	0.39	0.12	0.906	5.47	0.55	-0.52	0.602
ED*Slope ² - Boy	0.15	0.05	-0.14	0.892	-0.25	0.09	1.02	0.306
SLD - Boy	26.22	0.66	3.59	<.001	39.72	0.35	-0.66	0.508
SLD*Slope - Boy	1.45	0.12	-1.2	0.228	5.29	0.20	-1.60	0.111
SLD*Slope ² - Boy	0.23	0.02	0.14	0.886	-0.22	0.03	1.82	0.069

Note. The estimate column in the table reflects the fitted group means, while the S.E., t-value, and p-value are presented model estimated coefficients. Gen Ed = General Education. ED = Emotional Disturbance. SLD = Specific Learning Disability.

Table 5
Oral Reading Fluency Slopes and Intercepts by Group and Gender for Students with Reading Difficulties

Effect	Grade 2				Grade 3			
	Estimate	S.E.	t-value	p-value	Estimate	S.E.	t-value	p-value
Gen Ed Fall - Girl	35.47	0.25	144.32	<.001	50.45	0.15	97.88	<.001
Gen Ed Slope - Girl	2.21	0.05	41.32	<.001	7.08	0.08	61.18	<.001
Gen Ed Slope ² - Girl	0.19	0.01	25.95	<.001	-0.43	0.01	-48.23	<.001
ED Fall - Girl	21.49	1.45	-9.62	<.001	32.82	1.13	-3.22	0.001
ED*Slope - Girl	1.06	0.39	-2.97	0.003	4.61	0.56	-2.35	0.019
ED*Slope ² - Girl	0.20	0.06	0.26	0.792	-0.15	0.09	2.8	0.005
SLD - Girl	18.95	0.80	-20.74	<.001	28.17	0.42	-13.8	<.001
SLD*Slope - Girl	0.66	0.13	-11.85	<.001	5.26	0.21	-1.29	0.197
SLD*Slope ² - Girl	0.25	0.02	3.59	<.001	-0.22	0.03	4.61	<.001
Gen Ed Fall - Boy	31.37	0.31	-13.17	<.001	45.83	0.20	-2.56	0.010
Gen Ed Slope - Boy	1.88	0.07	-4.87	<.001	6.51	0.10	-2.25	0.025
Gen Ed Slope ² - Boy	0.19	0.01	0.35	0.729	-0.38	0.02	2.81	0.005
ED Fall - Boy	20.84	1.60	2.17	0.030	32.41	1.23	0.6	0.551
ED*Slope - Boy	1.07	0.42	0.82	0.412	4.84	0.63	0.72	0.470
ED*Slope ² - Boy	0.19	0.06	-0.27	0.789	-0.14	0.10	-0.25	0.802
SLD - Boy	16.63	0.92	1.94	0.052	26.31	0.50	1.93	0.053
SLD*Slope - Boy	0.56	0.16	1.49	0.135	4.37	0.24	-2.27	0.023
SLD*Slope ² - Boy	0.23	0.02	-1.17	0.241	-0.11	0.04	2.04	0.041

Note. The estimate column in the table reflects the fitted group means, while the S.E., t-value, and p-value are presented for the model estimated coefficients. Gen Ed = General Education. ED = Emotional Disturbance. SLD = Specific Learning Disability