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The Relative Impact of Remedial Reading Instruction on the Basic Reading Skills of Students with Emotional Disturbance and Learning Disabilities

Abstract: The purpose of this study was twofold: (a) to examine the effects of remedial reading instruction on the basic reading skills of elementary and middle school students with high-incidence disabilities (*n* = 45) and their comparison condition counterparts (*n* = 23); and (b) to examine the relative responsiveness of participating students with emotional disturbance (ED) and learning disabilities (LD) to such instruction. Statistically and educationally significant differences on measures of basic reading skills and oral reading fluency were found between students who received remedial reading instruction and those in the comparison condition. With the exception of performance on measures of oral reading fluency, students with ED were significantly more responsive than their counterparts with LD on measures of basic reading skills. Results, limitations, and implications are discussed.

Reading is the pivotal skill that allows children to achieve at high levels and become reflective, lifelong learners (Adams, 1990; National Institute of Child Health and Human Development [NICHD], 2000; Simmons & Kame'enui, 1998; Snow, Burns, & Griffin, 1998). Becoming a fluent reader is a prerequisite for success in any academic area and for success in our society. Furthermore, knowing how to read is related to personal resilience and overcoming social obstacles and, thus, has far-reaching positive effects (Simmons & Kame'enui). Failure to learn to read is the major reason for retention, long-term remediation, and qualification for special education services (Meese, 2001). If intervention is delayed until 9 years of age (the age that most children with reading difficulties receive services), approximately 75% of children experiencing reading problems will continue to have such problems in high school and throughout their lives (Francis, Shaywitz, Stuebing, Shaywitz, & Fletcher, 1996; NICHD).

Response to Intervention (RTI) is being used by schools as an alternative approach to the identification of learning disabilities and as a useful framework for guiding instruction and interventions for all students (e.g., Bradley, Danielson, & Doolittle, 2005; Gresham, 2002). RTI turns attention from student academic difficulties toward evaluating the extent to which the instruction and interventions used by schools are matched to student need (Gresham). To this end, researchers developed a three-tiered prevention model that combines progress monitoring with technically adequate assessments, implementing scientifically-based intervention to address student literacy needs, determining whether

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students are making sufficient progress, fidelity of intervention, and determining the intensity of the support that a student needs to be successful (Coyne, Kame'enui, & Simmons, 2004; Vaughn Gross Center for Reading and Language Arts, 2005). A three-tiered reading model comprised of Tiers I (primary), II (secondary), and III (tertiary) (Vaughn, Linan-Thompson, & Hickman, 2003) is used to meet student literacy needs. Tier I instruction is comprised of the core reading program and is designed for all students in the school. At Tier II, supplemental reading instruction is provided to students who are not making progress in the core reading program (Coyne et al.; Vaughn Gross Center for Reading and Language Arts). Tier III is composed of focused intervention programs and is for those students (5-10%) who did not make progress during Tier II instruction (Vaughn Gross Center for Reading and Language Arts). Often these Tier III students already are failing in school (e.g., students with specific learning disabilities).

Research on students with high-incidence disabilities indicates that most of these students have made little or no reading progress, especially those students beyond grade 2 (Lyon et al., 2001). Researchers have reported that 50% of students with high-incidence disabilities do not respond to effective reading intervention (Fuchs et al., 2001). They often describe these students as treatment nonresponders (Al Otaiba & Fuchs, 2002; Torgesen, 2000). Treatment nonresponders are those students (5-10%) who did not make sufficient progress during core or supplemental reading instruction and require intensive reading interventions (Tier III). In other words, these students are provided quality instruction and their progress is monitored yet they do not respond appropriately at Tier I. They are then provided supplemental instruction in Tier II and their progress is monitored. Those who do not respond appropriately are considered for special education services (Tier III).

Students requiring intensive, specially designed instruction who have not responded to reading interventions at Tiers I and II are not limited to students with learning disabilities (LD). Researchers have found that many students with emotional disturbance (ED) experience reading difficulties that are recalcitrant to quality reading intervention. A recent research synthesis (i.e., Trout, Nordness, Pierce, & Epstein, 2003) reported that the prevalence of underachievement in reading for students with ED ranged from 31% to 81%. Moreover, the magnitude of reading deficits ranged from 0.53 grade levels to more than 2 grade levels behind same-aged peers without disabilities. The prevalence of reading skill deficits among students with ED has been assessed over time (Greenbaum et al., 1996; Mattison, Hooper, & Glassberg, 2002). Greenbaum et al. sampled from all youth with ED (N = 812) across six states. The percentage of students reading below grade level at intake (ages 8 to 11 years), 4 years later (ages 12 to 14), and 7 years after intake (ages 15 to 18) was 54%, 83%, and 85%, respectively. These studies indicate that students with ED are likely to experience moderate reading difficulties that remain stable or worsen over time (Nelson, Benner, Lane, & Smith, 2004). The nature of the reading difficulties experienced among students with ED is problematic given that reading difficulties increase the frequency, severity, and persistence of antisocial behaviors (McEvoy & Welker, 2000).

Comparative analyses of the reading performance of students with ED and those with LD yield mixed findings. Researchers reported that children with ED were more likely (Gajar, 1979; Scruggs & Mastropieri, 1986) and less likely (Epstein & Cullinan, 1983; Wagner, 1995; Wilson, Cone, Bradley, & Reese, 1986) to evince reading deficits than those with LD. Researchers in one study compared the reading skills of students with ED and LD over time (Anderson, Kutash, & Duchnowski, 2001). Anderson et al. found that students with ED (n = 42) performed significantly bet-

ter than those with LD (n = 61) on reading measures in kindergarten and first grade but not in the fifth and sixth grades. Moreover, the reading achievement scores of students with ED did not improve over time, while students with LD demonstrated statistically significant improvement in the 5 years from intake to follow-up ($p < .001$). Although Anderson et al. reported that students with ED received significantly more full-time special education services than the group with LD during this time span, the quality and type of the special education services received was not clear. Although mainstreamed significantly more than those with ED, it is possible that students with LD were receiving more specially designed reading instruction than their counterparts with ED. These findings suggest that ED may have a more adverse impact on reading skills over time than does LD.

Despite the reading deficits experienced by students with ED, surprisingly little research has been conducted on the effects of reading interventions with this population. A historical review of the academic intervention research conducted with these students showed that only 55 studies have been conducted over the past 30 years (Mooney, Epstein, Reid, & Nelson, 2003). Only 28 reading intervention studies, involving a total of 125 students with ED, have been evaluated over the last 30 years. Despite the small number of studies and associated participants, researchers have found that the core reading and prereading skills of students with ED can be impacted through scientifically-based reading instruction (Barton-Arwood, Wehby, & Falk, 2005; Nelson, Benner, & Gonzalez, 2005; Torkelson-Trout, Epstein, Mickelson, Nelson, & Lewis, 2003). Yet, substantial gains in basic reading skills do not necessarily correspond to similar growth in oral reading fluency (Barton-Arwood et al.; Wehby, Falk, Barton-Arwood, Lane, & Cooley, 2003). Researchers argue that slowed responsiveness to systematic reading intervention in the area of oral reading fluency may typify the response patterns of students with ED, irrespective of the quality and dosage of intervention (Barton-Arwood et al.).

Scant research has been conducted using systematic remedial reading instruction on the basic reading skills of elementary and middle school students with high-incidence disabilities, particularly those with ED. Researchers have not explored the relative impact of remedial reading instruction on the basic reading skills of students with ED and LD. Thus, an important question arises—do students with ED and LD respond differently to remedial reading instruction? Two purposes of this study explored this question. The first purpose was to examine the effects of remedial reading intervention on the reading skills of elementary and middle school students with high-incidence disabilities. The second purpose was to examine the relative impact of this instruction on the reading skills of students with ED or LD.

Method

Participants

Sixty-eight public school students (43 males and 25 females) enrolled in seven elementary schools and two middle schools in an urban, northwestern city participated in this study. The gender, ethnicity, and services (e.g., Title I) received by participants by condition (i.e., participating and comparison) are reported in Table 1. Descriptions of the participating and comparison conditions follow.

Participating condition. Forty-five students (30 males, 15 females) in the participating condition received special education services for a high-incidence disability. These students were selected for participation in this study by their special education teachers due to their lack of responsiveness to core and supplementary reading interventions. Therefore, these students required intensive, specially designed reading intervention (Tier III). The numbers and percentages of participating condition students in the third, fourth, fifth, and eighth

grades were 7 (16%), 23 (51%), 8 (17%), and 7 (16%), respectively.

Ten participating students (22%) received services under the category of ED and 35 students (78%) received services under the category of LD. The gender and ethnicity of participants by disability (i.e., ED and LD) are reported in Table 2. The numbers and percentages of students with ED students in the third, fourth, fifth, and eighth grades were 1 (10%), 3 (30%), 3 (30%), and 3 (30%), respectively. The numbers and percentages of students with LD in the third, fourth, fifth, and eighth grades were 6 (17%), 20 (57%), 5 (14%), and 4 (12%), respectively.

Comparison condition. Twenty-three students (13 males, 10 females) in the comparison condition were matched to participating students by school attended, gender, and grade. The numbers and percentages of comparison condition students in the third, fourth, fifth, and sixth grades were 5 (22%), 10 (44%), 4 (17%), and 4 (17%), respectively. It was not possible to identify matched comparison students for 19 elementary grade students or 3 of the middle school students in the participating condition.

Setting

Students in the participating condition were placed in resource rooms for reading and

Table 1

Gender, Ethnicity, and Services of Students by Condition

	Participating (n = 45)		Comparison (n = 23)	
Demographic Variable	*n*	%	*n*	%
Gender				
Male	30	67	13	57
Female	15	33	10	43
Ethnicity				
African-American	8	18	9	39
Hispanic	4	9	1	5
Caucasian	17	38	12	51
Pacific Islander	1	2	1	5
Not Reported	15	33	—	—
Services				
Learning Disability	35	78	6	26
Emotional Disturbance	10	22	—	—
Title I	—	—	6	26
No Services	—	—	11	48

received special education services for a high-incidence disability. These students received instruction from eight certified special education teachers and the student teachers assigned to their respective classrooms. Participating teachers had collectively taught for 168 years, with a range of teaching experience from 4 to 32 years (Mean = 21.0, SD = 9.9). With one exception, participating teachers had very little or no experience delivering Direct Instruction programs. The one exception was a teacher with 5 years of experience implementing Direct Instruction programs as a special education teacher and extensive training in her teacher certification program. All student teachers were completing a 1-year teacher certification program ending in a preliminary special education endorsement and K-eighth grade general education certification. Student teachers were in their final quarter of student teaching at the time of the study.

Comparison students were educated in general education classroom environments and received a variety of reading approaches from seven general education teachers across five elementary schools. Comparison condition teachers reported that their focus was to build the comprehension skills of their students. They generally taught comprehension strategies and focused on vocabulary development. There was no determination of the teaching experience of these teachers.

Materials

The remedial reading intervention used was *Corrective Reading Decoding Level B: Decoding Strategies* (Engelmann, Hanner, & Johnson, 2002). The *Corrective Reading Decoding* program is designed for struggling readers in grades 3 through 12. There are two levels of *Corrective Reading Decoding Level B: B1* and *B2*. Each decoding level is comprised of 65 lessons that take 40 to 45 min to complete. The program targets basic reading skills, reading fluency, and the skill to read informational text (Stein & Kinder, 2004). The word iden-

Table 2

Gender and Ethnicity of Participating Students with ED and LD (n = 45)

	ED (*n* = 10)		*LD* (*n* = 35)	
Demographic Variable	*n*	%	*n*	%
Gender				
Male	9	80	21	60
Female	1	20	14	40
Ethnicity				
African-American	4	40	4	11
Hispanic	1	10	3	9
Caucasian	2	20	15	43
Pacific Islander	—	—	1	3
Not Reported	3	30	12	34

tification strategies in the program are phonics based. Students are systematically introduced to letter-sound correspondences, letter combinations, and carefully constructed word lists and text selections. Students are taught approximately 32 letter-sound combinations. Reading fluency is promoted through multiple readings of the text selection both within the teacher-directed lesson and through partner reading activities.

Program materials included a teacher book, separate workbook answer key, non-consumable student book, and consumable workbook. In addition to the program materials, teachers used stopwatches, dry erase boards and markers, pencils, and folders to track the progress of participating condition students.

Dependent Measures

Two dependent measures were used to measure basic reading skills and reading fluency: the *Woodcock-Johnson: Tests of Achievement, Third Edition (WJ-III)* (Woodcock, McGrew, & Mather, 2001) and the *Dynamic Indicators of Basic Early Literacy Skills* (*DIBELS*) (Kaminski & Good, 1996) Oral Reading Fluency (ORF) probe. The student teachers assigned to cooperating teachers conducted the *WJ-III* and *DIBELS* ORF probes. The *WJ-III* Basic Reading skills cluster and 3 third- or fourth-grade level *DIBELS* ORF probes were administered as a pretest (i.e., end of January) and as a posttest following intervention at the end of the school year (i.e., beginning of June). At both pre- and posttest, student teachers administered the *WJ-III* and *DIBELS*. The student teachers were trained to deliver the test in a consistent and accurate manner. Testing occurred on 3 consecutive days at both pre- and posttest. Descriptions of these measures follow.

WJ-III. The Basic Reading Skills cluster of the *WJ-III* was used to measure the basic reading skills of participants. The Basic Reading Skills cluster included two subtests: Letter-Word Identification and Word Attack. Letter-Word Identification assesses sight vocabulary, decoding, and structural analysis. Letters and words are presented to the student. The *WJ-III* Word Attack subtest measures skills in applying phonic and structural analysis to the pronunciation of unfamiliar printed words. In this subtest, the student is asked to read nonsense words aloud. Test-retest reliability coefficients of the Basic Reading Skills cluster, the Letter-Word Identification subtest, and the Word Attack subtest are .95, .94, and .87, respectively.

DIBELS. The *DIBELS* ORF probe assesses the student's accuracy and fluency with connected text. To administer the ORF probe, the student teacher presents the student with a reading passage of approximately 250 words. The passages are calibrated for the goal level of reading for each grade level. The student is then asked to read the passage aloud for 1 min. Words omitted or substituted and hesitations of more than 3 s are scored as errors. Words read correctly or self-corrected within 3 s are scored as accurate. Test-retest reliabilities for elementary students range from .92 to .97; alternate-form reliability of different reading passages drawn from the same level ranged from .89 to .94 (Deno, Fuchs, Marston, & Shinn, 2001; Tindal, Marston, & Deno, 1983). To increase the reliability of the *DIBELS* ORF probe, examiners conducted three different passages and calculated the median words read correctly per minute for each student at pre- and posttest. Students in the participating condition and their comparison counterparts received the *DIBELS* ORF third- or fourth-grade passages. Participating students and their comparison counterparts who were provided the *Corrective Reading Decoding B1* received third-grade-level *DIBELS* passages. Those receiving *Corrective Reading Decoding B2* and comparison peers received fourth-grade-level *DIBELS* passages. All participating and comparison condition students were administered the same third- or fourth-grade *DIBELS* ORF probes at pre- and posttest.

Scoring agreements. Scoring agreement checks on all *WJ-III* and *DIBELS* ORF protocols were conducted. Each protocol was checked for scoring accuracy by the author after initial scoring by student teachers. More specifically, in the case of the *WJ-III* the author checked the protocol to determine that basal and ceiling rules were followed and that the raw score was computed accurately for each subtest. In the case of completed *DIBELS* ORF probes, the author checked whether the total number of words read correctly was computed accurately. Agreement was calculated by dividing the number of agreements by agreements plus disagreements and multiplying by 100. An agreement was recorded when the agreement check calculations aligned with calculations made after initial scoring. Agreement in scoring *WJ-III* protocols and *DIBELS* ORF protocols was 98% (range = 96% to 100%), and 99% (range = 98% to 100%), respectively.

Evaluation Design

A pre-post quasi-experimental design (Martella, Nelson, & Marchand-Martella, 1999) was used to address the purposes of this study.

Procedures

Training for teachers. The certified and student teachers participating in the study were trained during a 1-day workshop. The trainer had more than 2 decades of experience in training teachers on Direct Instruction programs including *Corrective Reading.* Teachers were taught the placement system, instructional methods, corrective feedback procedures, and monitoring systems. They also were provided with opportunities to practice using the *Corrective Reading Decoding* program. Student teachers were required to implement at least 90% of the *Corrective Reading* lesson components as prescribed prior to beginning instruction. Project staff conducted two half-day follow-up sessions during the school year to discuss progress, implementation questions, and any other problems encountered.

Treatment implementation. Students in the participating condition received instruction in the following manner. A *Corrective Reading* placement test was administered to determine whether students began with *Corrective Reading Decoding Level B1* or *B2.* Thirty-two students placed into *Decoding Level B1* and 15 placed into *Decoding Level B2.* Students in the participating condition were provided an average of three 40- to 45-min lessons per week over the course of nearly 4 months (February to the end of May). The range of lessons completed was 25 to 40. Instruction was delivered to groups of 3 to 10 students with high-incidence disabilities who were placed in resource rooms for reading. Student teachers provided remedial reading intervention during the months of February and May, whereas special education teachers instructed during the months of March and April.

There were four parts to each lesson: Word Attack skills (10 min), Group Reading (15-20 min), Individual Reading Checkouts (10 min), and Workbook Exercises (10 min). A typical lesson began with the Word Attack portion. In Word Attack, students practiced pronouncing words, identifying the sounds and sound combinations, and reading isolated words composed of sounds and sound combinations. Group Reading followed Word Attack activities. In this part, students took turns reading aloud from their student book. Students who were not reading followed along. Individual Reading Checkouts followed the Group Reading activity. Assigned pairs of students read two passages. The first passage was from the lesson that the group just read and the second was from the preceding lesson. Each member of the pair first read the passage from the current story then the passage from the preceding lesson. Workbook exercises were done in the last part of the lesson.

Fidelity

A 10-item *Corrective Reading Decoding* Observation checklist was used to ascertain

treatment fidelity. There were six sections of the checklist: Word Attack, Group Story Reading, Individual Reading Checkouts, Workbook Exercises, Data Recorded, and Praise/Point System Used. Each section included at least one item (observer records a Yes or No). Items included whether the format was followed (Word Attack and Group Story Reading sections), error corrections used (Word Attack and Group Story Reading sections), appropriate signals (Word Attack section), and appropriate pacing (Word Attack section). The author and two nationally recognized experts on Direct Instruction programs conducted observations of student teachers. Although it is not necessary that experts conduct such observations to implement the *Corrective Reading* program, these experts were collaborators on this study and contributed by ensuring the programs were implemented with fidelity. The two experts had a combined 51 years of experience teaching, coaching, and consulting on *Corrective Reading* and other Direct Instruction programs. All student teachers met the fidelity criterion prior to implementing the *Corrective Reading Decoding* program (mean = 93%, SD = 4.3). Following training, student teachers were observed teaching lessons on two occasions by the author of this article and/or the *Corrective Reading* experts. Fidelity of implementation was measured (mean = 94.5%, SD = 3.5) and corrective feedback was provided as needed.

Analyses

There were three primary analyses in this investigation. First, Analyses of Covariance (ANCOVA) were used to determine if the differences in the posttest scores of participating and comparison students were statistically significant using pretest scores as a covariate. Second, the Mann-Whitney U Test was used to determine if there were statistically significant differences in the reading skill change scores of students with ED and LD after systematic remedial reading intervention. The Mann-Whitney U Test is more appropriate than the t-test in cases of unequal sample sizes, non-normal distributions, and unequal variances (Siegel & Castellan, 1988). Finally, effect size estimates were used to determine if differences in the change scores of participating and comparison students and participating students with ED and LD were educationally significant. Interpretations of the magnitude of effect sizes were made using Cohen (1988)—an effect size of 0.2 is considered small, an effect size of 0.5 is medium, and effect sizes of 0.8 or greater are large.

Results

Basic Reading Skill Change Scores of Participating Versus Comparison Students

To examine whether there were statistically significant differences in the posttest means of the basic reading skills of students, ANCOVAs were conducted with pretest scores serving as the covariate. A statistically significant main effect for condition (i.e., participating and comparison) was obtained in all cases. There were no other statistically significant main or interaction effects. Mean pre- and post-intervention standard scores, change scores, associated F-statistics for the main effect for condition, and effect sizes are presented in Table 3. Inspection of Table 3 reveals that relative to students in the comparison condition, students in the participating condition showed statistically significant improvements in their basic reading (*WJ-III* Basic Reading Skills Cluster: F [1, 67] = 10.1, $p < .01$), word attack (*WJ-III* Word Attack: F [1, 67] = 9.3, $p < .01$), and oral reading fluency (*DIBELS* ORF probe: F [1, 63] = 7.2, $p < .01$) skills relative to students in the comparison condition. Effect size estimates based on the mean change scores of participating and comparison students on the *WJ-III* Basic Reading Skills cluster (ES = 1.06) and *WJ-III* Word Attack subtest (ES = .92) scores were large in magnitude. The effect size estimates based on the mean change scores of partici-

pating and comparison students on the *WJ-III* Letter-Word Identification subtest (ES = .54) and *DIBELS* ORF probe (ES = .78) were moderate in magnitude. Thus, effect sizes across all reading measures were deemed educationally significant.

Relative Impact on Students with ED and LD

The mean *WJ-III* and *DIBELS* ORF change scores, Mann-Whitney U statistics, and effect sizes for participating condition students with ED (n =10) and LD (n = 35) are presented in Table 4. Inspection of Table 4 reveals that the mean pretest *WJ-III* Basic Reading Skills cluster, Letter-Word Identification, and Word Attack subtest scores of students with ED fell in the low average range, whereas those of students with LD fell in the average range. The mean *WJ-III* Word Attack subtest standard scores of students with ED improved from the low average range (SS = 79.9) at pretest to the average range (SS = 89.2) at posttest. With the exception of *DIBELS* ORF, students with ED were more responsive than their LD counterparts. Students with ED demonstrated statistically significant gains in their basic reading (*WJ-III* Basic Reading Skills Cluster: U [1, 44] = 90.5, $p < .05$) and word attack (*WJ-III* Word Attack: U [1, 44] = 87.5, $p < .05$) skills relative to students with LD. Effect size estimates based on the mean change scores of ED and LD students on the *WJ-III* Basic Reading Skills cluster (ES = .93) and *WJ-III* Word Attack subtest (ES = .93) scores were large in magnitude. The effect size estimates based on the mean change scores of ED and LD students on the *WJ-III* Letter-Word Identification subtest (ES = .47) and *DIBELS* ORF probe

Table 3

Mean WJ-III and DIBELS ORF Change Scores, Analysis of Covariance F Statistics, and Effect Sizes by Condition

	Participating (n = 45)			Comparison (n = 23)				
Measure	Pre	Post	Change	Pre	Post	Change	F	Effect Size
WJ-III Basic Reading Skills	85.1 (13.5)	89.9 (12.0)	4.8 (4.8)	92.5 (13.0)	92.8 (12.1)	.3 (3.6)	10.1**	1.06
Letter-Word Identification	82.8 (14.3)	86.7 (13.0)	3.9 (4.9)	90.4 (12.7)	91.6 (10.3)	1.2 (5.1)	1.5	.54
Word Attack	90.4 (12.3)	95.2 (10.3)	4.8 (5.9)	96.3 (11.9)	95.0 (13.3)	-1.3 (7.3)	9.3**	.92
DIBELS ORF probe	73.3 (30.1)	96.0 (32.8)	22.7 (11.7)	85.3 (20.6)	99.3 (21.3)	14.1 (10.4)	7.2**	.78

Note. ** $p < .01$, * $p < .05$. The *WJ-III* scores were standard scores based upon a mean of 100 and a standard deviation of 15. Numbers in parentheses are standard deviations. Effect sizes in the range of 0 to .3 are considered small, 0.3 to 0.8 are considered moderate, and 0.8 and above are considered large (Cohen, 1988).

(ES = -.31) were small in magnitude. Thus, effect sizes across all measures of basic reading skills were deemed educationally significant.

Discussion

Scant research has been conducted on the effects of remedial reading instruction on the basic reading skills of elementary and middle school students with high-incidence disabilities, particularly those with ED. In this context, there were two purposes of this study. The first purpose was to examine the effects of remedial reading intervention on the basic reading skills of elementary and middle school students with high-incidence disabilities. The second purpose was to examine the relative impact of remedial reading instruction on the basic reading skills of students with ED and LD. Several findings warrant discussion.

First, statistically and educationally significant improvements were found between students who received remedial reading instruction (n = 45) and those in the comparison condition (n = 23) on measures of basic reading skills. Participating students demonstrated statistically significant mean changes on the *WJ-III* Basic Reading Skills cluster and associated subtests and the *DIBELS* ORF probe compared to those in the comparison condition. Moreover, the magnitude of the effect of remedial reading instruction on the basic reading skills and, more specifically, word attack skills was large (i.e., above .80). Thus, the effect of remedial reading instruction on the reading skills (i.e., basic reading skills and oral reading fluency) of participating students with high incidence disabilities was educationally significant. This finding was heartening given that the reading difficulties of three out of four stu-

Table 4

Mean WJ-III and DIBELS ORF Change Scores, Mann-Whitney U Statistics, and Effect Sizes by Participating Group Special Education Category

	ED (n = 10)			*LD* (n = 35)				
Measure	Pre	Post	Change	Pre	Post	Change	U	Effect Size
WJ-III Basic Reading Skills	73.4 (10.0)	80.5 (8.7)	8.1 (4.8)	88.3 (12.4)	92.1 (11.8)	3.8 (4.4)	90.5*	.93
Letter-Word Identification	71.6 (12.8)	77.2 (10.7)	5.6 (4.5)	85.8 (13.0)	89.2 (12.3)	3.4 (4.9)	144.0	.47
Word Attack	79.9 (11.9)	89.2 (7.0)	9.3 (7.9)	93.6 (10.7)	96.9 (10.4)	3.3 (4.6)	87.5*	.93
DIBELS ORF probe	52.3 (27.3)	72.4 (27.9)	20.1 (12.0)	78.4 (28.5)	102.2 (31.0)	23.8 (12.0)	151.5	-.31

Note. ** $p < .01$, * $p < .05$. The *WJ-III* scores were standard scores based upon a mean of 100 and a standard deviation of 15. Numbers in parentheses are standard deviations. Effect sizes in the range of 0 to .3 are considered small, 0.3 to 0.8 are considered moderate, and 0.8 and above are considered large (Cohen, 1988).

dents with high-incidence disabilities will persist throughout their lives (NICHD, 2000).

Second, students with ED were more responsive than their LD counterparts on measures of basic reading skills. The word attack skills of students with ED improved from the low average range at pretest to the average range. This finding was surprising given that many students with ED tend not to be as responsive to remedial reading instruction as their peers including those with LD (e.g., Anderson et al., 2001; Nelson, Benner, & Gonzalez, 2003; Trout et al., 2003). However, researchers have found that the core reading and prereading skills of students with ED can be impacted through intensive reading instruction (Barton-Arwood et al., 2005; Nelson, Stage, Epstein, & Pierce, 2005; Torkelson-Trout et al., 2003). Corresponding with this study, effect sizes of teacher-mediated reading interventions on the reading skills of students with ED have ranged from 1.12 to 1.85 (Pierce, Reid, & Epstein, 2004). However, although participating students with ED and LD made statistically significant gains in oral reading fluency compared to those in the comparison condition, the lone area where participating students with ED did not significantly outperform their LD counterparts was oral reading fluency. This finding coincides with the work of previous researchers who found that students with ED made substantial gains in basic reading skills that did not correspond to similar growth in oral reading fluency (Barton-Arwood et al.; Wehby et al., 2003). Researchers have argued that slowed responsiveness to systematic reading intervention in the area of oral reading fluency may typify the response patterns of students with ED, irrespective of the quality and dosage of intervention (Barton-Arwood et al.).

Although there were several positive findings in this investigation, several limitations exist. First, the elementary and middle school students sampled were not demographically representative of the general population. The generalizability of the findings of this study is therefore limited. Future research should include demographically heterogeneous samples including students at other grade levels. Researchers of future investigations should examine the impact of remedial reading instruction on the reading skills of students with LD and ED using true experimental research designs. Second, given that the participating condition sample was not followed longitudinally, it is unclear whether their reading gains will be maintained. The effects of systematic remedial reading intervention on the reading skills of students with high-incidence disabilities should be examined longitudinally to ascertain whether the positive effects found in this investigation would be maintained over time. Third, qualitative and social validity data were not collected from teachers, parents, or participants. It is therefore unclear whether stakeholders were satisfied with the process, results, and feasibility of using the remedial reading intervention in this study. Fourth, the reading performance of participating students was not compared to those receiving a specific reading program. Future research should compare the treatment effects of the program used in this investigation (i.e., *Corrective Reading Decoding*) to other remedial reading approaches or programs. Fifth, the number of *Corrective Reading Decoding* lessons completed ranged from 25 to 40. Interpretations of research findings about the effectiveness of the intervention should be made cautiously.

There are several implications of this study. Remedial reading instruction for students with comorbid reading difficulties and ED should be scientifically based. Elements of scientifically based reading interventions include (a) a scope and sequence that ensures skill acquisition and consolidation, (b) instructional prompts to guide the teacher, (c) instructional activities to guide the learner, (c) effective error correction procedures, and (d) progress monitoring strategies (NICHD, 2000). Scientifically-based reading instruction should be of a sufficient dosage (40 min a day for 4 or

5 days a week) and continue until the student meets grade-level reading benchmarks. Researchers of two meta-analyses of over 800 studies concluded that such instruction produced the greatest gains in the academic performance of students with behavioral problems (Gottfredson & Gottfredson, 1996; Lipsky, 1991). For example, the results of the Follow Through study provide compelling evidence that scientifically-based Direct Instruction programs produced the greatest gains in reading skill development and social adjustment compared to 21 other models (Adams & Engelmann, 1996). Although scientifically-based instruction may be essential to the prevention and remediation of emotional disturbance, pinpointing and addressing reading difficulties is often eclipsed by meeting the behavioral needs of this population (Forness, 2005).

Corrective Reading continues to show great promise in building the reading skills of students who have not been responsive to core or supplemental reading interventions. The empirical evidence demonstrating the efficacy of this program with struggling readers continues to mount (Grossen, 1998; Marchand-Martella, Martella, & Przychodzin-Havis, 2005). Indeed, the collective results of 21 peer-reviewed investigations demonstrate that students who received *Corrective Reading* significantly outperformed the comparison groups on standardized and curriculum-based reading measures, measures of social adjustment, and attendance (e.g., Benner, Kinder, Beaudoin, Stein, & Hirschmann, 2005; Lloyd, Cullinan, Heins, & Epstein, 1980; Marchand-Martella, Martella, Orlob, & Ebey, 2000). Corresponding with the present investigation, Benner and colleagues (2005) recently found statistically and educationally significant improvements between students who received *Corrective Reading Decoding Level B1* (n = 28) and those in the comparison condition (n = 23) on measures of beginning reading skills and social adjustment. Statistically significant differences were found in the pretest and posttest percentages of *Corrective Reading* condition students whose performance fell in the below- or low-average range on measures of reading fluency (pretest = 79% and posttest = 36%) and beginning reading skills (pretest = 50% and posttest = 25%). Thus, a large percentage of students who experienced low or below-average reading skills at pretest performed in the average range at posttest.

Educators should use fluency-based screening and progress monitoring measures to identify and track the progress of students with reading difficulties. The remedial reading program used in this investigation included simple materials and procedures to track the progress of students in the participating condition. Given that not all remedial reading programs include curriculum-based assessments and accompanying charting materials, empirically validated Curriculum-Based Measurements (CBM) to screen and monitor the progress of students are widely available (e.g., Deno et al., 2001). CBM not only provides teachers and parents technically adequate assessment data, it also has produced significant results on the performance and motivation of students with high-incidence disabilities. Researchers have found that CBM produces moderate to large effect sizes (ES $\geq$ .5) on the academic fluency of students with high incidence disabilities, including those with ED (Shinn, 2002).

Students with high-incidence disabilities should not be left behind their peers in terms of reading success. Improving reading outcomes is one of the cornerstones of the reauthorization of the Elementary and Secondary Education Act—No Child Left Behind legislation (U.S. Department of Education, 2002). However, not leaving students with high-incidence disabilities behind will likely require a fundamental shift from a system that is reactive and compliance driven to one that is proactive and results driven (President's Commission on Excellence in Special Education, 2002). Teachers of students with high incidence disabilities should use a proac-

tive response to intervention (RTI) system to increase responsiveness to reading instruction. Such a system includes progress monitoring with technically adequate assessments, determining response to intervention, ensuring that intervention is delivered with fidelity and with sufficient dosage, and determining the intensity of the support that a student needs to be responsive to reading instruction.

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