

# *The Effects of the Corrective Reading Decoding Program on the Basic Reading Skills and Social Adjustment of Students With High-Incidence Disabilities*

**Abstract:** The purpose of this study was to examine the effects of the *Corrective Reading Decoding B1* program on the basic reading skills, social adjustment, and treatment responsiveness of elementary and middle school students with high-incidence disabilities ( $N = 51$ ). Students were provided an average of 3 40–45 min lessons per week over the course of nearly 4 months. Statistically and educationally significant improvements were found between students who received *Corrective Reading Decoding Level B1* ( $n = 28$ ) and those in the comparison condition ( $n = 23$ ) on measures of basic reading skills and social adjustment. Statistically significant differences were found in the pretest and posttest percentages of the *Corrective Reading* condition nonresponders (i.e., students who fail to acquire beginning reading skills within the normal range) on measures of reading fluency (pretest = 79% and posttest = 36%) and basic reading skills (pretest = 50% and posttest = 25%). Thus, a large percentage of students who experienced below average basic reading skills (i.e., nonresponders) at pretest performed in the average range at posttest (i.e., respon-

ders). 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, 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, 1998). The expansion of technological capabilities of our society and much of the international community has served to amplify the literacy demands placed upon individuals (Biancarosa & Snow, 2004). Indeed, the 25 fastest growing professions have far greater than average literacy demands (Barton, 2000).

The consequences of learning to read in the early grades are pervasive and enduring. Approximately 8 million students between 4th and 12th grade do not read at grade level (Biancarosa & Snow, 2004). The National Assessment of Educational Progress (2001) documents the lack of significant improvement in reading for fourth graders since 1992. Only 32% of fourth graders performed at or above the proficient level. Not only did the average scores fail to improve, but the gap

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between the highest and lowest performing students increased, with the lowest performing students scoring even more poorly than in past years (Donahue, Finnegan, Lutkus, Allen, & Campbell, 2001). For example, in the Nation's Report Card for fourth-grade reading, researchers at the National Center for Education Statistics found that the reading scores of low performing children have generally declined over the last 10 years while those of high performing students increased (U.S. Department of Education, 2001). The reading performance of middle school students also remains a major concern. Only 33% of eighth graders scored at or above the proficient level, and 26% of eighth-grade students were functioning below the basic level (National Assessment of Educational Progress, 2001). In sum, it appears that the majority of fourth- to eighth-grade students require some form of remediation in the area of reading.

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). Failure to learn to read is the major reason for qualification for special education services (Meese, 2001) and is a primary risk factor associated with school dropout (Cornwall & Bawden, 1992; Werner, 1993). Indeed, researchers have reported that 50% of students with high-incidence disabilities do not respond to effective reading intervention (Fuchs et al., 2001). Researchers have described these students as treatment nonresponders (Al Otaiba & Fuchs, 2002; Torgesen, 2000). Treatment nonresponders are those students who, despite participating in core and supplementary reading instructional programs, fail to acquire beginning reading skills within the normal range (Torgesen, 2000).

Nonresponsiveness to reading interventions does not seem to be limited to students with learning disabilities; researchers have found that the majority of students with emotional and behavioral disorders (EBD) experience

reading difficulties. A recent research synthesis (i.e., Trout, Nordness, Pierce, & Epstein, 2003) reported that the prevalence of underachievement in reading for students with EBD 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. Despite the reading deficits experienced by students with EBD, surprisingly little research has been conducted on the effects of reading interventions with this population. In a review of the literature, Coleman and Vaughn (2000) identified a total of eight published articles over the last 30 years that have examined the effects of reading interventions with students with EBD. Despite the scant number of studies reviewed, Coleman and Vaughn concluded that the most effective way to improve the reading skills of students with EBD was through direct instruction programs or procedures.

Direct Instruction reading programs are supported by research (see reviews by Adams & Engelmann, 1996 and White, 1988 for further details). One such reading program, *Corrective Reading* (Engelmann, Hanner, & Johnson, 2002), has shown great promise with students with high-incidence disabilities who experience reading difficulties. Professionals (e.g., general and special education teachers, paraprofessionals) and nonprofessionals (e.g., cross-age tutors) have successfully implemented the *Corrective Reading* program (Marchand-Martella, Martella, & Przychodzin-Havis, 2005). Studies have examined the effects of the *Corrective Reading Decoding* program with elementary-aged students with specific learning disabilities (Lloyd, Cullinan, Heins, & Epstein, 1980; Somerville & Leach, 1988; Thomson, 1992) compared to other programs. The results of these studies reported that students who received *Corrective Reading* significantly outperformed the comparison groups on standardized and curriculum-based reading measures.

Although researchers have examined the effects of the *Corrective Reading Decoding B1* program with students with high-incidence disabilities, several issues remain unexplored. First, researchers have not examined whether the *Corrective Reading Decoding B1* program impacts the prevalence of treatment nonresponsiveness among students with high-incidence disabilities. In other words, researchers have not examined whether the basic reading skills and reading fluency of students with high-incidence disabilities who receive *Corrective Reading Decoding* improve to the average range. Second, researchers have not examined the effects of the *Corrective Reading Decoding B1* program with students with EBD. Finally, researchers have not examined the effects of *Corrective Reading Decoding B1* on the social adjustment of elementary and middle school students with high-incidence disabilities. The purpose of this study was to examine the effects of *Corrective Reading Decoding B1* on the basic reading skills, social adjustment, and the treatment responsiveness of elementary and middle school students with high-incidence disabilities.

## Method

### Participants

Fifty-one public school students (31 males and 20 females) enrolled in five elementary schools and one middle school in an urban, Northwestern city participated in this study. The gender, ethnicity, socioeconomic status (SES), and services (e.g., Title I) received by participants by condition (i.e., *Corrective Reading* and comparison) are reported in Table 1. Descriptions of the *Corrective Reading* and comparison conditions follow.

*Corrective Reading condition.* Twenty-eight students (17 males, 11 females) in the *Corrective Reading* condition received special education services for a high-incidence disability. The numbers and percentages of *Corrective Reading* condition students in the third, fourth, fifth,

and eighth grades were 5 (18%), 15 (54%), 6 (21%), and 2 (7%), respectively.

*Comparison condition.* Twenty-three students (13 males, 10 females) in the comparison condition were matched to *Corrective Reading* 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 3 students at one elementary school or 2 of the middle school students in the *Corrective Reading* condition.

### Setting

Students in the *Corrective Reading* condition were placed in resource rooms for reading and received special education services for a high-incidence disability. These students received the *Corrective Reading* program from five certified special education teachers and the student teachers assigned to their respective classrooms. *Corrective Reading* teachers had collectively taught for 168 years, with a range of teaching experience from 4 to 32 years ( $M = 21.0$ ,  $SD = 9.9$ ). All student teachers were completing a 1-year teacher certification program ending in a preliminary special education endorsement and K–8th grade general education certification. Student teachers were in their final quarter of student teaching at the time of the study.

Students in the comparison condition were matched to all but 5 students in the *Corrective Reading* condition by school, gender, and grade (see above). These students were educated in general classroom environments and received a variety of reading approaches from seven general education teachers in five elementary schools. Comparison condition teachers reported that their focus was to build the comprehension skills of comparison group students rather than to improve their basic reading skills. They generally taught comprehension

strategies and focused on vocabulary development. There was no determination of the teaching experience of these teachers.

Students in the *Corrective Reading* condition were provided an average of three 40–45-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 *Corrective Reading* instruction during the months of February and May, whereas special education teachers instructed during the months of March and April.

## Materials

The remedial reading intervention used was *Corrective Reading Decoding B1*. The *Corrective Reading Decoding B1* program is designed for struggling readers in Grades 3 through 12. It 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 identification 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 in the *Corrective*

**Table 1**  
*Gender, Ethnicity, and Services of Students by Condition*

Demographic variable	<i>Corrective Reading</i> ( <i>n</i> = 28)		Comparison ( <i>n</i> = 23)	
	<i>n</i>	%	<i>n</i>	%
<i>Gender</i>				
Male	17	61	13	57
Female	11	39	10	43
<i>Ethnicity</i>				
African American	11	39	9	39
Hispanic	3	11	1	5
Caucasian	13	46	12	51
Pacific Islander	1	4	1	5
<i>Services</i>				
Learning disability	19	68	6	26
Behavior disorder	9	32	—	—
Title I	—	—	6	26
No services	—	—	11	48

*Reading Decoding* program. Reading fluency is promoted through multiple readings of the text selection both within the teacher-directed lesson and through partner reading activities.

Program materials used by teachers that delivered the *Corrective Reading* program included a teacher book, separate workbook answer key, nonconsumable 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 *Corrective Reading* condition students.

### Dependent Measures

Three dependent measures were used in this study. Two 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. One measure was used to assess the social adjustment of students: The Child Behavior Checklist: Teacher Report Form (TRF; Achenbach, 1991). Student teachers conducted the WJ—III and DIBELS ORF probes, whereas teachers completed the TRF. Descriptions of these measures follow.

*WJ—III.* The WJ—III Basic Reading skills cluster and three third-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. Administrators were trained to deliver the test in a consistent and accurate manner. Testing occurred on 3 consecutive days at both pre- and posttest. 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 subsets: Letter–Word

Identification and Word Attack. Letter–Word Identification measures 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, students 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 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 ranged 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. All *Corrective Reading* and comparison condition students were administered the same third-grade DIBELS ORF probes at pre- and posttest.

*TRF.* The TRF was completed on each student in the *Corrective Reading* and comparison condition. The teacher who had the most interaction with the student was asked to complete the TRF. The TRF was completed by these teachers at pretest and at posttest following intervention at the end of the school year. These teachers were not informed (i.e., “blind”) about the purpose of the study.

Completed pre- and posttest TRFs were received for 16 students (12 *Corrective Reading*, 4 Comparison). The TRF was used to measure the social adjustment of participants. The TRF consists of 113 problem items such as difficulty following directions, disturbs other pupils, and disrupts class discipline. The teacher rates the child on each item indicating the severity of the problem on a scale of 0 (*no problem*) to 2 (*severe problem*). The TRF scoring profile provides a total scale score (Total Problems), two broad band scale scores (Internalizing and Externalizing), and eight narrow band subscale scores (Withdrawn, Somatic Complaints, Anxious/Depressed, Social Problems, Thought Problems, Attention Problems, Delinquent Behavior, and Aggressive Behavior). The broad band Internalizing scale score is based on the sum of the Withdrawn, Somatic Complaints, and Anxious/Depressed scale scores. The broad band Externalizing scale score is based on the Delinquent Behavior and Aggressive Behavior scale scores. The narrow band Social Problems, Thought Problems, and Attention Problems scale scores are not included on either the broad band Internalizing or Externalizing scale scores.

Scoring agreement checks on all WJ—III and DIBELS ORF protocols were conducted. Each protocol was checked for scoring accuracy by the first author of this article after initial scoring by student teachers. 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 at 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 examine the effects of the *Corrective Reading Decoding B1* program on the reading and social adjustment of third-through eighth-grade students with high-incidence disabilities.

## 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 were also provided with opportunities to practice using the *Corrective Reading Decoding B1* program. Two half-day follow-up sessions were conducted during the school year to discuss progress, implementation questions, and any other problems encountered.

*Corrective Reading implementation.* Students in the *Corrective Reading* condition received instruction in the following manner. 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 les-

son. 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). Student teachers were required to implement at least 90% of the *Corrective Reading* lesson components as prescribed prior to beginning instruction. Observations of student teachers were conducted by three of the authors of this article. All student teachers met the criterion prior to implementing the *Corrective Reading Decoding B1* program ( $M = 93\%$ ,  $SD = 4.3$ ). Following training, student teachers were observed teaching lessons on two occasions by three authors of this article. Fidelity of implementation was measured ( $M = 94.5\%$ ,  $SD = 3.5$ ) and corrective feedback was provided as needed.

## Analyses

There were three primary analyses conducted. First, the Mann–Whitney  $U$  Test was used to determine if the differences in the change scores of *Corrective Reading* and comparison students were statistically significant. 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). Second, effect size estimates were used to determine if differences in the change scores of *Corrective Reading* and comparison students were educationally significant. Interpretations of the mag-

nitude 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. Finally, chi-square analysis was conducted to assess whether the differences in the distributions of nonresponders at pre- and posttest were statistically significant.

## Results

The mean WJ—III Basic Reading Skills cluster and DIBELS Oral Reading Fluency change scores, Mann–Whitney  $U$  test statistics, and effect sizes for students in the *Corrective Reading* and comparison conditions are reported in Table 2. The analyses conducted using the WJ—III, DIBELS, TRF, and the prevalence of nonresponders follow.

### WJ—III

Inspection of Table 2 reveals that relative to students in the comparison condition, students in the *Corrective Reading* condition showed statistically significant improvements in their basic reading (WJ—III Basic Reading Skills Cluster:  $U [1, 47] = 77.5$ ,  $p < .001$ ), letter–word identification (WJ—III Letter–Word Identification:  $U [1, 47] = 147.5$ ,  $p < .01$ ), and word attack (WJ—III Word Attack:  $U [1, 47] = 106.5$ ,  $p < .001$ ) skills relative to students in the comparison group. Effect size estimates based on the mean change scores of *Corrective Reading* and comparison students on the WJ—III Basic Reading Skills cluster ( $ES = 1.49$ ) and WJ—III Word Attack subtest ( $ES = 1.15$ ) scores were large in magnitude. The effect size estimate based on the mean change scores of *Corrective Reading* and comparison students on the WJ—III Letter–Word Identification subtest ( $ES = .52$ ) was moderate in magnitude. Thus, effect sizes across all WJ—III reading measures were deemed educationally significant.

## DIBELS

Inspection of Table 2 reveals that relative to students in the comparison condition, students in the *Corrective Reading* condition showed statistically significant improvements in their DIBELS ORF scores. Statistically significant differences between the mean change scores of students in the *Corrective Reading* and comparison conditions were obtained (DIBELS ORF probe:  $U [1, 47] = 158.5, p < .05$ ) relative to students in the comparison group. Effect size estimates based on the mean change scores of *Corrective Reading* and comparison students on the DIBELS ORF

probe (ES = .84) scores were large in magnitude. The effect size on the DIBELS ORF probe was educationally significant.

## TRF

The mean TRF gain scores and effect sizes are reported in Table 3. It was not possible to obtain completed TRFs on all 51 participants in this study because of teacher time constraints. As reported in Table 3, the problems of students in the *Corrective Reading Decoding B1* condition ( $n = 12$ ) were less across all areas than those in the comparison condition ( $n = 4$ ). Moreover, the *Corrective Reading Decoding B1*

**Table 2**  
*Mean WJ—III and DIBELS ORF Change Scores, Mann–Whitney U Statistics, and Effect Sizes by Condition*

Measure	<i>Corrective Reading</i> ( $n = 28$ )			Comparison ( $n = 23$ )			$U$	Effect size
	Pretest	Posttest	Change	Pretest	Posttest	Change		
WJ—III Basic Reading Skills	83.1 (10.7)	88.9 (8.8)	5.7 (4.0)	94.5 (12.8)	94.4 (12.4)	-.1 (3.8)	77.5***	1.49
Letter–Word Identification	80.4 (11.8)	84.7 (11.0)	3.6 (5.5)	92.5 (12.3)	93.3 (10.2)	.8 (5.3)	147.5**	.52
Word Attack	89.5 (10.4)	95.3 (7.1)	5.8 (5.9)	98.3 (11.3)	96.4 (13.4)	-1.9 (7.4)	106.5***	1.15
DIBELS ORF probe	63.8 (26.3)	89.1 (29.4)	25.3 (12.7)	84.8 (19.6)	99.8 (20.8)	15.0 (11.9)	158.5*	.84

*Note.* 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).

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

program produced small to large effect sizes on the social adjustment of students when compared to their counterparts in the comparison condition. The effect sizes calculated on all social adjustment measures were educationally significant (i.e., above .25). The overall effect of the *Corrective Reading Decoding B1* program on the total problems of *Corrective Reading* students compared to comparison peers was moderate in magnitude. The effects of the *Corrective Reading Decoding B1* program on the internalizing problems (i.e., depressive, anxious, and/or withdrawn behaviors) and attention problems were large in magnitude. The effect on externalizing behavior problems was small. In other words, although students receiving the *Corrective Reading Decoding B1* program experienced moderate, educationally sig-

nificant overall reductions in behavior problems, the greatest declines were observed in the areas of internalizing and attention problems. Indeed, *Corrective Reading* condition students experienced large improvements in concentration, attention, confidence, and happiness and large reductions in depressive behaviors, withdrawal, and distractibility.

### Nonresponder Analysis

Nonresponder analyses were conducted to ascertain the percentage of students in the *Corrective Reading* condition ( $n = 28$ ) who did not meet normative criteria for nonresponsiveness at pretest and at posttest. Two criteria were used to determine nonresponsiveness: (a) students whose WJ—III Basic Reading Skills cluster standard score fell at or below

**Table 3**  
*Mean Teacher Report Form Change Scores and Effect Sizes by Condition*

TRF measure	<i>Corrective Reading</i> ( $n = 12$ )	Comparison ( $n = 4$ )	Effect size
	Change	Change	
Total problems	-1.2 (4.0)	3.5 (7.4)	-.79
Internalizing problems	-2.9 (4.9)	4.5 (9.1)	-1.01
Externalizing problems	-.3 (6.8)	1.0 (1.2)	-.27
Attention problems	-1.1 (3.8)	3.5 (6.8)	-.84

*Note.* The TRF scores were  $t$  scores. 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).

85 (Torgesen et al., 1999), and (b) students whose words read correctly per minute using the DIBELS ORF fell below 80 (i.e., the end of the year third-grade benchmark for at-risk status). The percentage of *Corrective Reading* students who met these criteria prior to the intervention was compared to the percentage meeting the criteria after the intervention. Pre- and posttest differences were then compared. Statistically significant differences ( $X^2 = 9.3, 1, N = 28, p < .01$ ) were found in the percentages of nonresponders at pretest (50%) and posttest (25%) using the WJ—III Basic Reading Skills cluster. Similarly, statistically significant differences ( $X^2 = 4.2, 1, N = 28, p < .05$ ) were found in the percentages of nonresponders at pretest (79%) and posttest (36%) using the DIBELS ORF. These data indicate that the *Corrective Reading Decoding B1* program was of sufficient intensity to improve the basic reading skills and reading fluency of over half of *Corrective Reading* students, raising their scores from below average to the average range.

## Discussion

Statistically and educationally significant improvements were found between students who received *Corrective Reading Decoding B1* ( $n = 28$ ) and those in the comparison condition ( $n = 19$ ) on measures of basic reading skills and social adjustment. Statistically significant differences were found in the pre- and posttest percentages of *Corrective Reading* condition nonresponders on measures of reading fluency (pretest = 79% and posttest = 36%) and basic reading skills (pretest = 50% and posttest = 25%). Several findings warrant discussion.

First, the *Corrective Reading Decoding B1* program produced statistically and educationally significant changes in the basic reading skills of *Corrective Reading* students. Students in the *Corrective Reading* condition demonstrated statistically significant mean changes on the WJ—III Basic Reading Skills cluster and asso-

ciated subtests and the DIBELS ORF probe compared to those in the comparison condition. Moreover, effect sizes were large in magnitude (i.e., above .80), suggesting that the *Corrective Reading Decoding B1* program had educationally significant effects on the basic reading skills and oral reading fluency of students. An effect size of .25 is considered educationally significant, meaning that it is worth the expense and effort involved in learning to use a new instructional program or procedure (Adams & Engelmann, 1996).

Second, the *Corrective Reading Decoding B1* program was effective in reducing the prevalence of nonresponsiveness from pre- to posttest. Statistically significant differences were found in the percentages of *Corrective Reading* condition nonresponders using the mean WJ—III Basic Reading Skills cluster (pretest = 50% and posttest = 25%) and DIBELS ORF (pretest = 79% and posttest = 36%) scores. This finding underscores the utility of the *Corrective Reading Decoding B1* program in bringing the beginning reading skills of many non-responsive third- through eighth-grade students with high-incidence disabilities into the average range. Furthermore, statistically significant drops in the prevalence of nonresponsiveness were made after only 4 months of *Corrective Reading* instruction. The posttest rate of nonresponsiveness was notable considering previous studies of reading interventions on naturally occurring participant samples have reported a range of nonresponders from 30% to 80% (Nelson, Benner, & Gonzalez, 2003). It remains unclear, however, whether the rate of nonresponsiveness would have continued to decline had all 65 lessons of the *Corrective Reading Decoding B1* program been implemented, as opposed to 25 to 40. This finding coincides with extensive empirical studies demonstrating the efficacy of the program with struggling readers (Grossen, 1998; Marchand-Martella et al., 2005).

Finally, educationally significant changes in the social adjustment of *Corrective Reading* students

with high-incidence disabilities were found. The *Corrective Reading* program produced large changes in the internalizing (i.e., depressive, withdrawn, anxious) and inattention problems of *Corrective Reading* condition students with high-incidence disabilities. It is important to note that this finding should be interpreted cautiously given that we did not have completed measures of social adjustment for each student in this study. Despite this limitation, this finding coincides with the findings of researchers who found that those receiving the *Corrective Reading Decoding B1* program made gains in behavior compared to peers (Adams & Engelmann, 1996). The results of this study suggest that gains in reading skills are likely to produce collateral improvements in the social adjustment of public school students with high-incidence disabilities, particularly in the areas of internalizing behavior and attention. Researchers have found that reading skills are highly related to decreased risk of depression, self-esteem, personal resilience, and the ability to overcome social obstacles (National Institute of Child Health and Human Development, 2000; Simmons & Kame'enui, 1998).

There are several implications of this study. First, the findings underscore the effectiveness of Direct Instruction principles. Interventions based on such principles that effectively address key deficit areas such as phonemic awareness and phonics are a necessity for students with high-incidence disabilities, particularly those with behavior problems (U.S. Department of Education, 2001). In complex areas, such as basic reading skill development, it may be necessary for teachers to use scripted programs built upon direct instruction procedures. It would not only be time consuming and expensive for each classroom teacher to develop an effective basic reading skills curriculum, but such a curriculum is also fraught with a high degree of error. There is compelling evidence that supports the use of scripted programs rather than teacher-developed approaches to teach complex skills (Adams & Engelmann, 1996).

Second, 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). Given the poor prognosis for remediating reading difficulties over time, it is imperative that the educators identify effective, feasible methods of teaching reading and remediating existing deficits during the early elementary years when the discrepancy between current and desired levels of performance are most narrow and intervention outcomes are likely to be more effective (Lane & Menzies, 2002; Walker & Severson, 2002). Not only do these deficits remain as children move into adolescence, they actually appear to broaden. Yet, those students who continue to experience reading difficulties after third grade require more intensive scientifically-based reading instruction. The findings of this study suggest that not only will providing such instruction likely lead to significant gains in reading skills but also corresponding improvements in the social adjustment of youth who receive it.

Finally, researchers have demonstrated that problem behavior makes responding to reading instruction and developing reading skills less likely, and that underachievement leads to behavioral difficulties (Bower, 1995; Nelson et al., 2003). Reading difficulties and problem behaviors are reciprocally and inextricably related (Kauffman, 2001). Reading challenges can lead to behavioral problems that are, in turn, exacerbated by poor instruction and vice versa. Direct Instruction in reading may serve not only to improve the reading skills of students with challenging behaviors but also to decrease the interfering influence of problem behavior on instruction. The effectiveness of programs that use explicit or direct instruction procedures and instructional design principles on students with social adjustment problems is well documented (Gottfredson &

Gottfredson, 1996; Lipsky, 1991; U.S. Department of Education, 2001). Therefore, educators should strongly consider the use of Direct Instruction as a positive behavioral support for students with high-incidence disabilities, especially those who exhibit problem behaviors (Stein & Davis, 2000).

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. Second, given that the *Corrective Reading* condition sample was not followed longitudinally, it is unclear whether their reading gains would be maintained. The effects of the *Corrective Reading Decoding B1* program should be examined longitudinally to ascertain whether the positive effects found in this investigation would be maintained over time. Third, social validity data were not collected. It is therefore unclear whether stakeholders were satisfied with the process and results from the *Corrective Reading Decoding B1* program. Fourth, the reading performance of students receiving the *Corrective Reading Decoding B1* program was not compared to those receiving a specific reading program. Future research should compare the treatment effects of *Corrective Reading* to other reading programs. Fifth, the number of *Corrective Reading Decoding* lessons completed ranged from 25 to 40. Interpretations of research findings about the effectiveness of the *Corrective Reading Decoding* program should be made cautiously. Sixth, we received completed pre- and posttest TRFs for only 16 out of 51 *Corrective Reading* and comparison condition students. Therefore, the improvements to social adjustment of students in this study should not be generalized to the larger population of students with high-incidence disabilities. Finally, researchers of future investigations should examine the impact of

*Corrective Reading Decoding* on social adjustment using true experimental research designs.

In summary, students with high-incidence disabilities who experience reading difficulties require focused and intensive remedial reading instruction. Without such instruction, the reading difficulties of the vast majority of students with high-incidence disabilities will persist, hindering their vocational prospects and overall achievement. The basic reading skills and fluency of over half of the students who received the *Corrective Reading Decoding* program increased from below average to the average range. The results of the present study, and those of previous investigations, suggest that the *Corrective Reading Decoding* program appears to be of sufficient focus and intensity to improve the reading skills and social adjustment of struggling readers who have not been responsive to other remedial reading approaches.

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