

Assessing the Effects of Corrective Reading Decoding B1 with a High School Student with Intellectual and Developmental Disabilities: A Case Study

Abstract: Although *Corrective Reading Decoding* has been validated as effective over a wide range of students, there is a lack of information on its effectiveness with older students having intellectual and developmental disabilities (IDD). Thus, the purpose of this investigation was to determine the effectiveness of *Corrective Reading Decoding B1* on the reading skills of a high school student with IDD. Pre- and posttest data were collected on the *Woodcock-Johnson III (WJ-III)*. Scores were compared to a previous administration of the *Woodcock-Johnson Revised (WJ-R)*. Within-program assessments were also completed. Results showed that improvements occurred across the majority of the subtests and all reading clusters; gains were also evident when scores were compared to the normative group. Results of the within-program assessments showed mastery of skills taught within the *Corrective Reading Decoding B1* program.

Reading is the core element of education. Without reading, other academic areas such as writing and mathematics skills cannot be fully

developed because the skill of reading is a crucial element of all other subject areas. Students who have difficulty learning to read experience academic failure; this failure often leads to higher dropout rates and significantly lower rates of college attendance than those who do not experience reading difficulty (Biancarosa & Snow, 2004; Lyon, 1999; Meese, 2001; National Association of Secondary School Principals [NASSP], 2005). Deficiency in reading leads to long-term remediation and school retention and is the major reason for students to be referred to special education services (Biancarosa & Snow; Meese; NASSP).

The majority of students who qualify for special education services under the “intellectual and developmental disability (IDD)” category, formerly called mental retardation (MR) (see <http://www.aaidd.org> for details), read at much lower levels than expected for their mental age. Comprehension seems to be the most difficult aspect of reading for this population to grasp (Beirne-Smith, Patton, & Kim, 2006).

When reading instruction is provided to students with IDD, two general approaches are used. The first instructional approach involves sight words. Sight-word-based instruction is the most commonly used approach for teaching reading to students with IDD (Browder & Xin, 1998; Conners, 1992; Joseph & Seary, 2004). Sight-word instruction includes discrimination and drill and practice exercises until word mastery is achieved; this instruc-

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tion is best given in natural settings where sight words would normally occur (Browder & Xin, 1998; Schloss et al., 1995). Sight-word instruction is often labeled as “functional reading” because students focus on the most critical words to learn (e.g., *exit, stop, men, women*) to enhance their participation in present and future environments. One sight-word-based program used successfully with this population of students is the *Edmark Reading Program* (see <http://web.riverdeep.net> for details).

The second approach to reading instruction for students with IDD focuses on teaching decoding skills (Joseph & Seery, 2004). Students are taught to pronounce sounds for individual letters in isolation and then to blend the sounds to form words; this instruction involves the use of explicit phonics instruction (National Institute of Child Health and Human Development [NICHD], 2000). “Students with mental retardation learn best when instruction is explicit and systematic and instructional methods are derived from empirical research” (Heward, 2006, p. 159). Explicit instruction is designed to allow for mastery of skills with ample opportunities for review (NICHD). Halle, Chadsey, Lee, and Renzaglia (2004) noted “it is important to use a systematic-instruction approach with students with severe disabilities. ... Most compelling is that students with severe disabilities are unlikely to learn with other, less precise types of instruction” (p. 55).

Using explicit and systematic instruction to teach decoding skills has been shown to be highly effective (Biancarosa & Snow, 2004; NASSP, 2005; NICHD, 2000; Schieffer, Marchand-Martella, Martella, & Simonsen, 2002). However, few studies have investigated the effects of teaching decoding skills to students with IDD (Browder, Wakeman, Spooner, & Ahlgrim-Delzell, 2006; Houston & Torgesen, 2004; Joseph & Seery, 2004). For example, Browder et al. found 128 studies (1,123 participants) between the years of 1975 and 2003 that included the effects of reading

instruction with participants with MR (now IDD). Their research also included the lists of five other recent literature reviews (Browder & Xin, 1998; Conners, 1992; Houston & Torgesen, 2004; Joseph & Seery, 2004; Morse & Schuster, 2004). The Browder et al. analysis found that 78% of the studies included participants with moderate MR, a high number of studies involving this population. However, only 55% of the total participants across all studies were diagnosed with MR (Browder et al., 2006). The discrepancy between the number of studies conducted and the number of participants involved shows a need for research on teaching reading skills to students with MR. Twenty-three studies included participants diagnosed with “other” developmental disabilities including autism. Those participants with autism totaled 6% of the total population. Moreover, of the studies that Browder et al. (2006) analyzed, 34% used picture identification for sight-word acquisition, 24% of the studies analyzed comprehension measures, 28% examined fluency, and 10% and 4% targeted phonics and phonemic awareness skills, respectively. Interestingly, Joseph and Seery (2004) called for more research in the area of phonetic analysis and/or phonics (decoding) using students with MR.

One program having the potential for use with students with IDD, given its emphasis on explicit and systematic decoding instruction and success with students who struggle in reading, is *Corrective Reading* (Engelmann, Hanner, & Johnson, 1999; Marchand-Martella, Martella, & Przychodzin-Havis, 2005). *Corrective Reading* is based on the principles of Direct Instruction. *Corrective Reading* lessons are sequenced from simple to complex, and skills are practiced and reviewed to facilitate long-term learning (Engelmann et al., 1999a; Marchand-Martella, Martella, & Przychodzin-Havis). *Corrective Reading* has been used successfully in teaching reading skills in a variety of settings with diverse student populations.

In their recent review, Marchand-Martella, Martella, and Przychodzin-Havis (2005) found positive academic results for *Corrective Reading* in 27 of the 28 studies. However, none of those studies included participants who were specifically labeled as having IDD. Further, in an analysis of Direct Instruction programs used with students in special education, Marchand-Martella, Kinder, and Kubina (2005) found only one study using *Corrective Reading (Decoding A)* with students with moderate intellectual disabilities/autism (i.e., Flores, Shippen, Alberto, & Crowe, 2004). Thus, further research is needed on the use of *Corrective Reading* with participants with IDD. Therefore, the purpose of this study was to examine the effects of *Corrective Reading Decoding B1* (Engelmann et al., 1999a) on the decoding skills of a high school student with IDD.

Method

Participant

Chad was a 16-year-old male who had been diagnosed with Pervasive Developmental Disorder (PDD) and MR. On the *Stanford-Binet Intelligence Scale: 4th Edition* (Thorndike, Hagen, & Sattler, 1986), his Test Composite Standard Age Score was within the range of moderate MR. Chad was diagnosed with PDD in 1994 at the age of 4. The *Vineland Adaptive Behavior Scales (Interview Edition)* (Sparrow, Balla, & Cicchetti, 1984) were administered to Chad's mother, and the *Vineland Adaptive Behavior Scales (Classroom Edition)* (Sparrow, Balla, & Cicchetti, 1985) were administered to Chad's classroom teacher. The general pattern of ratings between Chad's mother and classroom teacher showed that he exhibited a substantial deficit in the area of adaptive behavior. At the age of 12 he functioned at a beginning 6-year-old level. The *Peabody Picture Vocabulary Test: 3rd Edition* (Dunn & Dunn, 1997) showed that Chad exhibited a moderate to severe language delay affecting content, form, and use of language. Chad did not take any medication during the investigation.

Chad had two reading objectives on his most current Individualized Education Program (IEP). The first stated that Chad would apply different reading rates to match text at the second-grade level by adjusting his reading rate to match the reading purpose (e.g., speed up for pleasure reading, slow down to practice new skills or read unfamiliar text). Chad's other reading objective stated that he would apply comprehension-monitoring strategies before, during, and after reading to determine the importance of information using theme, main idea, and supporting details in informational/expository text and/or literary/narrative text (science, social studies, math) at the second-grade level by identifying the main idea of an informational/expository passage and support with text-based evidence with teacher guidance.

Setting

For purposes of this study, Chad's reading instruction occurred for 30 min between the times of 7:45 a.m. and 8:30 a.m. every day. Every other day he had physical education from 8:30 a.m. to 10:30 a.m. From 10:30 a.m. and 11 a.m. on those days was academic time, and lunch was at 11 a.m. After-lunch activities depended on the day. On Mondays and Wednesdays, Chad went to his job-skills placement until 2 p.m. when he went home. On Tuesdays, Chad and his class attended a cooking class in the afternoon until 2 p.m. On days when Chad did not have physical education, the time between 8:30 a.m. and 11 a.m. was spent engaged in academic time. Every Thursday afternoon was devoted to academic time. All of Friday was spent in the community touring various support services, community resource agencies, and other facilities. Chad received instruction in math, writing, and growth and human development in addition to the reading intervention.

The study took place in a large public high school in an urban area in the Pacific Northwest. The school consisted of 1,741 students in grades 9 through 12; 66.3% of the stu-

dent population qualified for free or reduced-price meals. Of the total student population, 13.2% qualified for or received special education services (Office of the Superintendent of Public Instruction, 2007).

Chad was instructed in a self-contained setting with physical education in the general education setting. A graduate student in special education was the primary instructor in Chad's classroom and served as the instructor during *Corrective Reading* lessons. The supervising teacher in the room had 5 years' experience of teaching special education and was responsible for creating student portfolios to meet state standard requirements for all 10th-grade students. The graduate student (instructor in this study) had a bachelor's degree and a primary endorsement in English at the secondary level and was working toward a master's degree and primary endorsement in special education.

Curriculum and Materials

Corrective Reading: Decoding B1 (Engelmann et al., 1999a) was selected as the reading program for this study based on Chad's performance on the *Corrective Reading Decoding Placement Test*. This level of the program includes 65 lessons. The program emphasizes basic reading skills (Stein & Kinder, 2004).

The materials in the program included a teacher presentation book, a non-consumable student book, and a consumable workbook. The instructor also used a white board and dry-erase markers, pencils, and stopwatches throughout the study.

Dependent Measures

Two dependent measures were used to measure Chad's reading skills. The first dependent measure included grade equivalent and standard scores on the *Woodcock-Johnson Psycho-Educational Battery-Revised (WJ-R)* (Woodcock & Johnson, 1989, 1990) and the *Woodcock-Johnson Psycho-Educational Battery (Third Edition)*

(*WJ-III*) (Woodcock, McGrew, & Mather, 2001). The second measure included scores from the *Decoding B1 Strategies Mastery Test* (Engelmann et al., 1999b).

WJ-R and WJ-III. Chad was assessed previously in 2002 on the *WJ-R*. In the present study, he also was assessed before and after the implementation of *Corrective Reading Decoding B1* using the *WJ-III*. The *WJ-R* and *WJ-III* include individually administered standardized tests of achievement. For the pretest and posttest measures on the *WJ-III*, two forms (A and B) were used, respectively.

On the *WJ-R*, four subtests were previously administered in 2002 (Letter-Word Identification, Word Attack, Passage Comprehension, and Reading Vocabulary) yielding three cluster scores: Broad Reading, Basic Reading Skills, and Reading Comprehension. On the *WJ-III*, six reading subtests were administered (Letter-Word Identification, Word Attack, Passage Comprehension, Reading Vocabulary, Reading Fluency, and Sound Awareness).

The Broad Reading cluster score for the *WJ-R* consists of the Letter-Word Identification and Passage Comprehension subtests. The Broad Reading cluster of the *WJ-III* consists of the following three subtests: Letter-Word Identification, Reading Fluency, and Passage Comprehension. Due to the difference in number of subtests, a comparison was not made in the Broad Reading cluster between the 2002 *WJ-R* and the 2007 *WJ-III*.

The Basic Reading cluster score for both the *WJ-R* and *WJ-III* is comprised of two subtests: Letter-Word Identification and Word Attack. The Reading Comprehension cluster score for both the *WJ-R* and *WJ-III* is comprised of two subtests: Passage Comprehension and Reading Vocabulary. However, due to the difference in number of subtests, a comparison was not made in the Broad Reading cluster between the 2002 *WJ-R* and the 2007 *WJ-III*. Also, the

Sound Awareness subtest is considered a supplemental subtest for the *WJ-III*. This subtest is not included in the *WJ-R*.

Decoding B1 Strategies mastery test. Mastery tests within the *Corrective Reading Decoding B1* were administered during the program—once after completion of Lesson 30 and again after completion of Lesson 60. The first mastery test consists of two sections—word identification and story reading. The word identification section contains nine skills (i.e., writing letters for sounds; writing words with endings; matching completion; sentence copying; short-vowel words; long-vowel words; sound combinations; word endings *ed, ly, er*; and irregular words). Writing letters for sounds measures skill-level of connecting letters to the sounds they make. Writing words without endings measures skill-level of recognizing root words and spelling. Matching completion measures the skill level of recognizing different letters in different words. Sentence copying measures fine motor skills. Short-vowel words, long-vowel words, sound combinations, word endings *ed, ly, er*; and irregular words all measure the skill level of reading words with those characteristics.

The second mastery test consists of the same two sections—word identification and story reading. Story reading measures reading speed, accuracy, and comprehension. The word identification section contains 10 skills (i.e., identifying letter combinations; writing words without endings; following instructions; writing compound words; short-vowel words; consonant digraphs; *ed* endings in short-vowel words; word endings *s, ing, est, er*; and *ery*; sound combinations *ai, oa, or, ol, ea, ou, ow*; and irregular words). Identifying letter combinations measures the skill level of discrimination between letter combinations. Following instructions measures the skill level of doing what is asked. Writing compound words measures the skill level of combining two words or word parts to make a new compound word. As in the first mastery test, short-vowel words, consonant digraphs, *ed* endings in short-vowel

words, word endings *s, ing, est, er*; and *ery*, sound combinations *ai, oa, or, ol, ea, ou, ow*, and irregular words all measure the skill level of reading words with those characteristics.

Procedures

The effectiveness of *Corrective Reading Decoding B1* was evaluated over a 5-month implementation. Data were grouped on reading clusters (*WJ-R* and *WJ-III ACH*) and one supplemental subtest (*WJ-III*). Instruction consisted of one 30-min lesson per day before the school day began 5 days per week.

Daily lessons started with word attack skills consisting of chalkboard work during which Chad read words that the instructor wrote. The instructor then changed words as scripted in the program by one or more letters to form new words and Chad read the new words. Then Chad practiced pronouncing words, identifying sounds and sound combinations, and reading words in the student book portion of word attack. Following word attack, Chad read the story aloud and answered comprehension questions about the passage. Next, Chad read the story from the previous day's lesson. After that, he was timed while reading the same story. Chad then completed the workbook exercises on his own; the instructor scored these exercises for accuracy. Chad rewrote the correct answers to any that he answered incorrectly.

Corrective Reading provides a specific error correction procedure requiring the instructor to model the correct answer or word, lead the student in stating the correct answer or word, and test the student on that particular answer or word later in the lesson. Specific praise was applied consistently for appropriate behavior, attending to the task, and completing lessons and portions of lessons. The point system used in the back of the workbook as well as graphing words per minute on a fluency chart from daily timed readings were also used.

One divergence from the program script was incorporated to accommodate Chad's unique

needs. Due to his short-term memory deficits, comprehension questions were posed directly after reading the information in the answer rather than delaying the question until the end of the section as was recommended by the script. All other portions of the program were delivered as directed.

Treatment Fidelity

A 10-item *Corrective Reading Decoding* observation form (Benner, 2007) was used to assess treatment fidelity. There were 6 sections on the checklist: (a) word attack, (b) one-on-one story reading, (c) individual reading checkouts, (d) workbook exercises, (e) data recorded, and (f) praise/point system used. Each section included at least one item. Observers circled a *yes* or *no* to indicate whether the format was followed (word attack and one-on-one story reading sections), error corrections were used (word attack and one-on-one story reading sections), appropriate signals were used (word attack section), the pacing was appropriate (word attack section), and the section was completed efficiently (individual reading checkouts).

The observer was trained in Direct Instruction in undergraduate and graduate programs and had used the *Corrective Reading* programs as a classroom teacher. Five fidelity observations were conducted over the course of the study. On all 6 sections of the checklist, the observer confirmed that the instructor implemented the program correctly and provided feedback to the instructor accordingly. Thus, treatment fidelity was maintained consistently across the duration of the study.

Data Analysis

Grade equivalents and standard scores from the 2002 *WJ-R* and pretest and posttest scores from the *WJ-III* were compared. Effect sizes were calculated based on standard scores from the reading clusters as well as all subtests by subtracting the pretest scores from the posttest scores and dividing by the standard

deviation of the test norms (i.e., 15) (Martella, Nelson, & Marchand-Martella, 1999). Effect sizes were also calculated by comparing standard scores to the test norms by subtracting Chad's scores from 100 and dividing by 15. Magnitude of effect sizes were interpreted as follows: effect sizes between .20 and .49 were considered small, effect sizes between .50 and .79 were considered medium, and effect sizes of .80 and greater were considered large (Cohen, 1988). Additionally, scores from the *Decoding B1 Strategies Mastery Test* were reported and compared to the criterion for each subsection of the mastery test.

Results

WJR and WJ-III

As shown in Table 1, improvements were evidenced across the three reading clusters and the Sound Awareness subtest. There were grade-equivalent improvements across all subtests ranging from .1 (Reading Vocabulary) to 3.5 (Word Attack) on the *WJ-III*. It is important to note that in the nearly 5 years that passed between the 2002 *WJ-R* assessment and the *WJ-III* pretest, the grade-equivalent improvement ranged from -.2 (Passage Comprehension) to 1.6 (Letter Word Identification).

For Broad Reading on the *WJ-III*, effect size gains ranged from no change (-.07 in Letter-Word Identification) to large (1.47 in Passage Comprehension). Overall, the effect size of this reading cluster was considered small (.47). For Basic Reading, effect sizes ranged from no change (again, -.07 in Letter-Word Identification) to large (.80 in Word Attack). The overall effect size for this reading cluster was considered small (.47). For Reading Comprehension, effect sizes ranged from no change (.07 in Reading Vocabulary) to large (again, 1.47 in Passage Comprehension). Overall, the effect size for this reading cluster was considered large (.80). Finally, a moderate

effect size (.60) was noted for the Sound Awareness subtest.

Effect sizes of .25 and above are considered educationally significant (Adams & Engelmann, 1996). Based on this criterion, four of the six (67%) subtest standard scores would be classified as educationally significant and all cluster scores would be considered educationally significant.

Effect-size calculations comparing Chad's standard scores to the test norms showed general improvements across clusters and subtests on the WJ-III. For Broad Reading and Sound Awareness, Chad made gains in comparison to the normative group from the 2007 pretest to posttest assessments. For example, he was nearly 3 standard deviations behind the normative group at the beginning of the investigation and was 2.33 standard deviations behind at its completion on Broad Reading. For Letter-Word Identification, Chad showed gains in comparison to the normative group of .40 standard score points from the 2002 to 2007 pretest assessments. He did not make further gains over the 5 months of the investigation.

Gains in comparison to the norm group were also seen for Reading Fluency and Passage Comprehension. Importantly, even though Chad lost ground when compared to the normative group from 2002 to the 2007 pretest on the Passage Comprehension, Word Attack, and Reading Comprehension subtests and Basic Reading Cluster, he made a large gain over the 5-month investigation. Finally, Chad made gains compared to the normative group from the 2002 to the 2007 pretest assessments of .27 of a standard deviation and continued this improvement from the 2007 pretest to posttest assessments of .06 standard deviations.

Decoding B1 Strategies Mastery Test

On both mastery tests, Chad met criterion on all skills tested. In particular, he displayed an accelerated rate of decoding fluency that

exceeded program mastery requirements. Under story reading for Mastery Test 1, he read the passage in 64 s, which was below the criterion of 80 s; on Mastery Test 2, he read the passage in 74 s, which was again under the criterion of 80 s.

Discussion

The purpose of this study was to examine the effect of *Corrective Reading Decoding B1* on the reading skills of a high school student with IDD. Overall, the findings were positive: Chad attained mastery of the reading skills introduced in *Corrective Reading Decoding B1*. In addition, results showed that *Corrective Reading Decoding B1* had an educationally significant impact on all three reading clusters as well as on four of the six reading subtests of the *WJ III* (see Table 1). These findings show the promise of using an explicit and systematic reading program that emphasizes decoding skills with individuals with IDD.

As shown by the grade-equivalent improvements between the 2007 pretest and posttest assessments, Chad made progress in his reading skills. Most important were the gains made in comparison to the norm group. These gains would not be expected for a student with IDD. The 2002 assessment results indicated Chad was falling further behind in the two cluster areas of Basic Reading and Reading Comprehension for which scores were available (note that 2002 scores were not calculated for Broad Reading). He was also falling further behind in two of the four subtest areas for which scores were available (i.e., Passage Comprehension and Word Attack) (note that 2002 scores were not available for Reading Fluency and Sound Awareness). However, these negative achievement trends were reversed when the *Corrective Reading: Decoding B1* was implemented.

This study adds to the findings of the *Corrective Reading* research base conducted by

Table 1
WJR and WQJ-III Scores and Effect Sizes

Cluster/Subtest	Grade Equivalent				Standard Score			
	WJR 2002	WJ-III (2007)		Change	WJR 2002	WJ-III (2007)		Change
		Pre	Post			Pre	Post	
Broad Reading	n/a	2.8	3.5	.7	n/a	58	65	7
Effect Size Gain								.47
Comparison Effect Size					n/a	-2.80	-2.33	
Letter-Word Identification	2.8	4.4	4.7	.3	71	77	76	-1
Effect Size Gain								-.07
Comparison Effect Size					-1.93	-1.53	-1.60	
Reading Fluency	n/a	2.3	3.0	.7	n/a	63	68	5
Effect Size Gain								.33
Comparison Effect Size					n/a	-2.47	-2.13	
Passage Comp.	1.9	1.7	2.7	1.0	61	43	65	22
Effect Size Gain								1.47
Comparison Effect Size					-2.60	-3.80	-2.33	
Basic Reading	2.9	4.0	5.3	1.3	80	75	82	7
Effect Size Gain								.47
Comparison Effect Size					-1.33	-1.67	-1.20	
Letter-Word Identification	2.8	4.4	4.7	.3	71	77	76	-1
Effect Size Gain								-.07
Comparison Effect Size					-1.93	-1.53	-1.60	
Word Attack	3.3	3.3	6.8	3.5	89	81	93	12
Effect Size Gain								.80
Comparison Effect Size					-.73	-1.27	-.47	
Reading Comprehension	1.6	1.8	2.4	.6	50	42	54	12
Effect Size Gain								.80
Comparison Effect Size					-3.33	-3.87	-3.07	

(table continues)

Marchand-Martella, Martella, and Przychodzin-Havis (2005) where positive effects were found in 27 of 28 studies (96%) that used *Corrective Reading* to teach reading skills to struggling students. As noted previously, only two of the 28 studies (7%) examined a population base including students with IDD. Both of those studies showed positive gains in reading skills through the use of *Corrective Reading*. Further, this study adds to the research base gathered by Marchand-Martella, Kinder, and Kubina (2005) who found only one study using *Corrective Reading (Decoding A)* with students with moderate intellectual disabilities/autism; this study included the next level of the series (*Decoding B1*).

Corrective Reading Decoding B1 focuses on “learning-to-read” skills (i.e., phonemic awareness, phonics, and fluency); interestingly, large gains were noted in the phonics subtest of Word Attack (as part of the Basic Reading cluster)

and the phonemic awareness subtest of Sound Awareness. A small effect size was noted for Reading Fluency—the third important decoding skill. Another finding of importance related to Passage Comprehension, where the largest effect size (1.47) was noted. This finding is important because often when learning-to-read skills are acquired, comprehension skills improve as well (Armbruster, Lehr, & Osborn, 2003; Scheiffer et al., 2002). The notion is that when students can decode easily, they are able to focus on reading for understanding rather than focusing on each sound, word part, or word with decreased-emphasis on reading for meaning (Snowling, 2000; Torgesen, Rashotte, & Alexander, 2001).

Based on the criterion that effect sizes of .25 and above are educationally significant (Adams & Engelmann, 1996), 67% of subtest standard scores and all cluster scores obtained in the present study were educationally significant.

Table 1, continued
WJR and WQJ-III Scores and Effect Sizes

Cluster/Subtest	Grade Equivalent				Standard Score			
	WJR 2002	WJ-III (2007) Pre	WJ-III (2007) Post	Change	WJR 2002	WJ-III (2007) Pre	WJ-III (2007) Post	Change
Passage Comp.	1.9	1.7	2.7	1.0	61	43	65	22
Effect Size Gain								1.47
Comparison Effect Size					-2.60	-3.80	-2.33	
Reading Vocabulary	1.2	2.0	2.1	.1	52	56	57	1
Effect Size Gain								.07
Comparison Effect Size					-3.20	-2.93	-2.87	
Sound Awareness	n/a	2.4	3.6	1.2	n/a	75	84	9
Effect Size Gain								.60
Comparison Effect Size					n/a	-1.67	-1.07	

More importantly, Chad was able to achieve these gains on a nationally normed test through only a 5-month intervention with *Corrective Reading Decoding B1*. These results are encouraging because they show that gains are possible even after a student has not shown growth in reading cluster areas in several years of schooling (Browder et al., 2006; Houston & Torgesen, 2004).

Another important outcome of this study was the relative impact that the reading program had on Chad's attitude toward reading, specifically, and school, in general. As Chad progressed through *Decoding B1*, he appeared to be more confident about reading in class and usually was the first to volunteer to read aloud during group story reading activities. Chad's mother was also pleased with the changes she saw in her son's attitude toward reading at home. He was more excited to go to school and to be at school. As the program progressed, Chad became more self-motivated and would prompt the instructor that he was ready to start the day's lesson before the instructor would get the opportunity to even begin instruction.

Corrective Reading has shown great potential to increase the reading skills of students who have experienced difficulties in learning to read (Marchand-Martella, Martella, & Przychodzin-Havis, 2005). Empirical evidence showing the effectiveness of this program has continued to grow (e.g., Benner, 2007; Grossen, 1998). The meta-analyses of Browder et al. (2006) and Houston and Torgeson (2004) showed that few research studies have focused on teaching reading skills to students with intellectual and developmental disabilities. The results of this study continue to show the potential of teaching reading skills to students with IDD using a scientifically based reading intervention such as *Corrective Reading*.

Despite the positive findings noted in this investigation, several limitations exist. First,

this investigation included a single participant. However, to establish the generalizability of findings for students with IDD, future research should include multiple participants and implement either an appropriate single-case or group comparison design. Second, because the instructor was familiar with the participant, this relationship may have affected the outcomes of the study. Researchers may consider using varying instructors with differing backgrounds and levels of training to enhance generalizability of the findings in the future.

In this study, after the implementation of *Corrective Reading Decoding B1* the participant showed educationally significant gains in reading skills on the majority of the measures assessed. The participant also showed mastery of the skills taught by *Corrective Reading Decoding B1*. These results suggest that using teaching methods that are explicit and systematic with students with IDD can be beneficial, even for older students who have experienced years of failure.

References

- Adams, G. L., & Engelmann, S. (1996). *Research on Direct Instruction: 25 years beyond DISTAR*. Seattle, WA: Educational Achievement Systems.
- Armbruster, B., Lehr, F., & Osborn, J. (2003). *Put reading first: The research building blocks of reading instruction: Kindergarten through grade 3* (2nd ed.). Washington, DC: Center for the Improvement of Early Reading Achievement, National Institute for Literacy.
- Beirne-Smith, M., Patton, J., & Kim, S. (2006). *Mental retardation: An introduction to intellectual disabilities* (7th ed.). Upper Saddle River, NJ: Pearson.
- Benner, G. (2007). The relative impact of remedial reading instruction on the basic reading skills of students with emotional disturbance and learning disabilities. *Journal of Direct Instruction*, 7(1), 1-15.
- Biancarosa, C., & Snow, C. E. (2004). *Reading next: A vision for action and research in middle and high school literacy* (2nd ed.). Washington, DC: Alliance for Excellent Education.
- Browder, D. M., Wakeman, S.Y., Spooner, F., & Ahlgrim-Delzell, B. (2006). Research on reading

- instruction for individuals with significant cognitive disabilities. *Exceptional Children*, 72(4), 392-408.
- Browder, D. M., & Xin, Y. P. (1998). A meta-analysis of sight word research and its implications for teaching functional reading to individuals with moderate and severe disabilities. *Journal of Special Education*, 32, 130-153.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum.
- Conners, F. A. (1992). Reading instruction for students with moderate mental retardation: Review and analysis of research. *American Journal on Mental Retardation*, 96, 577-597.
- Dunn, L. M., & Dunn, L. M. (1997). *Peabody Picture Vocabulary Test—3rd Ed.* Bloomington, MN: Pearson.
- Engelmann, S., Hanner, S., & Johnson, G. (1999). *Corrective Reading series guide*. Columbus, OH: SRA/McGraw Hill.
- Engelmann, S., Meyer, L., Carnine, L., Becker, W., Eisele, J., & Johnson, G. (1999a). *Corrective Reading Decoding Strategies B1: Teacher's presentation book*. Columbus, OH: SRA/McGraw-Hill.
- Engelmann, S., Meyer, L., Carnine, L., Becker, W., Eisele, J., & Johnson, G. (1999b). *Decoding strategies B1: Mastery test booklet*. Columbus, OH: SRA/McGraw-Hill.
- Flores, M., Shippen, M., Alberto, P., & Crowe, L. (2004). Teaching letter-sound correspondence to students with moderate intellectual disabilities. *Journal of Direct Instruction*, 4, 173-188.
- Foorman, B. R., Francis, D. J., Fletcher, J. M., & Lynn, A. (1996). Relation of phonological and orthographic processing to early reading: Comparing two approaches to regression-based, reading-level-match designs. *Educational Psychology*, 88, 639-652.
- Grossen, B. (1998). *The research base for Corrective Reading*. SRA. Blacklick, OH: SRA/McGraw Hill.
- Halle, J., Chadsey, J., Lee, S., & Renzaglia, A. (2004). Systematic instruction. In C. H. Kennedy & E. M. Horn (Eds.), *Including students with severe disabilities* (pp. 54-77). Boston: Allyn and Bacon.
- Heward, W. L. (2006). *Exceptional children: An introduction to special education* (8th ed.). Englewood Cliffs, NJ: Merrill/Prentice-Hall.
- Houston, D., & Torgesen, J. (2004). *Teaching students with moderate disabilities to read: Insights from research*. Tallahassee, FL: Florida Department of Education: Bureau of Instructional Support and Community Services.
- Joseph, L.M., & Seery, M.E. (2004). Where is the phonics? A review of the literature on the use of phonetic analysis with students with mental retardation. *Remedial and Special Education*, 25(2), 88-94.
- Lyon, R. G. (1999). *Developing reading skills in young children—Lecture summary*. Retrieved on January 29, 2007, from http://www.schwablearning.org/print_resources.asp?type=article&r=37&popref=http%3A/
- Marchand-Martella, N. E., Kinder, D., & Kubina, R. (2005). *Special education and direct instruction: An effective combination*. DeSoto, TX: SRA.
- Marchand-Martella, N. E., Martella, R. C., & Przychodzin-Havis, A. (2005). *The research base and validation of SRA's Corrective Reading program*. DeSoto, TX: SRA/McGraw-Hill.
- Martella, R.C., Nelson, R., & Marchand-Martella, N.E. (1999). *Research methods: Learning to become a critical research consumer*. Boston: Allyn and Bacon.
- Meese, R. L. (2001). *Teaching learners with mild disabilities: Integrating research and practice* (2nd ed.). Belmont, CA: Wadsworth/Thompson Learning.
- Morse, T. E., & Schuster, J. W. (2004). Simultaneous prompting: A review of the literature. *Education and Training in Developmental Disabilities*, 39, 153-168.
- National Association of Secondary School Principals. (2005). *Creating a culture of literacy: A guide for middle and high school principals*. Reston, VA: Author.
- National Institute of Child Health and Human Development. (2000). *Report of the National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction: Reports of the sub-groups* (NIH Publication No. 00-4754). Washington, DC: U.S. Government Printing Office.
- Office of the Superintendent of Public Instruction. (2007). Washington state report card. Retrieved May 6, 2007, from <http://reportcard.ospi.k12.wa.us/?schooled=230&reportLevel=District&orgLinkId=230&yrs=>
- Schieffer, C., Marchand-Martella, N., Martella, R., & Simonsen, F. (2002). *The research base for Reading Mastery: Direct Instruction reading*. Desoto, TX: SRA/McGraw-Hill.
- Schloss, P. J., Alper, S., Young, H., Arnold-Reid, G., Aylward, M., & Dudenhoeffer, S. (1995). Acquisition of functional sight words in community-based recreational settings. *The Journal of Special Education*, 29, 84-96.
- Snowling, M. J. (2000). *Dyslexia* (2nd ed.). Oxford, UK: Blackwell.
- Sparrow, S. S., Balla, D. A., & Cicchetti, D. (1984). *Vineland Adaptive Behavior Scales (interview edition expanded and survey forms)*. Bloomington, MN: Pearson.
- Sparrow, S. S., Balla, D. A., & Cicchetti, D. (1985). *Vineland Adaptive Behavior Scales (classroom edition)*. Bloomington, MN: Pearson.

- Stein, M. L., & Kinder, D. (2004). Reading. In N. Marchand-Martella, T. Slocum, & R. C. Martella, (Eds.), *Introduction to Direct Instruction* (pp.100-139). Boston: Allyn and Bacon.
- Thorndike, R. L., Hagen, E. P., & Sattler, J. M. (1986). *Stanford-Binet Intelligence Scale: (4th ed.)*. Itasca, IL: Riverside.
- Torgesen, J.K., Rashotte, C. A., & Alexander, A. (2001). Principles of fluency instruction in reading: Relationships with established empirical outcomes. In M. Wolf (Ed.), *Dyslexia, fluency, and the brain* (pp. 333-355). Parkton, MD: York Press.
- Woodcock, R. W., & Johnson, M. B. (1989, 1990). *Woodcock-Johnson Psycho-Educational Battery—Revised*. Itasca, IL: Riverside.
- Woodcock, R. W., McGrew, K. S., & Mather, N. (2001). *Woodcock-Johnson III: Tests of Achievement*. Itasca, IL: Riverside.