

Effects of Corrective Reading on the Reading Abilities and Classroom Behaviors of Middle School Students With Reading Deficits and Challenging Behavior

Amy S. Lingo, Ed.D.
University of Louisville

Deborah Bott Slaton, Ph.D.
University of Kentucky

Kristine Jolivet, Ph.D.
Georgia State University

ABSTRACT: A multiple probe design was employed for this study to assess the effectiveness of the Corrective Reading program (Engelmann et al., 1999) on students' reading fluency and behavior during reading-related instruction. Direct observations assessed the effect on students' behavior in both general and special education classrooms. Reading fluency measures were included on within-program passages and grade-level text oral readings. The study revealed reading gains for within-program and generalization passages. Both students and teachers indicated positive perceptions of the Corrective Reading program.

■ Failure to be successful both academically and socially in school is characteristic for students with emotional and behavioral disorders (EBD), challenging behaviors, and learning difficulties (LD) (Foley & Epstein, 1992; Vaughn, Zaragoza, Hogan, & Walker, 1993). These students are far more likely to be deficient in basic academic skills than are their peers without disabilities. In fact, the academic difficulties faced by students with EBD and LD often result in school failure (Kauffman, 1997; Walker, Colvin, & Ramsey, 1995). For example, estimates of the prevalence of academic difficulties, especially reading and arithmetic deficits, of students with EBD range from 33% to 81% (Ruhl & Berlinghoff, 1992). It is clear that most students with challenging behaviors also have some type of academic difficulty as well.

Students with EBD, challenging behaviors, and learning difficulties often are excluded from instruction because of behaviors such as noncompliance, aggression, disruption, self-injury, and antisocial responses (Knitzer, Steinberg, & Fleisch, 1990; U.S. Department of Education, 1998). Behaviors that are considered violent, unsafe, and disruptive to classroom teachers, school administrators,

and other school personnel are the outcome of a predictable chain of events that begin with academic failure (Scott, Nelson, & Liaupsin, 2001). Some researchers have suggested that efforts to prevent behavior problems should include promoting effective academic instruction for those students who exhibit challenging behaviors (Carr, Taylor, & Robinson, 1991; Maguin & Loeber, 1996). Evidence supports early identification and intervention related to academic learning problems, which reduces the likelihood that students will engage in disruptive classroom behavior in the future (Maguin & Loeber). The link between poor academic achievement and types of behavior that threaten school safety, however, largely has been ignored.

Maguin and Loeber's (1996) meta-analysis on the academic and behavior connection identified three strong relationships between academic failure and challenging behavior or delinquency. First, poor academic performance is related to the onset, frequency, persistence, and seriousness of delinquent offending, whereas higher academic performance is associated with refraining or desisting from offending. Second, cognitive deficits and attention problems are associated with poor

academic performance and delinquency. Third, interventions that improve academic performance are associated with a reduction in the prevalence of delinquency. These findings support the link between academic achievement and social behaviors.

In schools, students with challenging behaviors and learning difficulties are typically less academically proficient than their peers for several reasons. First, students identified as having challenging behaviors or academic deficits in the classroom are more likely to experience negative or punitive interactions with their teachers, regardless of their behavior (Denny, Epstein, & Rose, 1992; Gunter, Jack, DePape, Reed, & Harrison, 1994). Second, students with challenging behaviors and learning difficulties also receive less academic engaged time with their teachers than students without challenging behaviors (Johns, 2000). Finally, teachers' instruction is more limited and characterized by easier tasks for students exhibiting behavior problems and learning difficulties than for students who do not exhibit such behaviors (Carr et al., 1991).

The interactions between teachers and students in the classroom contribute to the poor academic performance of students already experiencing academic and social problems. Gunter, Denny, Jack, Shores, & Nelson (1993) described a cycle of negative reinforcement to illustrate the teacher-student instructional interactions in classrooms for students with EBD and similar challenging behaviors. Gunter and colleagues defined negative reinforcement as the "removal of aversive stimuli contingent on the emission of a response which has the effect of increasing the future probability of that response" (p. 266). The interactions between students and teachers follow this cycle: the disruptive behaviors of students are negatively reinforced by the removal of academic task demands, and the teachers' actions are negatively reinforced by the removal of the disruptive behaviors. These factors of ineffective teaching practices and disciplinary removal of students from the instructional environment lead to the academic failure for students with challenging behaviors. Students who are excluded from academic instruction for disruptive behavior experience greater academic difficulty, which in turn leads to greater frustration with the academic tasks presented. This sets the occasion for the student to present additional behavioral challenges in the classroom, which leads to further exclusion from classroom instruction. Therefore, efforts

need to focus on effective instructional practices for students with challenging behaviors and learning difficulties.

Typically, researchers focus on the social outcomes of students with challenging behaviors and fail to recognize the academic deficits that contribute to the problem behavior (Gunter et al., 1993). Until recently, the professional literature contained minimal research on the effectiveness of specific academic interventions for students who have concomitant academic and social problem behavior. Academic failure, particularly in reading, is a major predictor of failure or success in school. Coleman and Vaughn (2000) stated that "although children with emotional and behavioral disorders demonstrate significant difficulties in reading, little research has addressed the efficacy of reading interventions for this population" (p. 93).

Reading instruction is a critical factor in the education of students with challenging behavior, learning problems, or both. It has been well established by researchers that failure in reading is a major predictor of larger failures throughout life as well as in school (Carnine, Silbert, & Kameenui, 1997; Epstein, Kinder, & Bursuck, 1989; Kauffman, 1997; Walker et al., 1995). Researchers also have documented that students with challenging behaviors are more likely to have reading problems than their peers (Coutinho, 1986; Epstein et al., 1989). Effective and efficient reading instruction is important to all students, but it is especially important to students who have difficulty with reading. One method for improving student reading performance is Direct Instruction (DI).

DI is an explicit, intensive, teacher-directed method of teaching that was developed by Engelmann and colleagues in 1964. Since then, more than 60 instructional programs featuring DI have been proposed and studied. One such program is the SRA *Corrective Reading* program (Engelmann et al., 1999). All DI programs incorporate a common instructional design and a group of presentation techniques to accommodate and ensure consistency among lesson presentations by teachers in various classroom settings and with a variety of learners (Adams & Engelmann, 1996; White, 1988).

Several meta-analyses of DI programs implemented with students in special education settings have been conducted. White (1988) examined 25 studies that compared DI with some other intervention for students with disabilities, and the results indicated that none of

the studies statistically favored the comparison intervention over DI. White concluded that the positive results were not “limited to a particular age range, or handicapping condition or skill area” (p. 372). His statement supports the implementation of DI with students with mild to severe disabilities. Adams and Engelmann (1996) examined 34 studies that used DI as the intervention and found that 32 of the 34 studies had positive outcomes related to DI. In fact, the overall average effect size per study was greater than 0.87 with an overall average effect size of 0.82 for students without disabilities and 0.90 for students with disabilities. Overall, students who received DI consistently outperformed students in comparative groups, and the DI techniques were effective in facilitating academic success for students of all ages, abilities, and backgrounds.

One specific DI program, *Corrective Reading* (Engelmann, 1988), has received some attention in the literature. For example, Thompson (1992) compared the effects of the *Corrective Reading* Decoding B program with whole language and traditional basal reading instruction. Students in the *Corrective Reading* group had lower intelligence scores and socioeconomic status than students in the comparison groups. Results suggest that only students in the *Corrective Reading* group had increased percentile rankings on the posttest of the Woodcock Johnson Reading test. In addition, students in the *Corrective Reading* group averaged a gain of 21 words per minute in reading fluency compared to 13 words per minute for the traditional group and 7 words per minute for the whole language group.

Grossen (1997) summarized research on the effectiveness of the *Corrective Reading* program as used by Thorne (1978), Arthur (1988), and LaCava’s study (as cited in Grossen, 1997). Thirteen students with severe behavior disorders in Thorne’s study made accuracy and comprehension gains based on 35 *Corrective Reading* lessons; 25 students with emotional disturbance in LaCava’s study also made similar gains; and the seventh and eighth grade students in Arthur’s study were reading at grade level after 1 year of the *Corrective Reading* program, and accuracy and comprehension increased 4.31 months for every month of instruction.

In another study, Malmgren and Leone (2000) examined the academic achievement of 45 incarcerated youth 13 to 19 years old using the *Corrective Reading* program (Engelmann, 1988). Twenty were receiving special education

services and 10 were diagnosed as EBD. The *Corrective Reading* program was conducted over a 6-week period for 2 hours and 50 minutes per day for 5 days a week. Results of the posttest indicated a statistically significant difference in the rate, accuracy, and passage subtests when compared to pretest data. Data from the comprehension subtests were not significantly different. Malmgren and Leone state that “the results ... demonstrate that it is possible to significantly improve reading skills for low-achieving juvenile delinquents with a relatively brief intervention” (p. 245).

The rationale for this study is fourfold: First, research supports using DI as a means of improving reading achievement for students with challenging behaviors and reading difficulties (Adams & Engelmann, 1996; Grossen, 1997; Malmgren & Leone, 2000; White, 1988). The results of this future research will expand the literature on effective reading interventions for students with reading problems and students who exhibit challenging behavior in school settings.

Second, there is a need for additional research regarding the effectiveness of specific academic interventions with students with challenging behaviors. Traditionally, the education for students with challenging behaviors has focused more on controlling and decreasing inappropriate social behaviors than on providing effective academic instruction (Coleman & Vaughn, 2000). Research has provided evidence that students with challenging behaviors do exhibit reading problems. Recently, researchers have begun to focus on specific instructional strategies that are effective in improving reading performance of students with challenging behaviors (Babiyak, Koorland, & Mathes, 2000; Coleman & Vaughn). This study will contribute to the literature base by focusing on the effects of academic interventions and the effect of such interventions on student classroom behavior.

Third, there is a need to research the effectiveness of the most recent edition of the *Corrective Reading* program (Engelmann et al., 1999) on the reading achievement of students with reading difficulties. Currently, all published studies (Adams & Engelmann, 1996; Malmgren & Leone, 2000; Thompson, 1992) use the 1988 version. Fourth, the influence of the *Corrective Reading* program on the fluency of grade-level materials also is an area for research. Students with challenging behavior often are educated, at least some portion of the school day, in general education classrooms. In these classrooms,

students are presented with grade-level reading material that they are expected to decode and comprehend. If students are to be successful in the general education setting, then effective reading interventions must be implemented to help them read grade-level material. Future research is needed to determine if the *Corrective Reading* program can assist students in reading grade-level passages.

The research questions guiding this study are as follows: a) What are the effects of the *Corrective Reading* program on the oral reading fluency of students with reading deficits and challenging behaviors on within-program passages? b) What are the effects of the *Corrective Reading* program on the oral reading fluency for these students on grade-level generalization passages? c) What are the effects of the *Corrective Reading* program on the social behaviors of these students as compared to their peers during reading-related instruction in both special and general education classrooms? and d) What is the social validity of the *Corrective Reading* program as assessed by these students and their special education teachers?

Method

Participants

Students. Seven ethnically diverse middle school students from two special education classrooms participated in the study. *Table*

1 reports information on each participant's age, disability category, reading assessment, socioeconomic status, gender, ethnicity, instructional reading level, and behavioral problems. Students selected for participation received reading instruction within the resource classroom, had reading objectives and behavioral objectives on their individual education plan (IEP), were diagnosed with a mild disability (i.e., EBD, LD, or OHI [other health impairment]), and had frequent, severe, and intensive challenging behaviors during reading instruction. Overall, these sixth and seventh grade students were reading 2 to 4 years below that of their peers and daily displayed aggressive, noncompliant, and disruptive behaviors during reading instruction and reading-related activities. In addition, in reviewing the office discipline referral information of the participants, they had 12 to 49 referrals for the current school year as compared to the 3 or fewer referrals for students without and with other disabilities.

Seven general education students served as comparisons during behavioral observations within the general education classrooms. These students were selected based on teacher recommendation. The teachers recommended three students who they thought exhibited average or expected behavior for students without disabilities in the general education classroom. For each general education classroom and from the nominated general education students, one student was

TABLE 1
Student Demographics

Student	Age/ Gender	Grade	Race/ Ethnicity	Free/Reduced Lunch	Disability ¹	IQ ²	Standardized Reading		
							Grade-Equivalent Score ³	Reading Assessment ⁴	Behavioral Problems ⁵
Evan	13.5/Male	7th	Hispanic	Yes	LD	84	2.1	206	10
John	13.10/Male	7th	African-Amer.	No	OHI	99	4.9	268	8, 9
Bill	14.2/Male	7th	African-Amer.	Yes	OHI	85	2.7	336	9
David	12.10/Male	7th	African-Amer.	No	EBD	73	2.4	390	9
Tammy	12.1/Female	6th	African-Amer.	Yes	OHI	81	3.0	435	10
Anthony	11.6/Male	6th	African-Amer.	Yes	OHI	86	4.0	426	9, 10
Will	12.5/Male	6th	African-Amer.	Yes	EBD	87	1.9	BR ⁶	8, 9, 10

¹LD, learning disability; OHI, other health impairment; EBD, emotional and behavioral disorder.

²Weschler Intelligence Scale for Children-III (WISC-III) Full-scale IQ Score.

³Woodcock Reading Mastery Test-Revised Normative Update (Woodcock, 2000) Basic Skills Cluster Score.

⁴Scholastic Reading Inventory (Scholastic Inc., 2000).

⁵8, aggression; 9, noncompliance; 10, disruptive.

⁶Beginning reader.

randomly selected from the list to serve as the comparison student during specific behavioral observations.

Teachers. Two special education teachers participated in the study by implementing the intervention in the resource classrooms. Both held state certification for K–12 in learning and behavioral disorders and each had at least 2 years of teaching experience. These teachers received 3 hours of training in implementing the intervention (i.e., *Corrective Reading* program) before beginning the study. The training consisted of a verbal description of the program, a demonstration and role-play of the program, and a detailed verbal and visual description and role-play of each instructional step of the program. After the training, the teachers demonstrated 100% accuracy in implementing all steps of the program.

Setting

We used an urban, southeastern public middle school with two special education resource classrooms serving students with emotional and behavioral disorders and learning disabilities in this study. Sessions were conducted during regularly scheduled reading and language art periods as close to a daily basis as possible. Each session lasted approximately 45 minutes and was conducted over about a 3-month period. The resource classroom was used for intervention sessions and for behavioral observations during social studies and science periods. Several general education classrooms also were used for behavioral observations during social studies, science, practical living, technology education, and health periods.

Materials

Materials included both the student and teacher forms from the *Corrective Reading* program (Engelmann et al., 1999), the Woodcock Reading Mastery Test—Revised Normative Update (WRMT-R^{NU}) Forms G and H (Woodcock, 1998), passages from the *Reading Mastery* program (Engelmann et al., 1988), behavioral observation forms, and student and teacher questionnaires. The students entered the *Correct Reading* program at an appropriate level based on individually administered placement tests from the program's Series Guide. In addition, we developed 20 generalization passages from either general

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education science or social studies grade-level texts, each with approximately 250 words.

Design

Two replications of a multiple probe design across students (Skouge, Tawney, & Gast, 1984) were used to evaluate the effectiveness of the *Corrective Reading* program. We selected a multiple probe design for the study because of the repeated exposure of students to the reading probes; therefore, periodic baseline measures were administered to prevent reactivity of the reading probes. Experimental control was established when a change in the dependent variable occurred only after the implementation of the *Corrective Reading* program in a time-lagged fashion. Once a participant was introduced to the intervention, we collected periodic baseline data on the remaining participants once a week and immediately before implementing the intervention.

Independent Variable and Procedures

The *Corrective Reading* program was the independent variable and was designed to improve the reading abilities of students in the fourth grade or higher who currently read below grade level. The program progresses from basic word attack skills to more difficult sound combinations and words. The skills then are applied in passages of increasing length and complexity. When the program is used, the teacher presents a scripted lesson followed by a reading fluency probe from the program. Each instructional lesson lasted approximately 45 minutes, with participants advancing to the next lesson once a criterion of mastery was achieved. If a participant did not meet the criterion then another program reading probe was administered during the following scheduled session.

Baseline. Baseline data were collected on each participant's oral reading fluency for *Corrective Reading* passages and for grade-level passages as well as social behavior in both special and general education classrooms during scheduled reading activities. Baseline continued for each participant for a minimum of three sessions or until baseline data for all measures were stable. All participants began baseline at the same time; however, once one participant was introduced to the intervention, participants in the remaining tiers were given periodic reading probes. During the baseline

condition, each participant was presented with a reading passage on his/her instructional level (as determined by the placement data and from the *Reading Mastery* program) and instructed to read the passage orally. Participants were given a consistent, scripted set of directions from the teacher (i.e., “I am going to give you a passage to read, and I am going to time you for one minute to see how many words you read. Please read quickly, but not so fast that you make mistakes. Begin.”)

Intervention. Intervention data were collected on the same measures as during the baseline condition. Each intervention session began with the teacher implementing a *Corrective Reading* lesson. A typical lesson included the following: a) participants in the intervention phase received instruction in the appropriate lesson; b) each lesson typically began with instruction on word attack skills, followed by word reading, story reading, individual reading, teacher-directed workbook exercises, and independent workbook exercises; and c) at the end of the lesson, the participant was given a *Corrective Reading* passage to read within 1 minute and the teacher used the same scripted directions for the reading passages as in the baseline condition. If the participant met the fluency criterion as stated in the *Corrective Reading* program, then the participant advanced to the next lesson and reading probe. If the participant did not meet the fluency criterion, the same lesson was repeated, and then a different but comparable reading passage was administered. At the conclusion of each reading probe, the teacher provided feedback to the participant (e.g., “You did a great job today. You read 80 words correctly with 2 errors in one minute.”). Once the first participant achieved the *Corrective Reading* program fluency criterion, then the participant in the second tier began the intervention. Once the second participant achieved criterion, then the third participant began the intervention, and so on.

Generalization. During baseline and intervention conditions, participants were provided with grade-level passages from the general education curriculum to read aloud after every third session. The participants received the same set of directions for these reading probes as for the *Corrective Reading* passages in baseline and intervention conditions. Data were collected on the participant’s oral reading fluency and errors. The student’s teacher and the first author selected these grade-level passages as passages that the student would be asked to

read independently later in the school year as part of their science and social studies general education curriculum. The selected passages were typed to resemble the font and style of the *Corrective Reading* passages. In addition, to ensure that each selected passage was of equivalent reading difficulty, we calculated the estimated readability grade level using Fry’s (1968) procedures. Each generalization passage was approximately 250 words long, and the mean grade levels were 7.4 for classroom 1 (seventh grade) and 6.3 for classroom 2 (sixth grade).

Dependent Variables and Data Collection

We collected data to measure several academic and social dependent variables in the study.

Academic Measures. Oral reading fluency, reading errors, and reading achievement data were measured. The teachers collected baseline, intervention, and generalization data on each participant’s oral reading fluency. Oral reading fluency was defined as the number of correct words read orally per minute. Teachers also measured the number of oral reading errors each participant made. An oral reading error was defined as: (a) a mispronunciation of sounds or words, (b) a substitution of words not included in the passage, (c) an addition or insertion of words not in the text, (d) a pause longer than 3 seconds, (e) a skipped sound or word, and (f) a reversal of sounds or words. If a participant made reversals or paused, the teacher used the following procedures and coding. Reversals of words were coded as one error for each word read out of place (e.g., “I am” in the text read as “am I” is two errors). Following a 3 second pause, the teacher stated the word that the participant did not know. The following were not coded as errors: (a) self-corrections within 3 seconds and (b) a pronunciation that sounded like how the participant talks in conversation (e.g., articulation, pattern, or accent). The teacher recorded the total number of words read correctly (number of words read minus number of errors) and the number of errors while each participant orally read a passage within 1 minute at the conclusion of a *Corrective Reading* lesson. In addition, before the baseline condition and at the conclusion of the intervention, each participant was administered the *Woodcock Reading Mastery Test-Revised Normative Update (WRMT-R^{NU})* Form G and Form H, respectively.

Social Measures. Direct observation data on participant (both those with disabilities and comparison peers) behavior were collected during baseline and intervention conditions in both the general and special education classrooms while participants engaged in oral reading or silent reading activities. Observations were counterbalanced across participants and were made for a maximum of 25 minutes or a minimum of 10 minutes, 3 times per 6 school days. During the observations, a 30 s partial-interval recording method was used to mark the occurrence of appropriate or inappropriate behavior of both the target participants and comparison peers. Appropriate behavior was defined as being in their assigned area, following directions within 10 s of the request, and being on task. Inappropriate behavior was defined as (a) out of area, any movement that was out of the area where the participant was assigned by the teacher; (b) noncompliance, failure of the participant to comply with teacher directions within 10 s of a request; (c) off task, participant's eyes not directed to the task at hand or at the speaker for 3 consecutive seconds or longer; and (d) disruptive behavior, any physical contact with another person or person's property or any sound created by the participant that distracted that person, a peer, or the teacher from the present task. The percentages of intervals of appropriate behavior were graphed for each participant.

Social Validity

The participants and teachers completed a social validity survey at the conclusion of the study. The participant and teacher versions each had 12 questions, 9 with a 3-point Likert scale and a prompt for additional comments and 3 open-ended questions. For the participant version, we used the Frye readability formula to ensure that the participants could read the questions. In addition, participant responses were tape recorded to avoid writing difficulties. On the teacher version, we also asked for their opinions concerning the training each received on how to implement the program.

Reliability

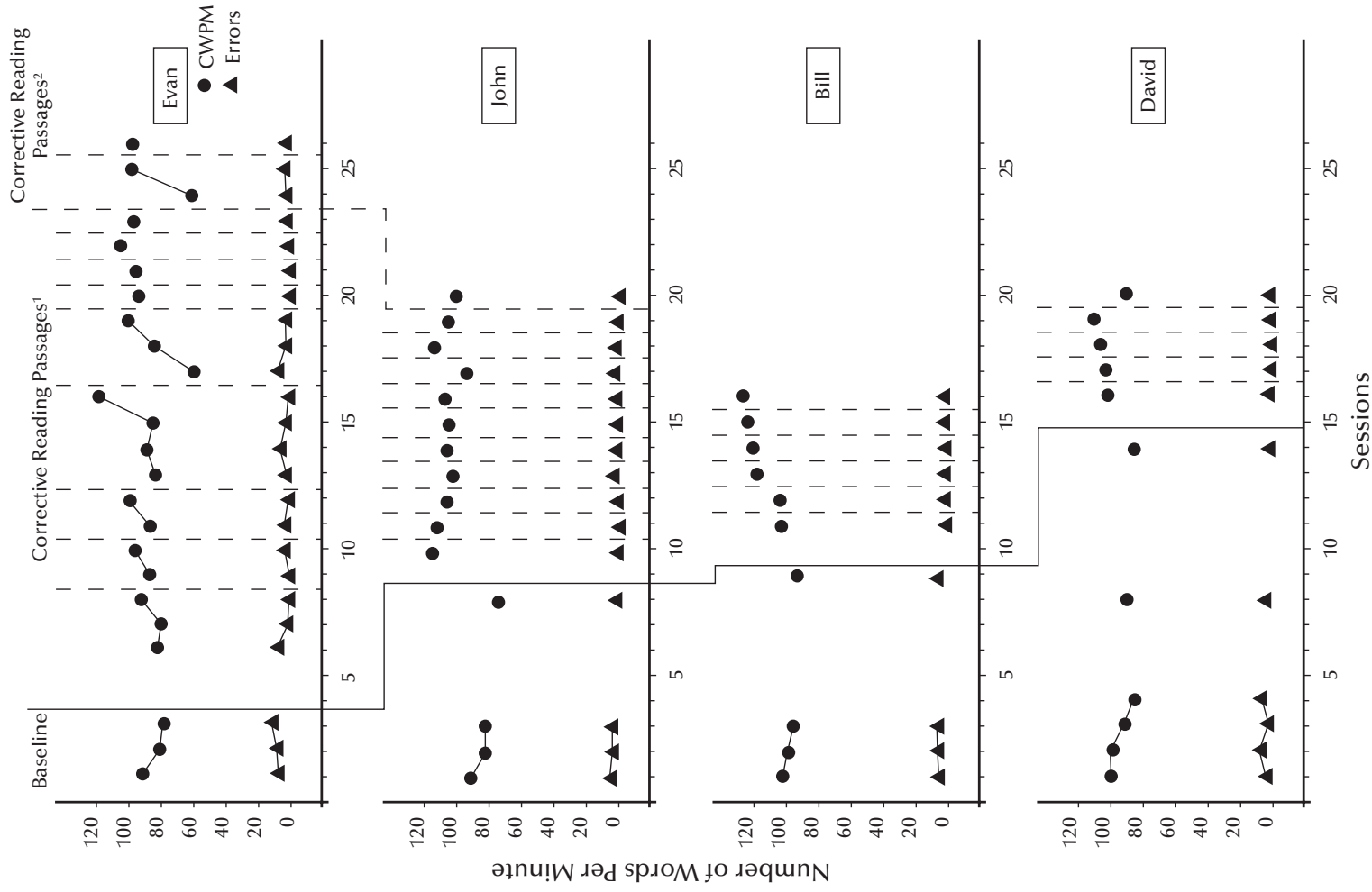
Procedural and interobserver reliability was coded for at least 20% of the sessions. The first author and trained staff measured procedural reliability, which was calculated using the following formula (Billingsey, White, & Munson, 1980): number of teacher

behaviors divided by the number of planned teacher behaviors and the result multiplied by 100. For the participants, reliability was assessed for 24% of the sessions for Will, 27% for Tammy and John, 29% for Evan, 30% for Anthony and Bill, and 37% for David. Average agreement for procedural reliability was 96% (range, 85 to 100%) for Tammy, 97% (range, 83 to 100%) for Evan, and 100% for Anthony, Will, John, Bill, and David. The same persons measured interobserver reliability for the reading probes, which was calculated using the following formula: number of correct words and error agreements divided by the number of agreements plus the number of disagreements and the sum multiplied by 100. Reliability was assessed for 30% of the sessions for Bill, 35% for Tammy, 36% for David, 40% for John, 41% for Will, 42% for Evan, and 45% for Anthony. Average agreement for interobserver reliability was 98.8% (range, 94 to 100%) for Anthony, 99.3% (range, 97 to 100%) for Evan, 99.9% (range, 99 to 100%) for Tammy, and 100% for Will, John, Bill, and David. The same persons measured interobserver reliability for the direct observations, and the point-by-point formula was used to calculate this reliability (Tawney et al., 1984). Reliability was assessed for 21% of the sessions for Tammy, 27% for David, 28% for Anthony, 33% for Will and Evan, 36% for Bill, and 38% for John. Average agreement was 93% (range, 90 to 100%) for Evan, 95% (range, 90 to 100%) for Anthony, Will, and David, 96% (range, 93 to 100%) for John, 96% (range, 90 to 100%) for Bill, and 97% (range, 90 to 100%) for Tammy.

Results

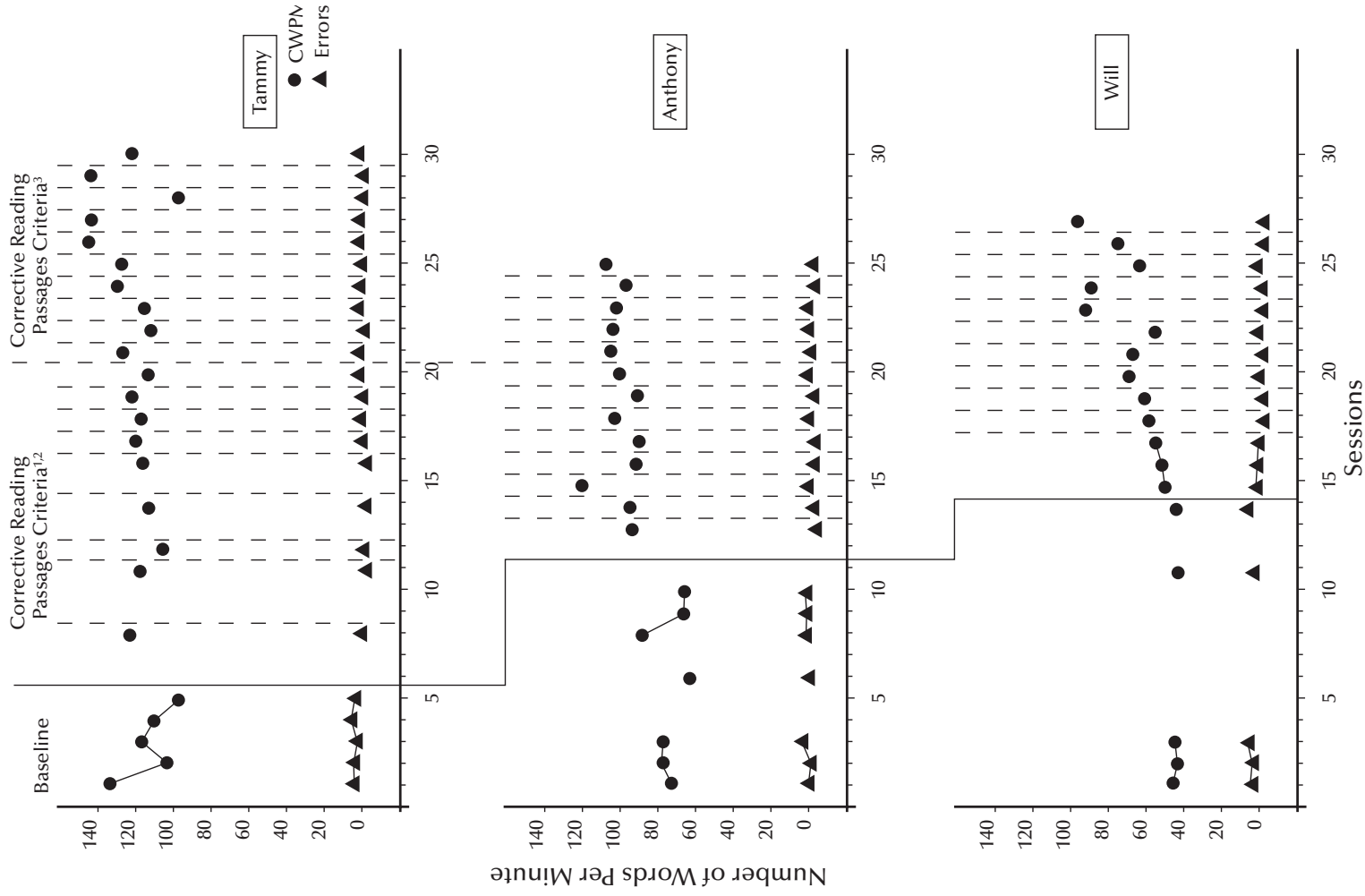
We summarize the effects of the *Corrective Reading* program separately for each participant in relation to their reading fluency behavior and then in relation to their social behavior, and discuss the social validity of the program.

Reading Behavior. The effectiveness of the *Corrective Reading* program on participant oral reading fluency is illustrated in *Figures 1* (classroom 1) and *2* (classroom 2) and described in *Table 2* (classrooms 1 and 2). Oral fluency generalization for participants is illustrated in *Figure 3* (classroom 1) and *Figure 4* (classroom 2) and described *Table 2*. *Table 3* gives pre- and posttest reading achievement data (standard scores and grade equivalencies). A one-tailed *t* test revealed a significant difference between the pretest scores ($M = 74.4286$, $SD = 10.75$)



Note: ¹Criteria = 90 words per minute with 3 or fewer errors; ²Criteria = 95 words per minute with 3 or fewer errors; dashed line means introduction of new Corrective Reading passage.

Figure 1. Classroom 1: Oral reading fluency on within program passages with criteria.^{1,2}



Note: ¹Criteria = 90 words per minute with 3 or fewer errors for Tammy and Anthony; ²Criteria = 55 words per minute with 3 or fewer errors for Will; ³Criteria = 95 words per minute with 3 or fewer errors for Tammy and Anthony; dashed line means introduction of new *Corrective Reading* passage.

Figure 2. Classroom 2: Oral reading fluency on within program passages with criteria. ^{1,2,3}

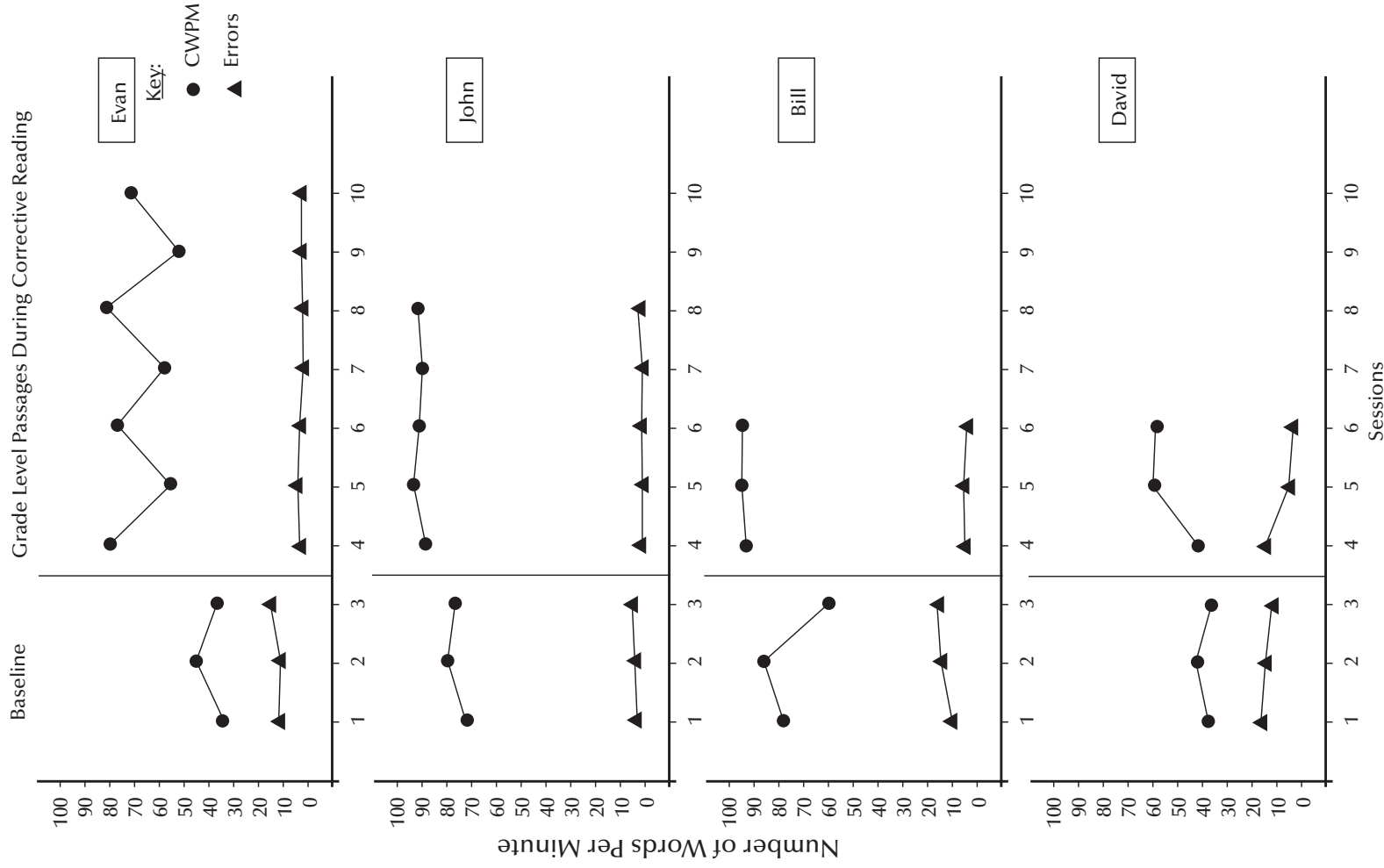


Figure 3. Classroom 1: Oral reading fluency on grade level passages.

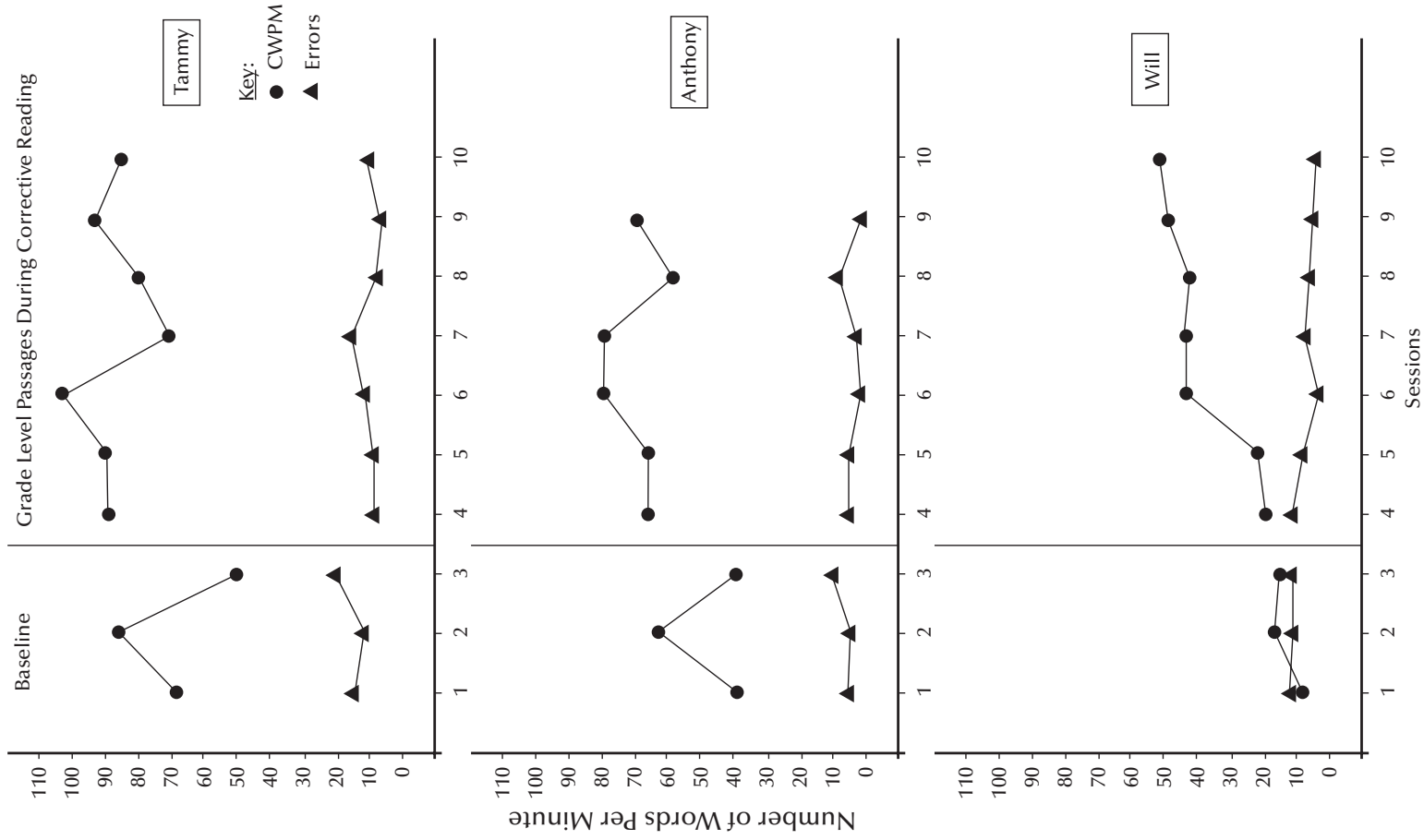


Figure 4. Classroom 2: Oral reading fluency on grade level passages.

TABLE 2
Classrooms 1 and 2: Mean Number of Correct Words per Minute and Errors on Corrective Reading Passages and Generalization Passages

<i>Student</i>	<i>Baseline Mean¹/Generalization Mean²</i> <i>Correct Errors</i>	<i>Intervention Mean¹/Generalization Mean²</i> <i>Correct Errors</i>	<i>Generalization Mean²</i> <i>Errors</i>
Classroom 1			
Evan	81.7/39	8.3/13.3	88.6/68.4
John	81.5/75.3	2.8/4.3	105.1/90.4
Bill	97.3/74.7	7/13.3	115.7/93.7
David	91/38.7	4.3/14	102/53
Classroom 2			
Tammy	112.4/68	5.2/16	121.5/87.3
Anthony	73.6/47	3.7/7.7	100.2/69.5
Will	45.4/13	6/12.3	68.5/39

¹Corrective Reading passages.

²Grade-level passages from general education curriculum.

TABLE 3
Standard Scores and Grade Equivalents on the Woodcock Reading Mastery Test—Revised Normative Update

<i>Student</i>	<i>Standard Scores</i>			<i>Grade Equivalents</i>			<i>Number of CR Lessons Completed</i>
	<i>Pretest</i>	<i>Posttest</i>	<i>Difference</i>	<i>Pretest</i>	<i>Posttest</i>	<i>Difference</i>	
Evan	65	74	+9	2.3	3.0	+0.7	12
John	84	87	+3	4.7	5.3	+0.6	12
Bill	68	73	+5	2.7	3.3	+0.6	7
David	71	75	+4	2.6	3.2	+2.6	6
Tammy	80	87	+7	3.0	4.2	+1.2	20
Anthony	91	89	-2	4.4	4.2	-0.2	14
Will	62	73	+11	1.8	2.8	+1.0	11

and posttest scores ($M = 79.7143$, $SD = 7.49$). The obtained $t(6)$ value of 3.2745 was greater than the critical $t(6)$ of 3.143 for $\alpha^1 < .01$, suggesting that the *Corrective Reading* program may have contributed to the improved reading abilities of the participants.

Evan. Evan made reading fluency gains on each passage presented during intervention and completed 11 lessons (21 intervention sessions). During baseline for *Corrective Reading* passages, his reading rate ranged from 76 correct words per minute (cwpm) with 10 errors to 90 cwpm with 7 errors. His reading rate during intervention for *Corrective Reading* passages ranged from 58 cwpm with 6 errors to 117 cwpm with 0 errors. During baseline for generalization passages, Evan's reading rate ranged from 35 cwpm with 12 errors to 45 cwpm with 16 errors. His reading rate during intervention for generalization passages ranged from 53 cwpm with 4 errors to 80 cwpm with 4 errors. Both Evan's standard and grade

equivalent scores increased on the posttest WRMT-R.

John. John made reading fluency gains on each passage presented during intervention and completed 11 lessons (11 intervention sessions). During baseline for *Corrective Reading* passages, his reading rate ranged from 73 cwpm with 1 error to 90 cwpm with 4 errors. His reading rate during intervention for *Corrective Reading* passages ranged from 92 cwpm with 3 errors to 114 cwpm with 1 error. During baseline for generalization passages, John's reading rate ranged from 71 cwpm with 4 errors to 79 cwpm with 4 errors. His reading rate during intervention for generalization passages ranged from 88 cwpm with 2 errors to 93 cwpm with 1 error. Both John's standard and grade equivalent scores increased on the posttest WRMT-R.

Bill. Bill made minimal reading fluency gains on each passage presented during intervention and completed six lessons (six

intervention sessions). During baseline for *Corrective Reading* passages, his reading rate ranged from 94 cwpw with 8 errors to 101 cwpw with 7 errors. His reading rate during intervention for *Corrective Reading* passages ranged from 103 cwpw with 2 errors to 126 cwpw with 2 errors. During baseline for generalization passages, Bill's reading rate ranged from 60 cwpw with 16 errors to 86 cwpw with 14 errors. His reading rate during intervention for generalization passages ranged from 93 cwpw with 5 errors to 94 cwpw with 4 errors. Both Bill's standard and grade equivalent scores increased on the posttest WRMT-R.

David. David made moderate reading fluency gains on each passage presented during intervention and completed five lessons (five intervention sessions). During baseline for *Corrective Reading* passages, his reading rate ranged from 85 cwpw with 7 errors to 99 cwpw with 4 errors. His reading rate during intervention for *Corrective Reading* passages ranged from 90 cwpw with 3 errors to 106 cwpw with 2 errors. During baseline for generalization passages, David's reading rate ranged from 36 cwpw with 12 errors to 42 cwpw with 14 errors. His reading rate during intervention for generalization passages ranged from 41 cwpw with 15 errors to 60 cwpw with 5 errors. Both David's standard and grade equivalent scores increased on the posttest WRMT-R.

Tammy. Tammy made minimal reading fluency gains on each passage presented during intervention and completed 19 lessons (19 intervention lessons). During baseline for *Corrective Reading* passages, her reading rate ranged from 98 cwpw with 7 errors to 133 cwpw with 5 errors. Her reading rate during intervention for *Corrective Reading* passages ranged from 98 cwpw with 1 error to 144 cwpw with 3 errors. During baseline for generalization passages, Tammy's reading rate ranged from 50 cwpw with 21 errors to 86 cwpw with 12 errors. Her reading rate during intervention for generalization passages ranged from 71 cwpw with 16 errors to 103 cwpw with 12 errors. Both Tammy's standard and grade equivalent scores increased on the posttest WRMT-R.

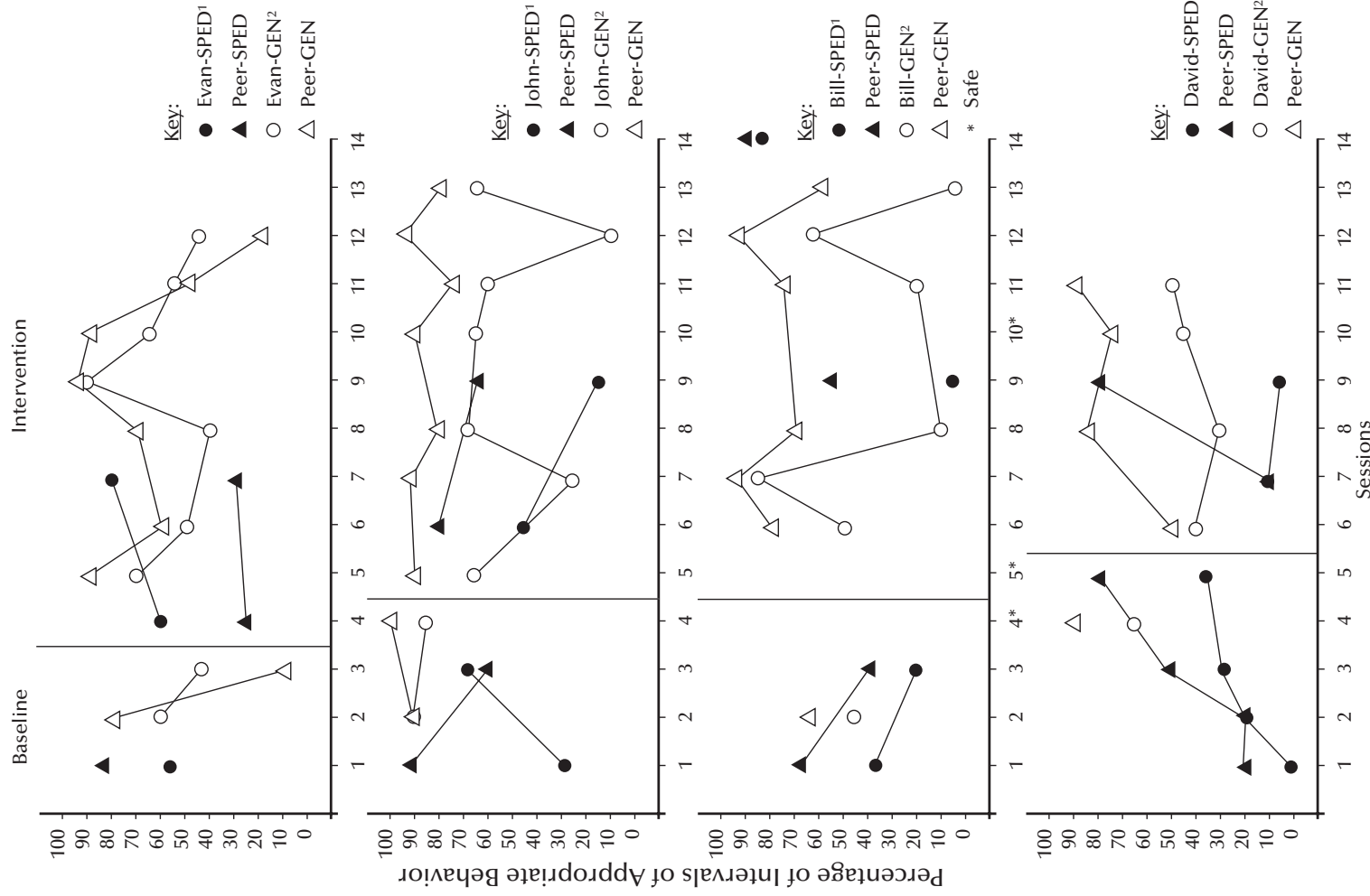
Anthony. Anthony made reading fluency gains on each passage presented during intervention and completed 13 lessons (13 intervention sessions). During baseline for *Corrective Reading* passages, his reading rate ranged from 64 cwpw with 3 errors to 88 cwpw with 4 errors. His reading rate during

intervention for *Corrective Reading* passages ranged from 94 cwpw with 0 errors to 120 cwpw with 3 errors. During baseline for generalization passages, Anthony's reading rate ranged from 39 cwpw with 11 errors to 63 cwpw with 6 errors. His reading rate during intervention for generalization passages ranged from 58 cwpw with 9 errors to 79 cwpw with 3 errors. Both Anthony's standard and grade equivalent scores decreased on the posttest WRMT-R.

Will. Will made reading fluency gains on each passage presented during intervention and completed 11 lessons (13 intervention sessions). He placed at a lower instructional level than his peers. During baseline for *Corrective Reading* passages, his reading rate ranged from 44 cwpw with 8 errors to 47 cwpw with 5 errors. His reading rate during intervention for *Corrective Reading* passages ranged from 51 cwpw with 3 errors to 97 cwpw with 0 errors. During baseline for generalization passages, Will's reading rate ranged from 8 cwpw with 12 errors to 16 cwpw with 12 errors. His reading rate during intervention for generalization passages ranged from 19 cwpw with 12 errors to 52 cwpw with 5 errors. Both Will's standard and grade equivalent scores increased on the posttest WRMT-R.

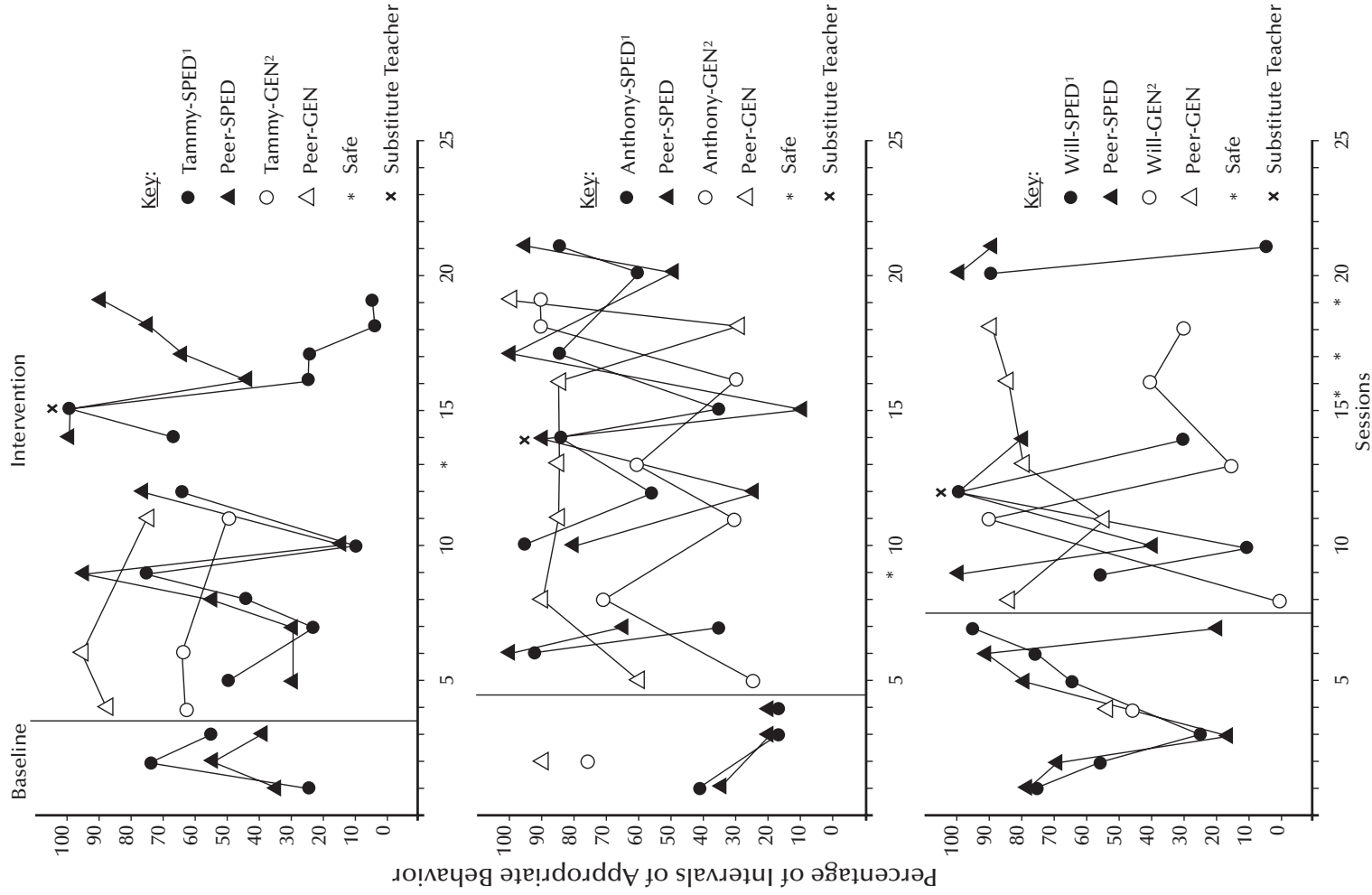
Social Behavior. Figures 5 (classroom 1) and 6 (classroom 2) illustrate participants' behavioral data. Overall, the appropriate social behaviors for the participants and comparison peers were variable across the special and general education settings during reading-related activities. Generally, John, Bill, David, and Will displayed decreasing percentages of appropriate behavior across both the special and general education settings during the intervention conditions, whereas Evan displayed overall increases in appropriate behavior during the intervention in both settings. Tammy's behavior was the most variable, and she displayed overall increases in her appropriate behaviors in the general education setting as compared to the special education setting whereas Anthony displayed the inverse. No relationship between the participant's social behavior and that of their peers could be made with the observed intervals.

Social Validity. Six participants indicated that the *Corrective Reading* program helped improve their reading abilities and that they liked the reading passages; however, four did not know if they would like to use the program again. Both teachers indicated that



Note: ¹SPED, special education classrooms; ²GEN, general education classrooms.

Figure 5. Classroom 1: Appropriate student behaviors in special and general education classrooms.^{1,2}



Note: ¹SPED, special education classrooms; ²GEN, general education classrooms.

Figure 6. Classroom 2: Appropriate student behaviors in special and general education classrooms.^{1/2}

the *Corrective Reading* program improved the reading abilities of their students, that they would continue to implement the program, and that they felt prepared to implement the program.

Discussion

This study examined the effects of the *Corrective Reading* program on the reading ability and classroom behaviors of seven ethnically diverse middle school students with severe and intensive challenging behaviors and reading difficulties. The findings from this study add to the research base that supports the benefits of Direct Instruction on the reading performances of students with mild disabilities (LaCava, 1992; Malmgren & Leone, 2000; Thorne, 1978). This study extended the Malmgren and Leone study in terms of age of participants, setting, and the use of the most recent edition of the *Corrective Reading* program. In addition, the results suggest that the newest version of the *Corrective Reading* program positively affected the students' oral reading fluency. The findings linked to reading performance of both the instructional-level *Corrective Reading* passages and generalization grade-level passages, and participant behaviors during reading instruction, are summarized below with study limitations and future directions following.

Participant Reading Performance

We had several positive findings related to participant reading performance. First, all participants' cwpm intervention means exceeded the cwpm baseline means. Five participants demonstrated these gains during the first *Corrective Reading* passage read during the intervention condition. Anthony had the highest gain in mean cwpm, from baseline (73.6) to intervention (100.2), whereas Evan had the lowest gain in mean cwpm, from baseline (81.7) to intervention (88.6). In addition, all participants had a reduction in the mean number of errors from baseline to intervention, thereby maintaining high rates of accuracy as their reading rates increased. These findings support the importance of maintaining reading accuracy while increasing reading rate (Carnine et al., 1997).

Second, each participant also showed substantial evidence of transfer of fluency gains to the grade-level generalization passages. All

participants demonstrated an increase in the mean cwpm and a reduction in the number of errors from baseline to intervention. For example, Evan had the highest gain across conditions with a mean 39 cwpm in baseline to 68.4 cwpm in intervention and David had the lowest gain across conditions with a mean of 38.7 cwpm in baseline to 53 cwpm in the intervention.

Third, six of the seven participants' overall reading ability increased as indicated on the Woodcock Johnson Reading Mastery Test. Statistically significant pretest to posttest gains were observed for the combined group. For example, David increased from a grade equivalency of 2.6 to 3.2 after 6 *Corrective Reading* lessons, and Will increased from a 1.8 to a 2.8 after 11 lessons. Most of the students made grade-equivalency gains over a short period of time when completing a limited number of lessons, which also was found in the Malmgren and Leone (2000) study.

Fourth, five of the seven students met reading criteria to move to the next *Correct Reading* lesson with a single intervention lesson. Both Evan and Will needed multiple intervention sessions to reach the criterion for six lessons and one lesson, respectively.

Participant Behavior Performance

The results of this study did not establish a relationship between improved oral reading fluency and a reduction of inappropriate behavior for the participants. None of the participants demonstrated improvement in their social behavior during the intervention condition when engaged in reading activities outside the *Corrective Reading* sessions. The variability in the participants' social behavior may be due to several factors. First, the task demands across the settings varied; therefore participants engaged in appropriate or inappropriate behavior largely dependent on what demands were in place. Second, teacher behaviors varied across the different settings observed, with the specific influence of such teacher behaviors on student behavior remaining unknown. Third, each participant demonstrated minimal treatment effects, and these effects may account for the lack of positive influence on student social behaviors during other reading-related activities.

Limitations and Future Directions

Several limitations of this study warrant mention and could be improved on with future research. First, the participants had a wide range of reading abilities. Thus, some moved more rapidly through the lessons than others. For example, Evan required more instruction to meet criteria than other participants. If other participants were in his reading group, then their progress would have been slowed. Future research may want to group students of similar reading fluency levels; however, this is a challenge given the wide range of ability levels among students in special education classrooms.

Second, each participant's background and preference of reading material may have influenced the data from the grade-level generalization passages. The participants' reading difficulties (see *Table 1* for reading scores) and subsequent ability to independently and accurately read text from grade-level materials is an important issue. In many cases, students with known reading difficulties are asked to read subject texts in general education classrooms that have not been adapted to match their abilities. Such was the case in this study where participants in classroom 1 had an average grade-equivalent score of 3.0 and classroom 2 had an average score of 2.9 while the generalization passages were four and three grade levels above that of the students' abilities, respectively. Future research may want to assess the effects of closer matches between students' ability and subject grade-level text on oral reading fluency. In addition, if participants were interested in the subject matter of the passage or had positive histories in these general education classrooms, their performance may have been affected. Several of the participants verbally protested their lack of choice once exposed to a generalization passage. Future research could focus on providing students with challenging behaviors with a choice of generalization passages. Giving choices to students with challenging behaviors during academic activities has resulted in increased academic engagement and accuracy as well as decreased inappropriate behavior (e.g., Clarke et al., 1995; Jolivette, Wehby, Canale, & Massey, 2001).

Third, the number of behavioral observations conducted across participants and settings (general education versus special education) was unequal, for several reasons.

First, nine days of planned observations were cancelled because of school cancellations. Second, absences of participants for unknown reasons (e.g., David was absent for 2 weeks at the end of the study) and in-school suspensions (e.g., Bill and Will were suspended for 3 days, Tammy and Anthony for 1 day) were frequent. Future research should be conducted with students with minimal histories of absences and in-school suspensions. Second, some participants received more instruction in general education settings than in special education settings, and vice versa, according to their IEPs. For example, some of the participants received only reading instruction from the special education teacher, while other participants received all services from the special education teacher except for art, music, and P.E., where reading activities were limited. Future research could include preplanned reading activities in these settings to ensure opportunities for observations. Third, the time of day in which reading was scheduled may have influenced observation opportunities. For example, if reading activities were scheduled for the last portion of the day, it was more likely that an observation would be cancelled because of participant inappropriate behavior earlier in the day. Future research may want to counterbalance the time of day observations are to be conducted or to schedule observations at the beginning of or in the middle of the day.

If students with academic and behavioral challenges are to break the pattern of outcome data they currently present (Knitzer et al., 1990; U.S. Department of Education, 2001), they must be given the academic and social skills necessary to prepare them for success in and out of school. This study and previous literature support the use of appropriate academic curricula such as the *Corrective Reading* program, alongside appropriate teacher behavior, in improving the oral reading fluency of students with behavioral challenges and reading difficulties. Although research shows that DI methods provide the best chance of success for these students, it is essential for students who may be at risk for academic or social failure to be provided with empirically based instruction (Serna, Nielson, Lambros, & Forness, 2000). Future research that extends the current literature base and addresses the limitations of this study is warranted to investigate both academic and social interventions and their effects on addressing the complex needs of students with challenging behavior and reading difficulties.

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AUTHORS' NOTES

Please direct all correspondence to Amy Lingo, Assistant Professor, Department of Teaching and Learning, College of Education and Human Development, University of Louisville, Louisville, KY 40292. Phone: (502) 852-6431; E-mail: amy.lingo@louisville.edu

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