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# READING COMPREHENSION AND FLUENCY: EXAMINING THE EFFECTS OF TUTORING AND VIDEO SELF-MODELING ON FIRST-GRADE STUDENTS WITH READING DIFFICULTIES

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**Abstract.** The need for research-based instructional support for culturally and linguistically diverse students with reading difficulties is a national priority. In this rural Hawaii study, teachers and parents selected four first-grade students who were experiencing delays in reading fluency and comprehension skills to receive tutoring and video self-modeling interventions. Two students were identified as having specific learning disabilities, one as being developmentally delayed, and one was in the process of being referred for special education. Community partners were trained to provide tutoring with the 25-step ACE reading protocol. Two 2-minute self-modeling videotapes were constructed: the first depicted the student fluently reading a passage; the second showed the student applying a story map and successfully answering comprehension questions. A multiple-baseline design across two behaviors (reading fluency and comprehension) was used to observe the effect of each intervention on reading fluency and comprehension skills. Reading fluency, measured in number of correct words per minute, doubled for three students and quadrupled for the fourth by the end of eight weeks. Reading comprehension, measured in number of correct responses, reached pre-established criteria. Viewing the self-modeling videotapes was associated with reduced variability and maintenance of increased performance. Follow-up indicated that gains maintained for six months. Teachers and parents reported generalization to classroom and home.

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Teaching an increasingly diverse population of children to read is a national priority (Reading First, 2002). According to the National Research Council (1998), over 40% of fourth- and eighth-grade students were not able to read well enough to perform assignments

at grade level. Failure to acquire literacy skills in the early elementary grades has devastating consequences, including poor academic outcomes, increased problem behaviors, higher probability of dropping out of school, limited employment opportunities, and a

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greater likelihood of living in poverty (National Institute for Literacy, 1997).

Being a member of a cultural or linguistic minority group dramatically increases the probability of a student having difficulty learning to read (National Center for Education Statistics, 2003). Thus, culturally and linguistically diverse students are more likely to be referred and classified as having learning disabilities (Artiles & Trent, 1994; Council for Exceptional Children [CEC], 2000). In the state of Hawaii, where students represent a collection of minority cultures, literacy outcomes follow the national pattern. That is, students from Native Hawaiian and Filipino minorities are more likely than other groups to have SAT test scores within the lower range. Of students receiving special education services, 34% are of Hawaiian ancestry, although this ethnicity comprises only 25% of the public school population (Hawaii Department of Education, 1997, 2004).

### ***Community Partners as Tutors***

Supplemental instruction provided by an instructional assistant has been successful in increasing decoding skills in early elementary students (Gunn, Biglan, Smolkowski, & Ary, 2000). Research studies have also documented the effectiveness of tutoring by an adult or community partner to increase reading fluency and comprehension skills (Dowrick et al., 2001; Jenkins, Vadasy, Firebaugh, & Profilet, 2000). The instructional dialogue may facilitate the student's understanding of the content of reading materials and is likely to include similar interaction styles and language (Au & Mason, 1983; Tepper, 1992). Further, community tutors provide links between the home, community, and school, thus promoting family involvement with a child's academic progress (Deslandes, Royer, Potvin, & LeClerc, 2000).

Sociocultural cognitive theory provided a model for both interventions in this study: tutoring and video self-modeling. Vygotsky (1978) proposed that the development of cognitive skills, which is mediated by language, has its origins in social relations and culture. Through dialogue with the tutor, students construct meaning or understanding of written texts (referred to as "scaffolding" and "semiotic mediation" by Vygotsky, 1978). The presence of the community partner provides an opportunity for community involvement in the school and, thus, in the sociocultural construction of learning. Combining tutoring with self-modeling supports the positive influence of the community partner in the child's learning process, as well as the efficacy of the child as his or her own model.

Bandura's (1997) emphasis on observational learning proposed that children learn by observing a model or receiving instructions without first-hand experience.

According to Bandura, self-efficacy is "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (p. 3). Children with reading disabilities are likely to have received both verbal and nonverbal feedback that has decreased their beliefs in their ability to perform skills or achieve goals. Video self-modeling provides a powerful model, the most similar and culturally appropriate model – the student him or herself.

### ***Characteristics of Students with Reading Disabilities***

Of children identified with a learning disability, 80% have difficulty with reading (Gersten, Fuchs, Williams, & Baker, 2001; Lerner, 1993). For example, classroom teachers, parents, or other professionals frequently point to classroom functioning that is significantly delayed compared to that of peers of the same age or grade level. Specifically, students with disabilities may exhibit memory and attention problems; problems in the affective domain, such as poor social skills, low self-esteem, or poor motivation; and behavioral concerns, such as adaptive behavior deficits, disruptive behavior, or withdrawal (Mercer & Mercer, 1998). If reading skills are to develop, students with disabilities will benefit from the opportunity to actively participate, supported with (a) control of task difficulty, (b) small-group instruction, and (c) direct response questioning (Vaughn, Gersten, & Chard, 2000).

### ***Instructional Strategies***

Current syntheses of the literature concur that the following skill components are essential for developing proficient reading fluency: (a) phonemic awareness, (b) phonics practice, (c) repeated reading, and (d) sight word knowledge. Reading comprehension skills develop when instruction includes (a) comprehension monitoring and (b) text structuring. Encouraging students to "think aloud," articulate thoughts, and receive feedback may support the development of comprehension skills (Gersten et al., 2001; National Reading Panel, 1999).

***Reading fluency.*** The National Reading Panel (1999) noted that a combination of methods is the most effective way to teach children with disabilities to read, including instruction in (a) phonemic awareness (units of sound), (b) phonics and sound blending, (c) guided oral reading, and (d) reading/vocabulary comprehension. Guided oral reading helps students learn new words, read accurately and fluently, and comprehend what they read. Vocabulary instruction (both direct and indirect) at the appropriate age and grade level builds comprehension skills. The panel recommended repetition and multiple exposure to vocabulary words.

***Reading comprehension.*** Some students with learning disabilities are able to read fluently but do not develop corresponding skills in reading comprehension

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(Mercer & Mercer, 1998). These students require direct instruction in cognitive strategies to build their comprehension (Vaughn, Gersten et al., 2000). A recent mega-analysis (synthesized meta-analyses of interventions in special education) reported large effect sizes for reading comprehension interventions (Lloyd, Forness, & Kavale, 1998). Almost any intervention designed to increase reading comprehension, regardless of method, was effective (Talbot, Lloyd, & Tankersley, 1994). Another review of best practices to promote reading comprehension skills in students with learning disabilities indicated that targeting reading fluency, among other weakness areas, typically led to improved reading comprehension (Mastropieri, Scruggs, Bakken, & Whedon, 1996). Further, Mastropieri and Scruggs (1989, 1997) reported stronger improvements when teachers used cues, questions, cognitive organizers, or peer tutoring.

### **Video Self-Modeling**

Video self-modeling is defined as a "procedure using the observation of images of oneself engaged in adaptive behavior" (Dowrick, 1999, p. 23). Two related terms, *feedforward* and *positive self-review*, define the difference between images of future and past success.

*Feedforward* (in contrast to feedback) refers to video images of target skills to be achieved in the future. These images are created by coaching the appropriate skill, or editing segments of component skills together, to produce a sample of the desired behavior (Dowrick, 1997). This might consist of recording phrases of a story read aloud with a tutor in an echo reading condition and splicing them together on videotape to provide a model of the student reading an entire story independently. It might also include examples of the student using strategies to develop other target skills, such as sounding out words.

*Positive self review* refers to "selectively compiling the best recorded examples of target skills already manageable but infrequently achieved" (Dowrick, 1991, p. 109). Such a videotape might consist of a collection of the best reading performance samples the student has achieved. Thus, feedforward may be used to teach new skills whereas positive self-review may be used to achieve consistency or maintenance of skills recently learned.

Video self-modeling interventions have been used to enhance both academic skills and behavior (Hitchcock, Dowrick, & Prater, 2003). In a recent review, Hitchcock et al. (2003) identified 18 school-based studies that showed functional control of targeted academic skills and behavior(s). Dependent variables included disruptive behavior (e.g., fighting, fidgeting, distractibility, touching, making noise, out-of-seat); compliant behavior (e.g., time on task, following teacher commands,

verbal or hand-raising responses to teacher questions); language responses (e.g., increases in verbal fluency, language use, or structure); quality of peer relationships; adaptive behaviors; mathematics skills; and reading fluency. In these studies, video self-modeling improved student outcomes. Further, generalization across settings and maintenance were found. Several of these studies demonstrated the accelerated effect that video self-modeling can have on reading fluency skills with a significant percentage of students (Dowrick, 1997; Dowrick, Power, Ginsburg-Block, Kim-Rupnow, & Manz, 2000).

### **Community Partners**

Children benefit from a positive supportive relationship between home and school when learning academic or other skills (Epstein, 1987). Parents' beliefs and attitudes towards reading strongly influence a child's development in literacy (Bayer, 1990; Sileo, Sileo, & Prater, 1996). Involvement of parents or community members promotes learning by providing culturally appropriate discourse patterns, interaction styles, and a positive affective atmosphere (Au & Mason, 1983; Heath, 1983; Purcell-Gates, 1995). Community interventions that included training for parents from low-income and ethnic minorities have been effective in increasing emerging literacy skills (Cronan, Cruz, Arriaga, & Sarkin, 1996).

### **Significance**

Although reading fluency and reading comprehension are correlated, the nature of this relationship is not clear (Shinn, 1989). Several researchers have suggested a need to investigate the effect of specific instruction on both reading fluency and comprehension skills (Jenkins et al., 2000; Mercer, Campbell, Miller, Mercer, & Lane, 2000; Vaughn, Chard et al., 2000). Concurrently examining the effect of applying interventions on reading fluency and comprehension was a major focus of this study. Despite general evidence linking fluency with comprehension, no single-subject studies could be identified in the literature that describe the developmental relationship between the two reading skills. The single-subject design allows examination of the effects of an intensive 8-week intervention on four students with reading difficulties.

This study expands the knowledge base on video self-modeling in school settings with academic skills. Video self-modeling has been effective with oral reading fluency (Dowrick et al., 2000); however, it has not been applied as an instructional strategy to teach reading comprehension skills. The study used a story map strategy to support predicting, sequencing, retelling, and discussing story content (e.g., who, what, where), as recommended by Gardill and Jitendra (1999).

The purpose of this study was to evaluate the effectiveness of tutoring provided by a community partner and video self-modeling on (a) reading fluency and (b) reading comprehension for first-grade students with reading disabilities. The effect of student behavior on teacher ratings was also measured. The project was designed to enhance classroom instruction and provide early intervention that supports academic success as well as healthy social/emotional development.

### METHOD

This study examined the effects of two independent variables, (a) community partner tutoring and (b) video self-modeling, as they were applied to two dependent variables, reading fluency and comprehension skills, with four students in the first grade. Data on teacher ratings of student behavior were also collected. A single-subject-multiple-baseline design was replicated with each of the four participants.

#### Participants and Setting

Teacher and parent teams collaboratively referred children who were having difficulty learning to read; four first-grade students (identified by pseudonym) were selected. Of the four, three were receiving special education services. Two participants (Cinnamon and Navy) had been identified as having a “specific learn-

ing disability” (SLD), and one (Blaze) as being developmentally delayed. The state of Hawaii defines SLD as a severe discrepancy (one and one-half standard deviations) between the student’s intellectual ability and academic achievement in one or more of the following areas: oral expression, listening comprehension, written expression, basic reading, reading comprehension, mathematics calculation, or mathematics reasoning. The severe discrepancy can be measured by alternative means when standardized tests are considered to be invalid for a specific student (Hawaii Department of Education, 2002). The fourth student (Indigo) was falling behind academically and was being considered for evaluation for special education services. All students were performing in the lower third of their class and were identified as “at risk” on the Dynamic Indicators of Basic Early Literacy Skills (DIBELS).

Table 1 presents a detailed description of each student, including disability category, age, grade, gender, ethnicity, standardized test scores on measured cognitive ability, number of years receiving special education services, and instructional level. Three of the four students were repeating the first grade. Baseline data collected in December and January indicated that the students were reading pre-primer passages below expected fluency rates for their grade level.

**Table 1**  
*Description of Participants*

Student (Category)	Age	Grade	Gender	Ethnicity	Cognitive (K-BIT <sup>a</sup> )	Years Receiving SPED Services	Instructional Level Rigby Grade 1 PM Collection
Cinnamon (SLD)	7-3	1 (R) <sup>b</sup>	Girl	Part Hawaiian <sup>c</sup>	94	1	Blue (Primer)
Navy (SLD)	6-11	1 (R)	Boy	Part Hawaiian	105	4	Blue (Primer)
Indigo (at-risk)	6-4	1	Boy	Part Hawaiian	105	n/a	Red/Yellow (Pre-primer)
Blaze (DD)	7-4	1 (R)	Boy	Part Hawaiian	84	4	Red/Yellow (Pre-primer)

<sup>a</sup> K-BIT = Kaufman Brief Intelligence Test (Kaufman & Kaufman, 1990).

<sup>b</sup> (R) is repeating the first grade.

<sup>c</sup> Part Hawaiian is a child of mixed ethnicity.

**Table 2**  
**Description of School/Community Partners**

Team Member	Age Range	Gender	Ethnicity	Involvement with School	Highest Degree
Tutor 1	25-35	F	Part Hawaiian	Educational assistant (2 years' experience)	A.A.
Tutor 2	35-45	F	Part Hawaiian	Educational assistant (6 years' experience)	HS Diploma (+23 credits)
Video tech	55-65	F	Caucasian	Reading specialist (20 years' experience)	M.Ed.

The study was conducted during the second semester of the school year in a public elementary school (393 students) in a rural setting in the state of Hawaii. A large portable classroom (20 by 30 feet) on campus was the center for the program. The room (shared with other programs) contained classroom furniture, a computer, TV, VCR, books and other reading materials. Two community partner tutors conducted daily half-hour sessions with the students, either during or after school. Table 2 presents a description of the community partners, including age, gender, ethnicity, role at school, and educational level.

Assessments of the students were conducted pre- and post-intervention. Standardized tests consisted of the Kaufman Brief Intelligence Test (pre- only) (Kaufman & Kaufman, 1990); the Woodcock Reading Mastery Test-Revised (Woodcock, 1998); and the Achenbach Teacher Rating Scale (Achenbach, 1991). Standard scores were calculated using the 1998 revised norms (Woodcock, 1998). Alternate forms (G and H) of the WRMT-R were used to control for practice effects. This pre-/post-assessment with the WRMT-R provided information on the students' performance in (a) word identification, (b) word attack, (c) basic skills, and (d) passage comprehension. The Achenbach Teacher Rating Form (TRF) provided *T* scores based on the teachers' identification of problem behaviors (Achenbach, 1991).

A focus group with all stakeholders (parents, teachers, and tutors) was conducted following the study to determine their satisfaction with the interventions and outcomes.

Additional information was gathered on the stu-

dents' knowledge of sight words from a list of the 45 most frequently used words (Beck et al., 1989). The classroom teacher determined the students' instructional reading level and recommended an appropriate series of books.

#### **Equipment**

A Sony DVD-TRV20 digital camcorder recorded the raw footage for the self-modeling tapes to digital video cassettes. A tripod increased image stability, and Sony WCS-999 wireless microphones maximized the sound quality of the recordings. Video footage was downloaded to an i-Mac computer through an i-link connection, and videotapes were edited with i-Movie computer software.

Books at the first-grade reading level (Rigby series) were used. Each book contained a story with colorful pictures and about 100 words, with content appropriate for emergent readers; the series increased in difficulty level from sentence books to paragraph books. Approximately 10 books were needed each week to provide a selection from which the students could choose. In addition, two new passages (without pictures) at the students' instructional level were used for the weekly independent measures of progress (Beck et al., 1989).

#### **Design and Procedures**

**Measures.** Data on reading fluency and comprehension were collected twice a week on nonconsecutive days. Oral reading fluency was measured in words read correctly per minute (cwpm), a commonly used measure to calculate reading fluency (Fuchs, Fuchs, Hamlett, Walz, & Germann, 1993; Mathes, Torgesen, & Allor,

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2001). The students were given short story passages of approximately 100 words each based on a basal reading series (Beck et al., 1989). The passages were (a) novel (i.e., new to the student) and (b) at the students' instructional level. The students were timed for 1 minute, and the oral fluency rate was calculated as the total number of words correctly read. To increase reliability, oral reading rate was calculated on the average of two passages. Omissions, substitutions, and words that took longer than 3 seconds to read were counted as errors, as were mispronunciations unless recognized as Hawaiian Creole English, an English-based language with its own unique vocabulary and grammatical rules developed by speakers of different languages (e.g., Portuguese, Japanese) in order to communicate. For example, pronouncing "th" as "t" is proper in Hawaiian Creole English. Thus, a student may pronounce the word "think" as "tink." This would not have been counted as incorrect.

Reading comprehension was measured in number of correct responses out of 15 comprehension questions. This measure was based on the state language arts content standards for reading and grade-level performance benchmarks (Hawaii Department of Education, 1999). The students read a passage (with pictures) and responded to the questions outlined in the tutoring protocol for reading comprehension. The protocol included the following procedures and scoring method: (a) 3 points for predictions; (b) 3 points for identifying main and supporting characters, and matching words/pictures; (c) 1 point for the setting; (d) 3 points for sequencing the story into beginning, middle, and ending; and (e) 5 points for retelling the story (students' own words). Criterion for success was established at 13 out of 15 correct responses. As with the fluency probes, comprehension scores were averaged on two stories.

To ensure that the reading materials for the tutoring sessions and probes were equivalent (with controlled level of difficulty) and at the students' instructional level, materials were chosen from textbook sets classified at the students' level. Instructional level was determined by the classroom teacher and the pre-intervention assessment data.

**Research design.** A multiple-baseline design across two behaviors (reading fluency and reading comprehension) was replicated with the four participants. This design allowed the researchers to examine performance on the two reading skills as the interventions were applied. The sequence in the multiple-baseline design was as follows. First, a series of repeated measures were taken on each of the two target behaviors to determine the students' level of performance. When criterion-level performance was reached on the first target

behavior, the next intervention phase was implemented. The six phases of the design for each target behavior were (a) baseline, (b) tutoring to increase reading fluency (TRF), (c) tutoring plus video self-modeling (TRF + VSM1), (d) tutoring to increase reading comprehension (TRC), (e) tutoring plus video self-modeling (TRC + VSM2), and (f) follow-up. The data for each behavior were graphed for each student.

**Training.** The tutors and videographer were trained according to previously documented ACE (Accelerated Community Empowerment) reading methods (see Anderson & Dowrick, 2000; Kim-Rupnow & Dowrick, 2000). An overview may be found on the ACE reading website (Dowrick, 2003). Training included (a) an overview of ACE reading; (b) repeated reading and phonics; (c) sight word recognition; and (d) audiotaping, tutoring checklists, use of praise, daily logs, reliability/procedural integrity, and scheduling procedures. The tutors practiced the protocol with a partner.

An additional 1-hour training was conducted before implementation of the TRC phase. Here the tutors were trained to implement the reading comprehension protocol, apply the story map, and record the number of correct responses. They were encouraged to relate the information to the students' life, elaborate the students' responses, and model appropriate answers when the students had difficulty answering the comprehension questions.

The videographer used a modified version of the procedures described by Anderson and Dowrick (2000) to create the (feedforward) self-modeling videotapes for each student. A text slightly ahead of students' current reading level was selected. The sequence of the video was planned using a storyboard; segments were videotaped, and the video was edited to create a version showing enhanced mastery by the child. Coaching and editing were used to minimize the amount of time required to construct the videos. With practice, the editing time totaled about 30 minutes per tape. The videographer constructed two 2-minute videotapes for each student, one for video self-modeling of reading fluency (VSM1) and one for video self-modeling of reading comprehension (VSM2). The first videotape showed the student reading a book fluently with encouragement from the tutor and playing the memory game. The second video showed the student applying a story map and successfully answering comprehension questions presented by the tutor.

### **Phases of the Design**

**Baseline.** Curriculum-based measures were conducted on two nonconsecutive days per week with material that was new to the student and at his/her instructional level. The tutor audiotaped the session,

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then calculated and recorded the number of points the child received on the checklist. Measures continued until stable.

**Tutoring to increase reading fluency (TRF).** To increase reading fluency skills, the tutor conducted a 30-minute session with each student once a day following the ACE reading protocol. This protocol contains elements of best practices identified by the National Reading Panel (1999), including repeated reading for oral fluency, sight word recognition and vocabulary, phonics skills, and basic comprehension (Kim-Rupnow & Dowrick, 2000).

At the beginning of each 30-minute session, the student selected a new book (approximately 100 words) from a choice of reading materials. The tutor and the student then read the book using (a) unison reading, (b) echo reading, and (c) independent reading. In unison reading, the tutor and student read the book aloud together, with the tutor modeling fluent reading with appropriate expression and pauses. During echo reading, the tutor read the text phrase by phrase (or sentence by sentence); after each phrase or sentence the student would repeat that segment aloud. Echo reading of the book could be repeated if the desired fluency rate was not achieved during the first reading. A 1-minute discussion to relate the content of the passage to the student's own experiences followed the first echo reading. Finally, the student read the book independently.

The tutor and the student then reviewed sight words using a memory game. The tutor created eight pairs of flashcards with six known and two unknown words. The new words were chosen from the reading passages or from the sight word list. The cards were shuffled and spread out face down on the table in a four-by-four matrix. The tutor and child took turns turning over two cards of their choice to find the matching words. Each time a card was turned over, the player had to say the word. If the words matched, the player kept the pair and was given another turn. The game continued until all the words had been matched.

**Tutoring to increase reading fluency plus video self-modeling (TRF + VSM1).** When the data appeared stable in the TRF phase, the videotape of reading fluency was added. The tutor and student viewed the 2-minute self-modeling video immediately before the daily tutoring session. This phase continued until the student reached his or her individual criterion for reading fluency (e.g., reading at a rate of 40 words per minute) or until the fluency data appeared stable. At this point the video was faded (viewed twice per week).

**Tutoring to increase reading comprehension (TRC).** Once the data in the TRF + VSM1 phase were stable, the tutoring intervention for reading comprehension was applied. That is, in addition to the TRF activities, the

tutors added the reading comprehension activities. The tutors used a graphic organizer (story map) and direct instruction on story structure to help the students organize and remember important information: the setting, characters, theme, a temporal sequence of events, and the ending. Tutoring sessions continued until the data stabilized. (The story map and tutoring checklist are available from the primary author upon request.)

**Tutoring to increase reading comprehension plus video self-modeling (TRC + VSM2).** The tutor and student viewed the videotape immediately before the daily tutoring session. This phase continued until the student reached his or her individual criterion for reading comprehension.

**Follow-up.** Tutoring sessions continued for 1 month following the intervention or until the end of the school year. During this phase the tutors used the repeated-reading intervention (fluency) and story retelling (comprehension) only. Students were encouraged to view their videotapes at least once per month during the summer break. A final follow-up measure was conducted at 6 months.

**Generalization.** Measures of reading fluency and comprehension were collected on one occasion in the classroom during the month following the intervention to determine if skills had generalized to the classroom.

#### **Social Validity**

At the end of the project, stakeholders (parents, tutors, and teachers) participated in a focus group to express their satisfaction with the program and outcomes. Participants provided an individual written evaluation. In addition, they participated in a group discussion, which was audiotaped and transcribed.

#### **Data Analysis**

The researchers conducted visual analysis of the data in terms of level (means), trend (slope), and variability (range). Lines of progress were drawn using the split-half quarter intersect method developed by White in 1971 and described in Cooper, Heron, and Heward (1987).

#### **Reliability**

**Interobserver reliability.** Interobserver agreement measures were conducted on 30% of the sessions in each phase of the study. An independent observer (a reading specialist) calculated the students' reading fluency and comprehension scores, and their results were compared with those collected by the research project coordinator. Measures ranged from 87% to 98%, with a mean of 96%.

**Procedural integrity.** Procedural integrity checks were also conducted on 30% of the sessions on a random basis. The project coordinator completed a coded

(yellow) procedural integrity checklist, which was identical to the checklist completed by the tutor. If a “live” check could not be conducted, procedural integrity was monitored through the audiotape recordings of the tutoring sessions. Reliabilities were calculated as the number of agreements divided by the number of agreements plus disagreements multiplied by 100 (Kazdin, 1982). Percent agreement ranged from 95 to 100 with a mean of 99%.

## RESULTS

Graphs for each student – Cinnamon, Navy, Indigo, and Blaze (pseudonyms) – were created from the bi-weekly curriculum-based measures of reading fluency and comprehension (see Figures 1 to 4). Data showed that tutoring by a community partner and video self-modeling increased both reading comprehension and reading fluency skills. The greatest rate of increase in oral reading fluency was noted when the video self-modeling tape for reading fluency was added. When the tutors introduced the reading comprehension protocol, all four students continued to make gains in both reading fluency and comprehension. Adding the videotape of the student successfully applying the story map and answering comprehension questions consolidated the gains and reduced variability.

### Pre-/Post-Assessments

Standardized assessments conducted before and after the intervention showed that students made gains in age-equivalent scores (see Table 3). However, standard

scores on the WRMT-R did not reflect the increase in the students’ curriculum-based reading measures, nor the initial concerns expressed by the teachers.

Behavioral measures provided by the Achenbach Teacher Rating Form Profile indicated improvements in total scores for all participants (see Table 3). For example, scores that were in the clinical or borderline clinical range in the pre-assessment moved to the normal range on the post-assessment. All internalizing and externalizing behavior ratings improved with the exception of Cinnamon, whose internalizing score remained the same. On the attention scale, teachers rated fewer problems in three out of four students on the post-assessment.

### Maintenance and Generalization

Follow-up data collected at 1 and 6 months indicated that skills were maintained in both reading fluency and comprehension. One follow-up measure, collected in the general education classroom, indicated that reading skills generalized. Teacher and parent evaluations supported these findings.

### Social Validity

Written and oral comments from teachers, parents, and tutors during the focus group showed that stakeholders rated the project highly and valued the students’ improvements in both reading and behavior (see Table 4). All 10 participants in the focus group said they would recommend the intervention to a friend or other student, and they rated the ACE reading

**Table 3**  
*Pre-/Post-Assessments for Reading and Behavior*

Student	Reading (WRMT-R) <sup>a</sup>						Behavior (Achenbach TRF) <sup>b</sup>		
	Word Id		Change (mo)	Passage Comp		Change (mo)	Pre-	Post-	Change
	Pre-	Post-		Pre-	Post-				
Cinnamon	7-2 (96)	7-6 (95)	+4	7-1 (92)	7-1 (92)	0	64 (clinical)	57 (normal)	+7
Navy	7-2 (102)	7-6 (102)	+4	7-1 (99)	6-10 (92)	-2	58 (normal)	52 (normal)	+6
Indigo	6-9 (105)	7-0 (107)	+3	6-0 (92)	6-8 (99)	+8	60 (borderline)	53 (normal)	+7
Blaze	6-10 (87)	7-0 (83)	+2	6-0 (79)	6-6 (83)	+6	47 (normal)	42 (normal)	+5

<sup>a</sup> WRMT - R is the Woodcock Reading Mastery Test – Revised (Woodcock, 1998).

<sup>b</sup> ASEBA = Achenbach System of Empirically Based Assessment, Teacher Rating Form (Achenbach, 1991).

Results are reported as age-equivalent scores with standard scores in parentheses (WRMT - R) and T scores (Achenbach). + = positive direction of change.



Figure 1. Curriculum-based reading measures for Cinnamon.

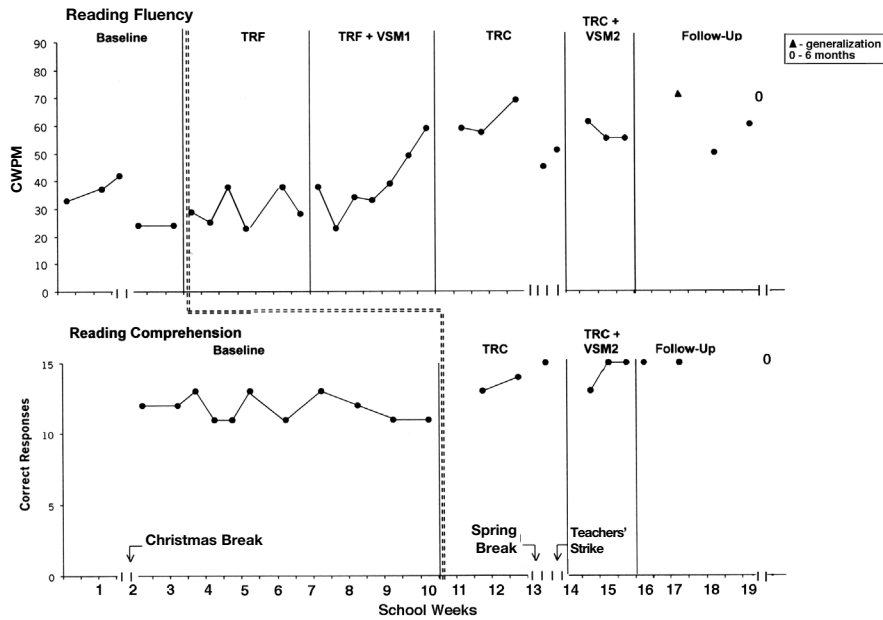
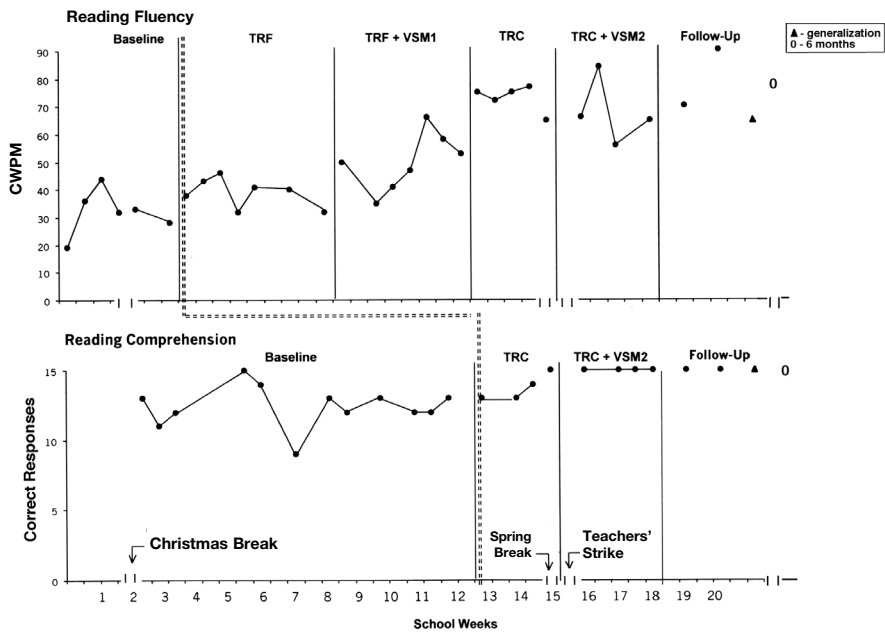
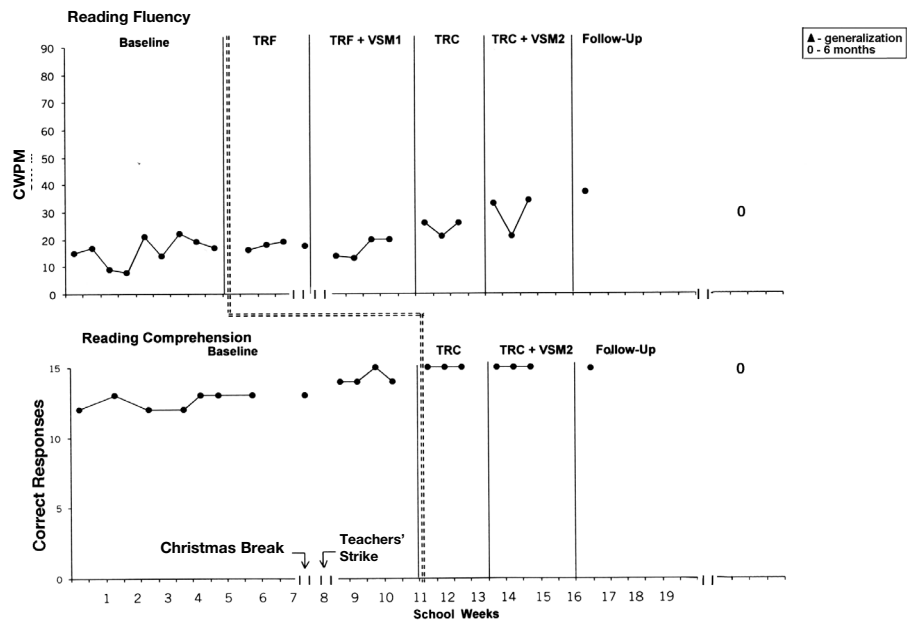


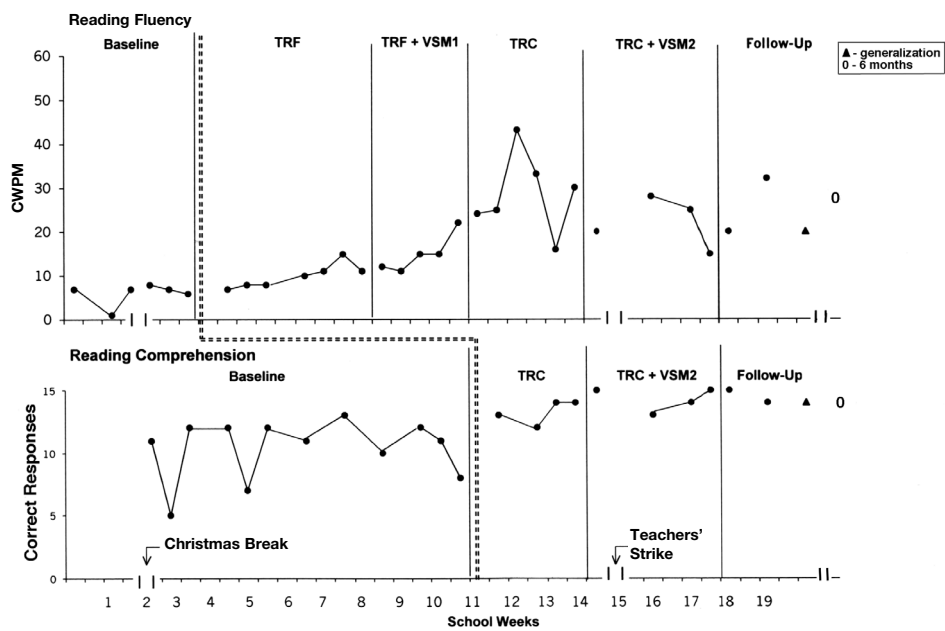
Figure 2. Curriculum-based reading measures for Navy.



**Figure 3.** Curriculum-based reading measures for Indigo.



**Figure 4.** Curriculum-based reading measures for Blaze.



**Table 4**

***Synthesis of Focus Group Dialogue and Individual Written Worksheets***

**What changes have you observed in the children of the ACE reading program?**

<b>Teachers</b>	<b>Parents</b>	<b>Team</b>
<ul style="list-style-type: none"><li>• more positive attitude</li><li>• greater self-confidence</li><li>• reading ability and fluency have really increased</li></ul>	<ul style="list-style-type: none"><li>• reads a lot faster</li><li>• beginning reading level was so poor, now is unbelievable</li><li>• improved very much in reading and comprehension</li><li>• likes to read</li><li>• really enjoys reading, and does it on his own</li><li>• works out what the words are</li></ul>	<ul style="list-style-type: none"><li>• reading abilities changed from 10-15 cwpm to 60-80 cwpm; comprehension skills also changed. They (the students) could apply what they read to the story map</li><li>• students who started off with difficulties in reading are now reading very fluently, and their comprehension is at a higher level than when they started</li><li>• rapid increase in fluency. They express more confidence in their ability to read. For those with adequate language there has been an increase in comprehension</li></ul>

interventions on a 5-point scale as either 4 = very good (three participants) or 5 = excellent (seven participants).

***Reliability***

The tutors applied the structured protocol or checklist of activities with a high degree of reliability. Point-by-point agreement quotients had a mean of 99%, with a range of 95% to 100%. Similarly, interobserver agreement measures conducted on 30% of the data collection sessions showed a high rate of reliability. The mean was 96%, with a range of 87% to 98%.

**DISCUSSION**

Tutoring by a community partner and video self-modeling increased both reading fluency and reading comprehension skills in the four participants. With the exception of Blaze, TRF + VSM1 improved reading fluency rates. TRC had positive effects on comprehension, and TRC + VSM2 maintained gains in both reading fluency and comprehension skills, as well as reducing variability in the data. Graphed curriculum-based measures demonstrated that two of the four students reached or exceeded the targeted 40 to 60 cwpm first-grade oral reading fluency rates (Fuchs et al., 1993). This was significant as three of the four students were repeating the first grade and baseline data in December

showed their performance as still below grade level. A comparison of measures on the follow-up and baseline phases showed that all students' reading fluency rates at least doubled; one quadrupled. The only student (Indigo) who, although making progress, failed to reach the cwpm criterion was frequently absent from school and, therefore, received only 25 of the 40 scheduled tutoring sessions.

As suggested by Dowrick et al. (2001), the community tutor played an important role in developing comprehension skills. Dialogue between tutor and student provided communication and interaction styles similar to the student's own, as well as opportunities to develop connections between new and existing knowledge (Au & Mason, 1983). During the TRC phase, three students reached the target criterion for reading comprehension, and the other was 1 point from the goal. All participants reached criterion in the following phase with video self-modeling. Although a ceiling effect may have occurred, the gains in the students' ability to consistently answer standards-based comprehension questions were encouraging. The results support the findings of the review by Gersten et al. (2001), which recommended teaching strategies to develop self-directed questioning skills. The story map was apparently effective in developing these skills with first graders.

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Two recent reviews of the literature conducted by the National Reading Panel (1999) and Vaughn, Chard et al. (2000) recommended instruction in reading comprehension. An interesting finding from the tutoring for reading comprehension (TRC) phase was that reading fluency improved along with reading comprehension skills. Although rate of improvement in reading fluency was less in this phase for three students, all students continued to make and consolidate net gains during this and subsequent phases of the study. Two students achieved their highest fluency rates during this phase.

Motivating students with verbal praise, maintaining a positive rapport, and focusing on success were also critical ways in which the community partners played a vital role (Dowrick et al., 2001). The tutors remarked on their attachment to the children, and parents commented on the one-to-one attention their child received as well as the affection between the tutors and the children. The tutors also helped build word knowledge skills through the use of the memory game strategy. The students enjoyed playing the game and learned new vocabulary at a rate of two words per day, equal to their peers without disabilities (Fuchs et al., 1993). In addition to the participants of this study, who were Part Hawaiian, ACE reading programs have produced similar results with children from diverse ethnic backgrounds such as African-American, Asian, and Pacific Islanders (Yuen, Dowrick, & Alaimaleata, in press).

Video self-modeling resulted in consolidating gains in both reading fluency and reading comprehension skills for all students. Skills were performed more consistently, as evidenced by increases in the performance means and decreases in the variability of the data. The significance of this study is that reading comprehension, a new curriculum area, has been added to the research literature supporting the efficacy of video self-modeling in developing academic skills in school settings (Buggey, 1995; Dowrick, 1999; Dowrick et al., 2000; Hitchcock et al., 2003; Schunk & Hanson, 1989).

The results of the pre- and post-assessments with the Woodcock Reading Mastery Test-Revised (WRMT-R) were disappointing, and provided little evidence for the effectiveness of the interventions. The age- and grade-equivalent scores on aggregate subtests indicated gains in both basic reading and comprehension skills for all participants, but data from the standard scores were mixed. This finding highlights the difficulties in using standardized assessments to measure progress or determine instructional needs (Ysseldyke & Algozzine, 1995). One participant, Blaze, continued to perform at a level below that of his grade-level peers, but he had positive difference scores on three of four WRMT-R subtests.

Increases in reading skills were accompanied by improvement in the participants' behavior, as documented by the pre-/post teacher ratings on the Achenbach Teacher Rating Form (TRF) profiles (Achenbach, 1991). The teachers identified fewer problem behaviors on the student profiles, as well as fewer problems with attention and focus. Measures that fell in the borderline or clinically significant range in the pre-assessment moved to within the normal range on the post-assessment. The tutors, parents, and teachers also rated the students' reading behaviors positively, reporting increases in confidence, attention, effort, and enjoyment. The ratings of improved behavior support other findings in the literature where video self-modeling resulted in improvements in both academic and behavioral functioning (Dowrick, 1999; Meharg & Woltersdorf, 1990).

### ***Contribution to the Existing Literature***

This study provided further evidence in support of the reading strategies recommended by the National Reading Panel (1999) and recent reviews of the literature (Gersten et al., 2001): (a) repeated reading to increase oral reading fluency, (b) activities to increase word knowledge and word comprehension, (c) development of questioning skills through direct instruction in story grammar with a graphic organizer, (d) control of task difficulty, (e) one-to-one tutoring, and (f) positive verbal praise. The nature of the interactive dialogue with the tutor increased the students' active engagement with the stories and their abilities to make connections between new material and their background knowledge.

Further evidence was also provided for the efficacy of video self-modeling to increase academic and, incidentally, behavioral skills (Dowrick, 1999). Video self-modeling accelerated reading fluency skills and consolidated reading comprehension skills. This study offers the first application of self-modeling directly to reading comprehension skills. Video self-modeling may be less restrictive and time consuming than other interventions (Kehle, Clark, Jenson, & Wampold, 1986); it has been used to facilitate generalization and maintenance of effects (Hitchcock et al., 2003). Although the specific intervention here was for reading, there were also positive effects on the students' behavior in the classroom and at home. Improvements in behavior were documented by the Achenbach TRF profiles, tutors' ratings of behavior, and parents' comments in the focus group.

### ***Limitations***

The results of this study must be interpreted within the context of its limitations. The nature of the single-subject research design poses an inherent threat to

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external validity, and results cannot be assumed to apply to the larger population. However, there is a growing body of evidence from other research that demonstrates the efficacy of tutoring and video self-modeling with students who are having difficulty learning to read (Dowrick et al., 2000) and who are having problems in other academic subjects (Hitchcock et al., 2003). One further caveat should be noted; although video self-modeling may be effective for a percentage of students who are experiencing reading difficulties, some students will require alternative interventions.

This study points to the need for further research on the effectiveness of video self-modeling and tutoring in promoting reading skills. Counterbalancing the two comprehension phases to determine which intervention is more effective, tutoring or video self-modeling, is a suggestion for future research. Additional comprehension questions, such as *why* and *how*, to promote higher-level thinking are needed to address the ceiling effect in the data. Further, extending the numbers and types of participants to include students with low-incidence disabilities (such as children with autism or mental retardation) is also suggested. Developing profiles of students with high-incidence disabilities would indicate who may benefit most from these interventions. Finally, creating videos of increasingly complex skills might be investigated as a means of achieving benchmarks in an individual education program.

In conclusion, the results of this study provide evidence for the positive effect of video self-modeling on reading and support the findings of other studies that focused on reading fluency (Dowrick & Yuen, in press; Dowrick et al., 2001). The study also reinforces the importance of instruction in reading comprehension (Gersten et al., 2001). All of these components have implications for practice.

### **Implications for Practice**

Learning to read successfully requires a variety of skills. When teaching reading, teachers should incorporate daily activities to improve both reading fluency and comprehension. Reading fluency instruction might include repeated reading and practice with sight words or general word knowledge. Teaching self-questioning strategies or using a graphic organizer such as a story map could improve reading comprehension skills. The story map in this study provided a visual strategy with prompts for *who*, *what*, *where* questions, as well as predicting outcomes, sequencing events, and story retelling.

Teachers are urged to consider video self-modeling and tutoring when designing instruction for first-grade readers. The interventions in this study provided the

students with more opportunities to practice reading decoding skills as well as time to discuss story content with a person from their cultural community. As illustrated, the students' confidence increased and they viewed themselves as competent readers.

Classroom teachers are encouraged to conduct action research with video self-modeling. Alternating or combining the order of the two interventions (reading fluency and comprehension) would generate interesting research questions. Digital cameras and new software programs have made the filming and editing process much easier. Upper-grade level students would be good resources for technology support. Information on how to construct a self-modeling video may be found at the Video Futures web site ([www.alaskachd.org/video](http://www.alaskachd.org/video)) or a start-up kit may be ordered from [www.creating-futures.org](http://www.creating-futures.org).

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## NOTES

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