Using Self- and Peer Modeling to Improve Reading Fluency with Struggling Readers

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Abstract

The authors compared the effects of video self-modeling and video peer modeling on oral reading fluency of elementary students with learning disabilities. A control group was also included to gauge general improvement due to reading instruction and familiarity with researchers. The results indicated that both interventions resulted in improved fluency. Students in both experimental groups improved their reading fluency. Two students in the self-modeling group made substantial and immediate gains beyond any of the other students. Discussion is included that focuses on the importance that positive imagery can have on student performance and the possible applications of both forms of video modeling with students who have had negative experiences in reading.
Using Video Self - and Peer - Modeling to Facilitate Reading Fluency in Children with Learning Disabilities

Reading is a foundational skill taught in every school. Success in reading has been determined to not only dictate success in school in general, but also is related to self-esteem, opportunities for higher education, and employment outcomes (Shaywitz et al., 2003). Reading is a complex process requiring the simultaneous coordination of multiple cognitive abilities. Reading fluency is likewise complex with little agreement among reading researchers on a single definition of what reading fluency is (Strecker, Roser, & Martinez, 1998; Zutell & Rasinski, 1991). In its simplest form reading fluency has been defined as the combination of reading accuracy and speed, resulting in a rate that can be expressed in words read correctly per minute (WCPM) (Fuchs, Fuchs, & Maxwell, 1988). Research has indicated that this simple measure can be used as an indicator of overall reading competence and be predictive of reading comprehension ability (Fuchs, Fuchs, Hosp, & Jenkins, 2001).

Modeling of reading skills by adults and peers is probably as old as written language and most parents begin preparing their children for learning to read by reading to them. Siblings and peers who are older or who have advanced reading skills also serve as models. However, for children who are slow to acquire reading skills, or cannot acquire them, observation of skillful models may become a negative as the viewer realizes the growing discrepancy in abilities. Bandura (1997) did extensive research on the importance of the relationship of observer and model to learning. He found that the best models are those closest to the observer in all attributes including ability. Thus, as the discrepancy in skills between poor and good readers increase, the less likely it is that age or grade peers will serve as the most appropriate models. The most appropriate
models for students with learning problems would be those with similar, but slightly advanced skills. However, there is a method that allows for the observer and the viewer to be identical, except for a slight variation in ability: video self-modeling (VSM). Self-modeling is the process of using carefully edited videos to depict an individual performing slightly better or more appropriately than usual (Dowrick, 1999). No other model can be as similar to the observer in all traits and abilities as when the viewer and model are the same person.

Bandura’s (1997) research also revealed the importance of visual imagery to learning. Being able to visualize present and future performance allows one to establish baselines and develop goals. Being able to visualize success is directly related to self-efficacy, belief that a goal can be attained, which in turn is directly related to success. Both video peer and self-modeling provide the viewer imagery of success. However, providing the observer personal imagery of success, as can be done with VSM, may allow for development of stronger beliefs in self-efficacy. Bandura focused on peer and adult-modeling and did not carry out studies on self-modeling. He did, however, recognize the potential in the method. He stated, “Self-modeling has remarkably wide applications and often succeeds with inveterate self-doubters where other instructional modeling, and incentive approaches fail. Apparently it is hard to beat observed personal attainment as a self-persuader of capability (p. 94).” Given that many readers who experience failure lose confidence and self-efficacy (Brophy, 2003; Heward, 2000) it is logical that seeing oneself succeeding at reading, or at least showing improvement, might serve to ameliorate or moderate these effects. Likewise, viewing peers succeeding who are known to the individuals and who are similar in ability might provide the optimal peer-models and produce similar results.
There are several filming and editing techniques that will allow an individual to see slightly better or more appropriate behavior than usual. For example, children can role-play appropriate social behaviors that often present them with problems. If a child can imitate, the prompts associated with the imitation can be removed making it appear the behavior was spontaneous, or clips of oral language production can be combined to produce longer utterances. Children can then watch themselves performing in an advanced manner (Buggey, 2009). Self-modeling has been used effectively to improve language skills (Buggey, 1995; Buggey, Toombs, Gardener, & Cervetti, 1999; Wert & Neisworth, 2003), Math computation (Woltersdorf, 1992), social skills (Bellini, Akullian, & Hopf, 2007; Crandell & Johnson, 2009), and to reduce behaviors such as tantrums (Buggey, 2005) and non-compliance (Creer & Miklich, 1970). However, its use with reading and literacy has been limited.

Researchers with the ACE Reading programs (Dowrick, Power, Ginsburg-Block, Kim-Rupnow, & Manz, 2000), implemented at the Children's Seashore House in Philadelphia and at the Hawaii University Affiliated Program, provided information on the use of VSM to facilitate growth in reading. They used repeated readings, echo reading, and intensive word work on specific passages using flashcards to create personal videos of fluent reading. One of the characteristics of VSM is that only positive imagery is used (Buggey, 2009). Thus, footage in which children faltered in some way was edited out and readings were sometimes repeated during filming until a good example was obtained. Curriculum-based measures were used to assess progress in reading by having students read orally for one minute from passages selected at random from their basal reading program. Students exhibited significant gains in reading fluency. The ACE Reading Program makes use of volunteer tutors as well as self-modeling so attributing
gains to the self-modeling was problematic. In a subsequent study, Dowrick, Kim-Rupnow, and Power, (2006) used a multiple-baseline design across 10 individuals to differentiate the effects of tutoring and self-modeling on reading fluency. A comparison group within the same reading program without tutoring or VSM was also evaluated. While all students made gains in reading across all conditions, the most significant results were seen during the self-modeling phase of the study.

Self-modeling was one part of a three-part intervention to improve oral reading fluency that was investigated by Bray, Kehle, Spackman, & Hintze (1998). A 5-minute video was created depicting 5 students reading fluently. The final video was a compilation of exemplars extracted from footage of the students reading. The researchers also used self-observation of videos: watching unedited 1-minute movies of their reading. The students were also given their fluency scores in words correct per minute (WCPM) which they recorded and used to evaluate progress to preset goals. All of the children made good gains in reading fluency; however, the strength each of the elements (VSM, self-observation, self-monitoring) played in the results was impossible to determine.

Another study that focused on reading was carried out by Ayala (2010). She used VSM to train decoding and word recognition skills with 10 first-grade students. These students were in a tier II remedial program associated with a Response to Intervention school model. The students were filmed correctly decoding words and reading vocabulary words taken directly from their instructional materials. The resulting short movies contained 5 examples of successful decoding and 5 new sight words being read correctly. The students viewed themselves 4 times per week and curriculum-based measures were used to collect performance data twice per week. Several standardized reading tests were used as pre-post test measures. Results showed improvements in both
decoding and word recognition for all participants. Seventy percent of the participants retained or improved their highest scores obtained during intervention and the other 30% maintained scores that were well above baseline. Ayala used nonsense word decoding as a measure of generalization and saw similar improvements.

In the only other study using VSM to facilitate oral reading fluency (Greenberg, Buggey, & Bond, 2002) self-modeling alone was introduced as a supplement to the reading program of 3 fourth graders who were being referred for special education and had reading achievement deficits of more than 2 grade levels. Repeated and echo reading along with sight word work on targeted passages were used until the students exhibited mastery of the passage. Then several videos were taken of the students reading the passages. The best of these were chosen to show to the students. Spikes in curriculum-based measures of reading fluency were seen immediately after viewing their videos. Pre and post reading achievement scores also showed marked improvement. The studies by Ayala and Greenberg and colleagues have not been published in journals. The former was a doctoral dissertation and the latter a masters thesis; thus, the studies concerning the ACE Reading program and the one carried out by Bray and her colleagues remain the only published studies that directly associated self-modeling to reading.

The use of video peer-modeling for reading instruction has also received little attention in the literature, although peer tutoring, which probably contains modeling elements, has been relatively widely researched (e.g. Oddo, Barnett, Hawkins, & Musti-Rao, 2010; Topping, Miller, Thurston, McGavock, & Conlin, 2011). An ERIC search for the terms “peer-tutoring” and “reading” in the title returned 64 documents while none were found in which “peer-modeling” was paired with “reading”. Interestingly, only four documents were found on peer-modeling that were carried out this century. The research
that does exist on peer-modeling appears to be focused on the social development of young children (e.g. Ryalls, Gul, & Ryalls, 2000; Sagotsky, & Lepper, 1982) and teaching skills to children with autism (Charlop, & Walsh, 1986; Wang, Cui, & Parrila, 2011). The term “video-modeling” is more widely used than “peer-modeling” in the autism research; however, analysis of the methodology reveals that peers were used as models in the video in the vast majority of studies. There is also no reference to the term “video-modeling” being used in conjunction with “reading”.

Thus, one must step outside the reading milieu to examine the efficacy of video/peer modeling and to find the few studies that have compared video peer to video self-modeling. Included in this small group of studies were two that attempted to analyze the entire spectrum of studies using at least one of the methods with children with autism. Bellini and Akullian, (2007) conducted a meta-analysis of all forms of video modeling used with children with autism. They identified 16 studies using video modeling and 8 that addressed self-modeling that met pre-established criteria for rigor of design. Their results indicated that both methods produced very positive results in skill acquisition, generalization, and maintenance, meeting the Council for Exceptional Children’s criteria for research-based methods. Almost all of the studies identified for inclusion in this study targeted either social or functional skills. McCoy and Hermansen (2007) completed a review of literature on the two forms of modeling with children with autism which included 27 studies on video modeling and 7 on self-modeling. They concluded that self-modeling produced equivalent or greater results than peer video-modeling.

Studies that have addressed both peer and self-modeling are especially rare. Marcus and Wilder (2009) used a combination multiple-baseline and multiple-element design to compare video modeling and self-modeling to teach the identification of novel
terms to three children ages 4, 9, and 9. They found that VSM was more effective for all of the children with all three successfully meeting goals based on their baseline performance. Only one of the three children met the same criteria when peer-modeling videos were used.

Schunk and Hanson (1989) conducted the only study that did not use a multiple-baseline design and one of the very few that addressed academic skills. They taught fraction skills to 48 children ages 9 to 13 using both peer and self-modeling along with a comparison group that was taught with a typical in vivo, text book form of instruction. They found that both peer and self-modeling produced similar results with both being significantly better than the comparison group. Similar results were obtained by Sherer and her colleagues (2001) in their investigation of teaching responding behaviors to five children with autism ages 4 – 11. A combination multiple-baseline across persons and alternating treatment design was used to evaluate results of both techniques. They found that both methods produced equivalent, positive results. Overall, there appears to be slightly more evidence for self-modeling out-performing peer modeling, but there is not enough research to make a definitive conclusion.

Several questions remain after reviewing the literature. The first is whether peer or self-modeling would actually be effective for reading instruction and/or improving the self-efficacy of struggling readers. Secondly, would one of these methods be more effective than the other. Finally, it would be important to know whether the strength and ease of use of these two methods justify their consideration as primary reading interventions. The purpose of the present article was to expand the limited research-base on video modeling applications with reading and to compare the effects of self and peer-modeling on the reading fluency of struggling readers.
Methods

Participants

Nine elementary-aged students, 2 boys and 4 girls, with an age range of 8 years 7 months to 12 years 1 month, participated in the study. The students ranged from third through fifth grade and received their reading instruction in a special education resource room. Three students from each grade were randomly selected from a group of eighteen special education students who had a primary diagnosis of specific learning disability based on discrepant reading achievement scores. Ages and tests scores for each student are presented in Table 1. Several of the older students had repeated grades.

Table 1

Description of Students

<table>
<thead>
<tr>
<th>Student (Group)(^a)</th>
<th>Age (Grade)</th>
<th>Gender</th>
<th>Cognitive Skills (WISC - 3(^{rd}) Edition)(^b)</th>
<th>Basic Reading Skills (Woodcock-Johnson III)(^c)</th>
<th>Grade Level Reading (Brigance)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annie (VPM)</td>
<td>8-7 (3)</td>
<td>F</td>
<td>87</td>
<td>71</td>
<td>2.0</td>
</tr>
<tr>
<td>Brandy (VPM)</td>
<td>11-2 (5)</td>
<td>F</td>
<td>82</td>
<td>71</td>
<td>3.0</td>
</tr>
<tr>
<td>Rolin (VPM)</td>
<td>9-11 (4)</td>
<td>M</td>
<td>90</td>
<td>72</td>
<td>3.0</td>
</tr>
<tr>
<td>Dusty (VSM)</td>
<td>9-2 (3)</td>
<td>M</td>
<td>97</td>
<td>64</td>
<td>2.5</td>
</tr>
<tr>
<td>Ellie (VSM)</td>
<td>12-1 (5)</td>
<td>F</td>
<td>83</td>
<td>72</td>
<td>3.5</td>
</tr>
<tr>
<td>Lacy (VSM)</td>
<td>10-0 (4)</td>
<td>F</td>
<td>95</td>
<td>84</td>
<td>3.5</td>
</tr>
<tr>
<td>Miranda (CG)</td>
<td>10-11 (5)</td>
<td>F</td>
<td>86</td>
<td>75</td>
<td>3.0</td>
</tr>
<tr>
<td>Roby (CG)</td>
<td>10 (4)</td>
<td>M</td>
<td>93</td>
<td>63</td>
<td>3.0</td>
</tr>
<tr>
<td>Timmy (CG)</td>
<td>9-3 (3)</td>
<td>M</td>
<td>80</td>
<td>66</td>
<td>1.5</td>
</tr>
</tbody>
</table>

\(^a\) VPM – video peer-modeling; VSM – video self-modeling; CG – comparison group

\(^b\) IQ scores
Setting

The elementary school is in a rural mountain setting and includes pre-school through fifth grades with a total of 253 students enrolled. It is a Title I school located in an area where many families receive assistance from the Family Resource Center that is housed on the school property. Clothing and other supplies are made available to those in need. Sixty per cent of the students are included in a free or reduced lunch program. There is a primary resource room for first and second grade students who receive special education services, and an intermediate resource room for students in third, fourth and fifth grade. A full time Title I teacher works with students who do not qualify for special education services, but are at-risk for failure in reading and mathematics.

Procedures

Study design. A multiple-baseline design across participants was used to evaluate the effects of video self-modeling, and video peer-modeling, on the students’ reading fluency. A control/comparison group was also included. Tawney and Gast (1984) suggest this design because of its rigorous experimental control and flexibility. This research design also provides for compatibility between research and instructional practices. Visual inspection of the graphed data as well as analyses of means across phases and conditions were used to evaluate results. The percentage of non-overlapping data (PND) (Scruggs & Mastropieri, 1998) was also calculated to augment and strengthen the more traditional forms of data analyses.

The independent variables were the interventions of video self-modeling, video peer-modeling (VPM), and the typical instruction within the classroom. The dependent variable of reading fluency was used to measure any differences or changes that occurred.
In this study, the multiple-baseline design with comparison group was advantageous, as the continuous monitoring during the study phases occurred in alignment with how other students in the resource setting were progressing with reading fluency (Tawney & Gast, 1984). Comparison groups are not typically employed in multiple-baseline designs; however, in this case the researchers hoped to be able to ascertain what effects, if any, were taking place due to children becoming comfortable with the researcher’s presence and/or the probing process.

There were three phases of this study: (1) Baseline, (2) Intervention, and (3) Follow-up/maintenance. Curriculum-based measurement (CBM) progress-monitoring occurred twice weekly on non-consecutive days for the entire study to determine words read correctly per minute (WCPM). After reading a passage at his or her level for three minutes, the students retold the story and discussed the passage details and main ideas to show comprehension of characters, events and setting (Cambourne, 1988). Each response was checked according to the Running Record form designed by Clay (1988). Responses were scored as being complete, (all passage details included) adequate, (main idea, characters, some events) or limited (few details, omitted characters or setting). This brief retelling was recorded along with the readings for review during assessment and to provide a context for inter-rater reliability. Four questions regarding details of the passage were also asked.

**Equipment/materials.** A digital camcorder was used to film the VSM movies that were subsequently used with the peer-model group. The videotapes were edited using the iMovieHD® software to produce examples of fluent reading. A tripod was used to assure image stability. Sony WCS-999 wireless microphones were used to maximize the sound quality of the recordings. Each reading session was recorded with the use of a
mini-tape recorder. Each student was recorded on an individual mini-cassette, and these recordings of probes were used when examining data. These recordings also provided documentation for inter-rater reliability checks.

A timer was used during each reading probe session. The students were timed for three minutes and the oral fluency rate calculated by subtracting the number of errors from the total number of words read and then dividing words read correctly by three. The three minute readings can give a more accurate WCPM score than a one minute reading due to increasing the amount of data sampled and by minimizing effects related to start-up of the session (Fuchs, Fuchs, & Maxwell, 1988).

**Protocol.** Words read correctly were those pronounced correctly in the context of the passage read. Repetitions, (R) and self-corrections (SC) counted as correct. Omissions, (O) Substitutions (S) or words told (T) were considered errors. When a student paused for more than 3 seconds, s/he was told the word (Shinn, 1989).

**Scoring.** Data were collected using CBM probes to monitor progress of oral reading fluency and comprehension. Fluency norms have been established for grades 1 through 8 from the results of a compilation of studies of oral reading fluency data collected on over 9,000 students from five Western and Midwestern states (Hasbrouck & Tindal, 2006). Probes of 150-500 word passages taken directly from the student’s current reading text were used. Students read one of three different probes at their level on alternate, non-consecutive days, twice weekly. The text for the reading probes was selected from the student’s own instructional level books used in the resource room. Each reading probe was typed onto a separate page, using the OKAPI (2011) probe generator. This provided two print-outs of the text: one for the examiner, which contained the Spache Readability Formula for the passage and a cumulative word count on the right
side of the page, and one for the student which contained no pictures or other illustrations, only text. The probes were placed into grade-leveled notebooks for easy retrieval. This procedure was used consistently during baseline, intervention and maintenance phases of the study.

**Design Phases**

**Baseline.** The students were assessed individually with a running record (Clay, 1988) of their reading to determine each participant’s baseline instructional reading level. This insured that instructional levels of probes were accurate for each student, based on an instructional reading level of 90-95% accuracy. The students recorded their readings with the researcher in a quiet location (the counselor’s office).

Three students from each grade were randomly selected to participate in the study. One of the three grade level peers was randomly placed into the VSM group, VPM group, and comparison group. Video recordings were then made of the students in the VSM group. This was done using a camcorder and microphone, and was edited using IMovieHD® (Apple, 2002) software. A process of echo reading was used whereby the researcher read sentences and the student “echoed”, imitating the expression and accuracy. Any errors made by the student and all evidence of the adult were deleted resulting in a movie of apparent accurate, fluent reading. Additionally, an introduction (“This is _______’s reading movie, starring _____”) was added as well as an ending that had student applause with a still-frame with the words “Good Reading, _____!” Buggey (2009) recommended that an introduction such as this be included to help the participant focus on the salient feature of the movie.

**Intervention.** Two students in fifth grade began Intervention. All other students continued Baseline phase, reading probes twice weekly. Following two weeks of
Intervention (10 viewings of their videos and 4 data points from probes), the second pair (in fourth grade) was introduced to the self and peer-modeling tapes. Research findings indicate that gains from VSM intervention begin soon after initiation. It was deemed necessary to collect the 4 data points during intervention to ensure that any gains were constant. If change was not seen during this time, it was unlikely that further exposure to the movies would make any difference (Buggey, 2009) and moving to the next participant would be appropriate. Likewise, after two more weeks the third pair (in third grade) commenced their intervention of viewing either a Self or Peer-modeling tape for a two week period.

Procedures for the students receiving intervention were as follows: The students viewed their video once daily, their own video if they received Video Self-modeling or their peer’s video of fluent reading if they received peer modeling intervention. Using a classroom peer as the model for the VPM group ensured considerable similarity (age, ability, and culture) between viewer and model as per Bandura’s (1997) suggestions on optimal models. Students viewed the video in the resource room, with no other student present, and wore headphones as they watched the video. When the study was completed, the students in the VSM group were given the copy of their videotape.

**Maintenance.** Here, intervention was withdrawn, and reading probes continued as they had before. The follow-up phase for the third group receiving intervention was necessarily shorter than the others, just as the baseline for the first group was shorter than the other groups.

**Data Collection.** A variety of measures were used to monitor progress. These included:
• Twice weekly curriculum-based measures of reading fluency including comprehension checks in all study phases.

• Visual analysis of continuous measures: data were collected and graphed for each student and reviewed in terms of level (mean), relation to grade level fluency norms (Hasbrouk & Tindal, 2006), and variability (range).

• Percentage of non-overlapping data (Scruggs & Mastropieri, 1998).

• A journal was used to collect unsolicited comments from teachers and students related to the study.

The multiple-baseline design provided the format for evaluating changes from baseline with each phase providing a comparison condition for the next intervention. Reliability was demonstrated when measures changed immediately following each intervention when compared to the previous phase. If no behavior change occurred on other baselines that had not yet received the intervention, the results were strengthened.

**Inter-rater agreement.** Inter-rater agreement was randomly assessed for one-third of all reading probes used during the study. Agreement was evaluated on a word-by-word basis by listening to recorded readings of the curriculum-based probes. Total percentage of error agreement was then calculated for each probe by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100 (Tawney & Gast, 1984). The first author and another trained rater scored each reading sample and a comparison of the scoring of errors, omissions, insertions, and self-corrections was used to determine agreement.

Other information included in the final analysis were comments and observations of the classroom teachers and parents noted in the researcher’s journal which include
telephone conversations and electronic mail messages. These helped to provide a context for overall growth or changes in the participants’ performance of reading fluency.

**Procedural Integrity.** Procedural integrity of administration of probes was monitored through the audiotape recordings of all individual reading probe sessions. Integrity of the process for viewing the video was carried out by direct observation by the primary author.

**Results**

**Treatment Effect**

Results of the study showed that in both conditions, video self-modeling intervention (depicted in Figure 1) and video peer-modeling intervention (depicted in Figure 2), there was an increase in reading fluency between Baseline and Intervention and gains continued or were maintained throughout the Maintenance phases. The comparison group (Figure 3) made slow, continuous gains, but there was no apparent spike appearing for any of the probes. As the data indicate, Lacy and Ellie, who received VSM intervention, more than doubled their reading fluency rate during intervention. Dusty’s gains were not as dramatic, but there was still a mean gain of over 20 words per minute. Gains for the VPM group were also good, similar to Dusty’s gains, but did not approach the gains of Ellie and Lacy. However Rolin made especially good gains between baseline and maintenance with mean improvement of 45 WPM. Analysis of the percentage of non-overlapping data (PND) across students and for both experimental conditions revealed no overlapping data points giving a 100% non-overlapping data score. This indicates a high likelihood that the intervention was effective. Table 2 provides a summary of each participant’s mean fluency scores for the three phases of the
study along with grade level norms based on the work of Hasbrouk and Tindal (2006). These data indicate growth in oral reading rate observed during each condition. This is followed by a detailed description of results for each participant within the modeling groups.

Table 2

*Mean Fluency Scores and Grade Norms Across Phases*

<table>
<thead>
<tr>
<th>Participant (Condition)</th>
<th>Baseline WCPM</th>
<th>Grade Norm *</th>
<th>Intervention WCPM</th>
<th>Grade Norm</th>
<th>Maintenance WCPM</th>
<th>Grade Norm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annie (VPM)</td>
<td>55.5</td>
<td>Begin 2</td>
<td>82</td>
<td>Late 2</td>
<td>75.5</td>
<td>Mid 2</td>
</tr>
<tr>
<td>Brandy (VPM)</td>
<td>50.3</td>
<td>Late 1</td>
<td>71</td>
<td>Mid 2</td>
<td>76.5</td>
<td>Mid 2</td>
</tr>
<tr>
<td>Rolin (VPM)</td>
<td>74.6</td>
<td>Mid 2</td>
<td>100</td>
<td>Late 3</td>
<td>120</td>
<td>Late 4</td>
</tr>
<tr>
<td>Dusty (VSM)</td>
<td>70</td>
<td>Begin 3</td>
<td>95</td>
<td>Mid 3</td>
<td>103</td>
<td>Mid 4</td>
</tr>
<tr>
<td>Ellie (VSM)</td>
<td>45.3</td>
<td>Mid 1</td>
<td>109</td>
<td>Late 3</td>
<td>121</td>
<td>Late 4</td>
</tr>
<tr>
<td>Lacy (VSM)</td>
<td>65</td>
<td>Mid 2</td>
<td>150.25</td>
<td>Late 6</td>
<td>161.6</td>
<td>8+</td>
</tr>
<tr>
<td>Miranda (CG)</td>
<td>58.5</td>
<td>Begin 2</td>
<td>87</td>
<td>Late 2</td>
<td>113</td>
<td>Mid 4</td>
</tr>
<tr>
<td>Roby (CG)</td>
<td>55</td>
<td>Late 1</td>
<td>74</td>
<td>Mid 2</td>
<td>86</td>
<td>Late 2</td>
</tr>
<tr>
<td>Timmy (CG)</td>
<td>27.8</td>
<td>Mid 1</td>
<td>45.3</td>
<td>Late 1</td>
<td>62</td>
<td>Mid 2</td>
</tr>
</tbody>
</table>

*Note: There was overlap in scores between grades in Hasbrouk and Tindal’s data. The scores presented here are based on the first time this WCPM score appeared in the data.*
Figure 1. Graphed Results of Video Self-Modeling Probes.
Figure 2. Graphed Results of Video Peer-Modeling Probes
Figure 3. Graphed results of comparison group probes.
VSM group findings.

Ellie. Ellie was a twelve years one month old female in the fifth grade who read at the third grade level as evidenced by teacher report and achievement test data (see table 2). When Ellie began watching the video recording of herself reading fluently, there was a dramatic increase to a mean score of 109 WCPM with a range from 103 to 117 WCPM. Qualitative information collected tended to confirm the gains as well as document a positive change in attitude. A marked change in Ellie’s over-all demeanor was noted in the recordings following her first viewing of the VSM movie. She asked if she could show her mother the video and looked forward to taking it home at the conclusion of the study. Also, Ellie’s teacher called the first author after school on the day of Ellie’s first viewing and stated emphatically, “it was “like the oxygen had been turned on”. Some changes that were written in the teacher journals went beyond academics. Ellie’s teacher wrote that her appearance and attention to hygiene improved markedly in relation to viewing her video. She also stated that the three 5th grade girls were rivals, often bickering and causing classroom disruptions. Following the intervention the teacher noticed a dramatic, positive change in this behavior among all 3 participants.

Lacy. Lacy was a 10 year-old female in the fourth grade who read at the third grade level from teacher reports. This was confirmed with achievement test information. Lacy was quiet though very interested in participating in the study. She entered the room briskly and quickly focused, eager to see the text. Lacy exhibited the most gain by any of the participants. During the probe sessions, Lacy was talkative and appeared excited to be reading well. Lacy continued to perform very well in the comprehension checks of the probes during this phase. Twice, she asked if she might finish the story after the 3-minute timer sounded.
**Dusty.** Dusty was a nine years two months old boy in the third grade. Dusty’s teacher rated his reading skills at the middle first grade level at the beginning of the study. Achievement tests scores indicated that the reading level was slightly higher. Curriculum-based measures indicated a mean increase of 25 WCPM during intervention and another 8 WCPM in maintenance. Also noted at the intervention phase, was his interest in reading and ability to self-correct his errors. During review of recordings of his intervention reading probes, Dusty was audibly more expressive and emphatic. For example, in a deep voice: “ME, TIRED? said Father Bear. I am NEVER TIRED!”

**Video Peer-modeling Group.**

**Annie.** Annie was an eight years, six month old girl. Annie’s teacher rated her reading skills as a year below her third grade level at the beginning of the study which was accurate when compared to achievement test data. Annie consistently scored high on the retellings and comprehension checks during all phases. Data collected during maintenance indicated that Annie retained much of the reading skills she had achieved during intervention, although measures of reading fluency decreased from a mean at intervention of 82, to a mean of 75.5 at follow-up, well above her baseline mean score of 55.5. Annie was the only participant whose reading rate scores decreased during maintenance. The classroom teacher reported changes in Annie’s behavior noting that she was eager to read to her. This was not the case prior to intervention.

**Rolin.** Rolin was a nine years eleven months old male in the fourth grade who read at the third grade level. Rolin had often exhibited behavior problems in the general education classroom and sometimes refused to do required work. When the study began, he claimed he “did not want to read”. During baseline comprehension checks and
retelling of the story passages, Rolin responded accurately indicating he had good understanding of what he had read. On the first day after intervention had begun the researcher noted a marked change in Rolin’s interest to participate. He was in a hurry to get to his chair and begin reading. He performed well and seemed aware of his progress. This behavior continued throughout the intervention and maintenance phases.

**Brandy.** Brandy was an eleven years two months old female in the fifth grade, reading at a beginning third grade level. Brandy was hesitant during baseline and appeared unsure of herself. Audio-recordings of the probes revealed her soft-spoken responses. Comprehension checks were accurate and her retellings were complete. Brandy was eager to begin the reading probes throughout the intervention phase, and audio-recordings of the sessions contained increased volume and expression in her reading. The researcher noted on the day immediately following the onset of VPM intervention, Brandy asked the researcher if she might continue reading the passage after the three-minute timer sounded and appeared pleased with her recognition of her increased ability to read the passage well.

The gains made by Lacy and Ellie in the VSM group were unexpected and impressed teachers and parents. Both the classroom teacher and special education teacher commented that there was an “enthusiasm” that generalized to classroom performance as they observed changes in the VSM participants’ attitudes toward other classroom work. Inspection of journal entries indicated that the special education teacher noted an especially dramatic increase in effort, interest, and ability in the students after they had viewed their self-modeling movies. She was curious to know why watching a videotape of their reading would have an effect upon their math performance, for example. The
teacher also asked if video-self-modeling might be used with other students after the
study was concluded.

Qualitative data taken from teacher journals also indicated positive changes for
students in the peer-modeling group especially directed to the reading process. Rolin
seemed to generalize the positive attitude gains to other areas of academics and behavior.
Classroom behaviors of all 3 of the 5\textsuperscript{th} grade girls irrespective of groups changed for the
better.

**Social Validity**

Social validity was not measured formally because the importance of reading
fluency in school performance is universally accepted. However, teacher comments from
journals underscored that the results obtained were very important and relevant to school
success.

**Comprehension checks**

All participants correctly answered at least 3 of the 4 comprehension questions
associated with each probe and scored at least “adequate” on the retellings at all phases of
the study. As the students began to repeat the reading of a specific probe their responses
improved and by the end of each follow-up phase, all were getting 4 of the 4 questions
correct and the retellings were almost always “complete”. Because all of the students did
so well during baseline there was little room for improvement here.

**Procedural Integrity**

Analysis of audio recordings indicated that administration of probes was done
consistently. The showing of the videos occurred at the same time each day without
discussion except for an initial prompt by the teacher. The first author was present for
most of the viewing sessions.
Inter-rater Reliability

Inter-rater agreement was randomly assessed for one-third of all reading probes of the study participants. Both observers were trained in curriculum-based measurement of reading and in completing running records. The audio recording of all sessions allowed for repeated listening if raters had questions. The total percentage agreement was calculated for each reading probe by dividing the number of agreements per passage by the number of agreements plus disagreements and multiplying by 100. Inter-rater agreement measures ranged from 90% to 98% with a mean of 96% indicating a high degree of reliability of observation.

Conclusion

The use of video self- and peer-modeling improved the oral reading fluency of 6 children diagnosed with specific learning disabilities as measured in both quantitative and qualitative terms. The use of self-modeling with two of the students produced results that outstripped all of their peers by a considerable amount. Positive changes in attitude and demeanor were seen in both experimental groups when the videos were introduced.

Discussion

While it is obvious from visual inspection of the graphs that students performed better during intervention than baseline, the short baseline period for the first two participants in the video modeling groups and an upward trend in fluency during baseline make definitive statements about the results somewhat problematic. Three factors that might support video modeling as the agent of change were the teacher reports of improved attitude and performance, the leveling off of gains seen when the video modeling ceased, and contrasts made with the comparison group that made slow but steady gains. Regarding the last point, there were no indications of spikes in scores that
could be attributed to growing comfortable with the evaluator or the evaluation process. Changes in the intervention phase for the peer-modeling group could be interpreted as a continuation of gains seen in baseline; however, the slope of the gains was accelerated.

It is not clear whether the positive effects seen with self-modeling arise from viewing new skills, improved self-efficacy, or some combination of both (Buggey, 2009; Dowrick, 1999). Skills instruction was not a part of the intervention in this study. The students may have picked up changes in prosody and other pragmatic aspects of reading during the echo reading used for the videos; however, these sessions were very short in duration lasting at most 15-minutes. It could be postulated that improved confidence or self-efficacy was behind the improvements seen. This is supported by the qualitative information gathered from teachers and, to a lesser extent, from parents. Improved confidence and attitude was especially noted with the VSM group; however, it was also seen with the VPM students. Seeing images of personal success may have provided evidence that success was possible for the VSM group. Likewise, the viewing of peers with similar ability succeeding may have given students in the VPM groups more confidence. With no instruction occurring, changes in self-efficacy may be the only explanation for the changes seen.

In general this study may offer small indicators of importance in two directions. The first is that video modeling, possibly more-so with self-modeling, may represent a valid form of intervention in the area of reading. The second is the importance of self-efficacy. In this study viewers were presented evidence either that “they can” or that “their classmate can”. Both seemed to result in gains in fluency without specific instruction. The peer models viewed in the study would be considered by Bandura (1997) to be close to optimal models. They were age-matched, similar in ability, and functioned
in the same school environment. However, Bandura’s research did not address the modeling of reading. It would be interesting to compare the results of similar versus dis-similar models to determine if Bandura’s findings generalize to reading.

The results with Lacy and Ellie were similar to the results obtained by Greenberg, Buggey, and Bond (2002) with struggling readers in the fourth grade. Results in both studies were dramatic and immediately noted by teachers. It would appear that viewing images of success has the potential to unlock confidence that enables immediate and substantial improvements in performance on reading assessments. Put in the context of children developing learned helplessness as a result of school failures (Brophy, 2003), it would seem that seeing personal success may counter the negative effects of repeated failure. There may be evidence to support this last supposition. Margiano, Kehle, Bray, Nastassi, and DeWees (2009) found that students with emotional disabilities not only learned new behaviors with the use of self-modeling, their memories of the former maladaptive behaviors were much diminished. These results are very preliminary and need replication; however, if substantiated it would mean that not only would improvements be seen in self-efficacy, the negative effects of prior failure might be minimized. The possibility that performance on measures of reading could improve simply by viewing success has significant ramifications and should be pursued in further research. Likewise, if repeated failure can suppress reading scores to a degree well beyond what would normally be expected due to slow development of reading skills, it behooves educators to head off, or work to correct these negative effects. Although both peer-modeling and self-modeling could be used to this end, Bandura’s modeling research and the results in the present study indicate that self-modeling would probably be the most effective.
References


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