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Title: Video Self-modeling as an Intervention  
With a Preschooler With Language Delays

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Abstract

Researchers have studied learning from modeled behavior for some time. The more *like the individual* the model was perceived to be, the more effective the results. It may be logical to assume that if an individual were to observe him/herself being successful at a task, self-efficacy would increase. This appears to be the case in this study, in which Video Self-modeling was used with a preschooler with language delays.

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Abstract

Researchers have studied learning from modeled behavior for some time. The more *like the individual* the model was perceived to be, the more effective the results. It may be logical to assume that if an individual were to observe him/herself being successful at a task, self-efficacy would increase. This appears to be the case in this study, in which Video Self-modeling was used with a preschooler with language delays.

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Video Self-modeling as an Intervention With a Preschooler  
With Language Delays

Researchers have studied learning from modeled behavior for some time. Researchers have found that a person's perceived chance of success will have a direct impact on the individual's ability to learn a behavior (Bandura, 1982, Hosford, 1981). Bandura called this *self-efficacy*. He proposed that higher self-efficacy is what caused a person to attempt a new learning task and suggested principle sources of increasing self-efficacy: a) enactive attainments, b) vicarious experiences, c) verbal persuasion, and d) by altering how one perceives one's own physical state. In other words, a person has a greater chance of learning a behavior and gaining a perception of self-competence, when s/he perceives a greater chance of success or self-efficacy. Bandura's first method of increasing self-efficacy is what he has called "Enactive Performance" (p.126). Enactive Performance in this context means that a person actually experiences performing the learned behavior successfully. Self-competence is proven through self-performance. Thus, successful performance has a positive impact on self-efficacy.

Bandura's second principle of increasing self-efficacy is what he called "vicarious experience" (Bandura, 1982, p.

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126). He went on to say this is accomplished through modeling and asserted that the more *like the individual* the model was perceived to be, the more effective the inculcation of high self-efficacy (Bandura, 1982;). It would be reasonable to conclude from this that peers would make better models than adults. Researchers at the Merrill-Palmer institute in Detroit found this to be true (Ryalls, Gul, & Ryalls, 2000). Extrapolating Bandura's, Hosford's, and Ryalls' research on increased similarity of models, it may be logical to assume that if an individual were to observe him/herself being successful at a task, self-efficacy would increase.

Bandura's third principle of increasing self-efficacy, "Verbal Persuasion", is usually effective only when a person's self-efficacy is fairly high already (Bandura, 1982, p. 127).

Bandura's fourth principle of increasing self-efficacy is called "Physiological factors". These are factors such as fatigue, excitement, anticipation, or fear that effect self-efficacy. The actual factors do not produce higher or lower self-efficacy, but rather it is the individual's perception of these factors and what they mean to the individual that become the influencing factors on self-efficacy. Bandura postulated that self-efficacy served as a key component of motivation and subsequent success (Bandura, 1982, p. 127). Since Bandura's publication of

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this hypothesis in Self-Efficacy Mechanisms in Human Agency in 1982, other research findings have supported this position (Buggey, 1995; Clare, Jenson, Kehle, & Bray, 2000; Dowrick & Dove, 1980).

An obstacle associated with using persons as their own models is how to arrange a situation where they are performing or appear to be performing in a more advanced manner (Buggey, 1999). The technology available to those who work with children has expanded to include ready availability of videotaping. Videotaping allows for a new approach to matching similarity of the model with the subject. Three methods of videotaping have been used to enable the subject to be used as the model: a) the subject can role-play a target behavior (Creer & Miklich, 1970); b) rarely performed tasks can be condensed to appear to have occurred in a shorter period of time (Buggey, Toombs, Gardener, & Cervetti, 1999); or c) hidden supports may be used to enable the subject to perform a given task and then edited out creating the illusion that the subject performed the task without support (Dowrick, 1983). In this way, videotaping allows the subject to be the model. This method of self-modeling has been used in many research projects and is referred to as Video Self-modeling, or VSM (Bray, Kehle, Spackman, & Hintze, 1998; Buggey, 1999; Dowrick & Raeburn, 1995).

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## History and Properties of VSM

Video self-modeling is an intervention procedure using video vignettes captured using the video camera and edited to include only the positive target behavior. The subject, as the self-model, repeatedly views this two to four minute video clip in order to learn the target behaviors. It is often referred to as *feedforward* because it shows the subject as s/he could be in the future (Dowrick, 1999). The first instance of self-modeling occurred in the 1960's at the Denver Asthma Center, where two psychologists, Thomas Creer and Donald Miklich, having considered the learning theory proposed in Bandura's then recently published book (Bandura, 1969), decided to use a patient with problematic behavior as a self-model. The patient, Chuck, was videotaped role-playing himself engaged in positive behavior. No change in behavior occurred during the taping process, but change did occur as Chuck repeatedly viewed the tape of the positive behavior. (Creer & Miklich, 1970) This was the first article to use the term *self-modeling*.

During the same time period, Ray Hosford, from the University of California at Santa Barbara, was developing a counseling intervention technique using *self-as-model*. His influence on his graduate students' theses produced a number of studies using self-as-model (Hosford & DeVissor, 1974; Hosford, Moss, & Morell 1976; Hosford & Polly, 1976; Hosford & Johnson 1983).

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Peter W. Dowrick, inspired by Bandura and the research works mentioned above, became interested in videotaping as an intervention and conducted research on video feedback (Dowrick, 1977; Dowrick, 1991). Video feedback includes all performed behavior, both negative and positive. Dowrick found mixed results with the use of video feedback. The video images that were viewed as negative by the subject were less than therapeutic. As a result of this research, Dowrick focused on structuring video feedback to include only those examples of positive behaviors, which may have occurred rarely, but had been condensed through video editing to appear to be occurring more regularly. This technique is referred to as positive self-review (Dowrick, 1991). This technique was broadened to include skills that the subject had never performed. By taking the component parts, and editing them in a new sequence, it appears the subject is performing the target behavior. For example, Dowrick and Raeburn (1995) conducted a study of 18 children who had some type of physical handicap. One of these children was Shirley, a 6 year-old girl with mild cerebral palsy. Shirley could walk fairly well on flat surfaces, but had difficulty stepping over obstructions of even 1 to 2 cm. This presented problems for her in terms of being able to navigate stairs and curbs. Shirley had made little progress on improving this skill over the previous six months of traditional therapy. A feedforward videotape was

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created in which Shirley navigated a constructed obstacle course. Since she needed assistance when she stepped over an obstacle, her pathologist provided support, while the camera operator was careful to catch only Shirley on the tape. Through the process of editing, Shirley's best performances were selected to create a two-minute videotape that showed Shirley walking smoothly through the obstacle course without hesitation or assistance. After watching this tape 3 times per week for two weeks, Shirley was able to navigate an obstacle course without hesitation, stepping over obstacles that were 6cm. high. Even more encouraging was the generalization that occurred. Shirley was able to navigate curbs and stairs in the natural environment. This method of video use has come to be known as *feedforward* (Dowrick, 1977), because it is a preview of the subject's skills as they could be in the future. While it may present some obstacles when trying to create a video of a child performing skills s/he has never done, it may be preferable to using another model for the target behavior. The use of oneself may be more effective than observing someone else as a model of behavior because it reinforces belief in personal capability and increases the attention given to the modeled behavior (Bandura, 1997).

Dowrick examined two other subtle underlying interventions that are utilized in the above example and are parallel to interventions used outside of VSM. The

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first is the related self-image created in the mind of the subject as an intervention for learning a target behavior. This method involves rehearsing the target behavior in the mind, also referred to as *mental-rehearsals*. In studies done with *mental-rehearsals* alone, Dowrick (1999) states the mental rehearsals had "positive but modest effects" (p.24) and were found to be "less vivid and reliable" (p.24) than video images. Certainly the *mental-rehearsals* Shirley experienced by watching the tapes were vivid-- she could see her self-competence-- and reliable; she succeeded every time. Dowrick also examined the related intervention of *picture prompts*. Used as a separate intervention, *picture prompts* consist of a series of pictures of self or a model performing a target behavior. For example, if the target behavior was brushing teeth, the pictures set might include a picture of getting down the toothbrush, getting out the toothpaste, putting toothpaste on the toothbrush, brushing teeth, rinsing the toothbrush, rinsing the mouth, and putting the toothbrush and paste away. In the case of Shirley, the series of pictures were video clips that showed her approach to an obstacle, her knee bending, her foot stepping over the obstacle, and her continuation forward with the other foot. These pictures didn't just happen by accident. This was a planned use of *picture prompts*. The planning stage of VSM actually included a plan

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of clips needed to model the target behavior. This preplanning tool is called the storyboard.

The early research carried out by Dowrick and others laid the groundwork for the terminology and methods that would be used in later research using VSM. Researchers have slowly widened the scope of behaviors addressed by VSM. These have included sports, physical education, and motor acquisition; counseling, relational issues, and behavioral issues; self-help and vocational skills; academic skill acquisition; and language acquisition.

#### Application of VSM

According to Dowrick (1999), VSM can be most effective when used for a) increasing adaptive behavior currently intermixed with non-desired behavior, b) transfer of setting-specific behavior to other environments, c) hidden supports for disorders that may be anxiety based, d) improved image for mood-based disorders, e) recombining component skills, f) transferring role-play to the real world, and g) engagement of a disused or low frequency skill.

The application of VSM is being utilized in this study to determine whether or not this intervention would be effective for increasing the low frequency use of plural -s and transfer of this skill to the real world and if an

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increase in this skill would have the indirect effect of increasing the mean length of utterance (MLU).

### Method

#### Participant

The participant, Kacy, is a 54-month-old female. While all fourteen grammatical morphemes are present in her baseline language sample, the use of plural -s is used with low frequency and has been targeted for VSM intervention.

#### Case History

Kacy has a history of ear infections and associated intermittent hearing loss. Kacy was first evaluated in a rural Infant Program in March of 2000 when she was twenty-five months old. She was evaluated using the *Preschool Language Scale-3(PLS-3)*. Her scores are recorded in Table 1.

**Table 1-** Preschool Language Scale Performance Age 25 months

Area	Standard Score	Percentile Rank	Age Equivalent
Auditory Comprehension	105	63	27 months
Expressive Communication	83	13	20 months
Total Language	93	32	24 months

Her receptive language was within normal limits, while her expressive language showed a slight delay. An articulation screening was not possible as Kacy refused to

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imitate the pathologist's requests to imitate phrases. At this point it was recommended that Kacy be reevaluated in 5 months.

Kacy was reevaluated in August of 2000 at age 31 months old. She was again given the *PLS-3* and received the scores recorded in Table 2.

**Table 2-** Preschool Language Scale Performance age 31 months

Area	Standard Score	Percentile Rank	Age Equivalent
Auditory Comprehension	92	30	29 months
Expressive Communication	79	8	25 months
Total Language	84	14	28 months

As a result of this evaluation it was recommended that Kacy be enrolled in an infant program. She was enrolled and was given a developmental evaluation in September of 2000 at age 32 months. All other areas of development fell within normal limits. Kacy's mother was counseled regarding language stimulation at home.

When Kacy turned three in January of 2001, she was enrolled in the county's Special Education Preschool. At that time she was given an *Imfermal Assessment* and showed a mild delay in grammatical morphemes of plural *-s* and past tense *-ed*. She was also given a *Goldman-Fristoe Test of Articulation* and was fronting /td/ for /kg/. The *Batelle*

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*Developmental Inventory* given determined other

developmental skills to be within normal limits. The language goals that resulted on her IEP included 1) Increasing mean length of utterance to 5+ words, 2) Use of plural -s, 3) Use past tense -ed, 4) Answer wh-questions appropriately. Her prevocational goals included 1) attending to task, 2) following rules to simple games, 3) complying with authority. Kacy worked on these goals for the rest of that school year and returned to preschool the following fall. An interview with her speech-language pathologist in May of 2002 indicated that Kacy is working on those same goals.

### Setting

Because the preschool closed for the summer, the study was home-based and took place in a variety of home settings including Kacy's bedroom, outside, and at the dining room table. Both the construction and viewing of the self-modeling videotape took place in her bedroom. The free play language samples were collected in a variety of settings with a freestanding microcassette recorder. The original plan was to use a fannie pack housing for the tape player and a microphone wire. This plan was abandoned because of Kacy's resistance to wearing the fannie pack.

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## Design

This study was an ABCD design.

*Baseline Data.* In May of 2002, at age 54 months, baseline data (A) were collected over three sessions where Kacy was engaged in free play. The recorded language samples were transferred from microcassette to a computer using *Sound Forge*. An analysis of mean length of utterance and grammatical morpheme usage was completed using the first one hundred utterances. Kacy's mean length of utterance was 3.27, which falls within an age equivalency range of 35-38 months (Retherford, 2000, p. 111). Kacy used all 14 grammatical morphemes. Within obligatory context, Kacy showed mastery (90% or higher) of the use of *-ing*, *in* and *on*. Her use of plural *-s* in obligatory context dropped to 38% for an age equivalency range of 24-41 months. As indicated in the interview with Kacy's SLP, these findings were consistent with her present level of performance for Kacy. Since the school year was coming to an end and Kacy would not be receiving services over the summer, this eliminated the potential confounding effects of other interventions such as language therapy or preschool attendance. For these reasons, this grammatical morpheme was targeted for VSM intervention.

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Each of the three baseline language samples (A1, A2, and A3) was transferred from microcassette to a computer using *Sound Forge* and was examined independently. The percentage use of plural *-s* in obligatory context was recorded separately for each sample to obtain three separate scores: 38.4%, 44%, and 42% plural usage respectively. The summary for all of the language samples may be viewed in Table 1.

## Videotape Construction

Following the baseline sample collection, Kacy was videotaped imitating singular phrases and contrasting plural phrases. This presented some problems because Kacy is resistant to the practice of imitating. After the researcher set the scene as playing movie director and actress, Kacy cooperated and imitated the phrases. She held up an item and repeated, "This is one car", followed by imitating the phrase, "These are three cars." In some cases, the same phrase was repeated several times to capture the plural usage. Ten items were taped in this way. The tape was then edited to show Kacy's best examples. When Kacy had been asked if she wanted to make a movie to help other children learn, she had stated that she wanted to be

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on Sesame Street. To capture her attention and interest,  
the edited tape opened with a few bars of the Sesame Street  
Song and a picture of Big Bird. Kacy saw and heard the  
words: "Here is Kacy! She is doing a good job of showing us  
one and more than one." It was problematic to label the  
skill being targeted. Kacy did not know what an "s" is,  
therefore the skill could not be described in this way.  
Instead, the natural form of the plural in context  
contrasting it with singular use was depended upon. The  
leader was followed by the positive exemplars. The  
exemplars were separated by three seconds of blue-field. In  
other words, Kacy saw and heard herself say, "These are 3  
cars," followed by 3 seconds of silent blue field. The blue  
field was added to separate the phrases. However, half way  
through the first viewing, without being told to do so,  
Kacy used this 3-second interval to imitate what she had  
just heard on the tape. This continued through most of the  
subsequent viewings.

#### Return to Baseline

The next two sessions were spent collecting language  
samples to determine if the creation of the tape had  
effected her use of plural -s. Both of the language samples  
were transferred to the computer. The first sample (B1)

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showed an increased use of plural -s to 63.6% with a return to baseline (B2) of 40.7% in the second session. After the return to baseline, the intervention began.

#### Intervention

Kacy watched the created video twice per day, three days per week for a total of 5 sessions, at which point she scored 100% usage of plural -s in obligatory context. This placed her within the mastery range of ninety percent or greater (Retherford, 2000). The edited tape was one minute and 6 seconds long. This translates to a total intervention time of just over 10 minutes. To determine generalization effects, language samples were collected during free play on each day Kacy viewed the tape (C1,C2,C3,C4,C5). The recorded language samples were transferred from microcassette to a computer using *Sound Forge*. After reaching mastery, the viewing of the tape was discontinued and language samples were collected once per week for two weeks as follow up (D1, D2). The first one hundred utterances were used to obtain the new mean length of utterance (MLU) and plural obligatory usage.

#### Language Sample Analysis and Interrater Reliability

Language samples were taken at each step of the study. They were all taken while Kacy was engaged in free play

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activity. They were all transferred to computer using *Sound Forge*. The use of this software allowed for a visual image of the sound waves. Because the ending sound of -s can be difficult to hear, the visual images were helpful in determining when the sound was being used. Three raters, the researcher, a speech/language pathologist (SLP), and a sound technician, listened to the language sample independently of each other. The sound technician was used because of his familiarity with the software and his trained ear. Interrater reliability was determined by calculating the percent agreement per utterance, adding, and dividing by the total to find the average. The reliability ranged from 86.4%-97.3%. The results can be viewed in the Table 3.

**Table 3.** Summary of Obligatory Use and Interrater Reliability

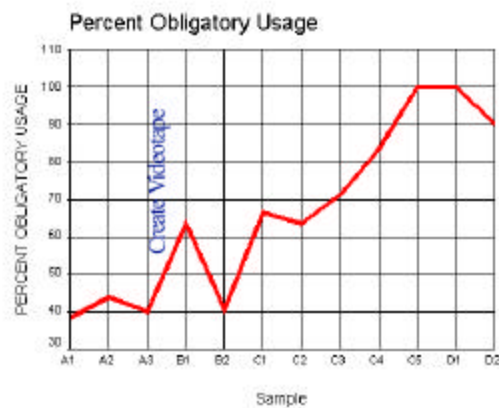
Sample	Obligatory Use	Interrater Agreement
A1	38.4%	97.3%
A2	44.0%	92.4%
A3	40.0%	100%
B1	63.6%	93.8%
B2	40.7%	96.2 %
C1	66.6%	95.1%
C2	63.6%	93.8%
C3	71.4%	95.1%
C4	83.3%	94.3%
C5	100%	93.2%
D1	100%	96.2%
D2	90%	86.4%

A=Baseline, B=Return to Baseline, C=Intervention D=Maintainence

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## Results

Kacy's use of plural *-s* improved from 38.4% at the beginning of the study to 100% during maintenance. Kacy's mean length of utterance (MLU) increased from 3.27 to 5.65, which is an age equivalency of 51-67 months. Kacy is now 56 months old. Her use of plural *-s* and her MLU is age appropriate.



Both Kacy's mother and grandmother remarked they had seen an improvement in Kacy's talkativeness.

## Discussion

According to Leonard, (1998), imitation and modeling are powerful interventions in remediation, with imitation having the advantage. Self-modeling and imitation were combined through the use of video self-modeling. Kacy has been somewhat resistant to imitation in language therapy sessions, as reported by her current language pathologist.

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It is possible the gains shown in this study are due to Kacy's willingness to imitate herself as she viewed her videotape.

Of concern is the single language sample collection for the return to baseline. Additional samples would have yielded greater stability.

An additional concern is the one-on-one attention Kacy has been given by the examiner as a possible confounding influence during this study. Kacy has been receiving one-on-one language therapy for the past two years. The one-on-one attention utilized in her traditional language therapy sessions failed to produce change. Her traditional language therapy sessions occurred over two years with a schedule of 30-minute sessions twice per week. The sessions were pathologist directed and included direct remediation efforts. In contrast, the video self-modeling intervention was three times per week, for approximately five weeks, with no direct remediation efforts made by the examiner. It seems unreasonable to conclude that the one-on-one attention given by the examiner had a confounding effect on the outcome.

An obvious limitation is the sample size of one subject. This study can be used only as a descriptive analysis of the use of video self-modeling in this one

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particular case study. Video self-modeling as an effective  
intervention with preschoolers with language delays will  
need more study before conclusions may be drawn.

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