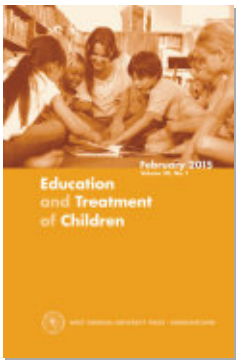
Evaluating the Utility of Commercial Videotapes for Teaching Hand Washing to Children With Autism



Nancy E. Rosenberg, Ilene S. Schwartz, Carol A. Davis

Education and Treatment of Children, Volume 33, Number 3, August 2010, pp. 443-455 (Article)

Published by West Virginia University Press
DOI: 10.1353/etc.0.0098

EDUCATION AND TREATMENT OF CHILDREN Vol. 33, No. 3, 2010

Evaluating the Utility of Commercial Videotapes for Teaching Hand Washing to Children With Autism

Nancy E. Rosenberg, Ilene S. Schwartz, & Carol A. Davis
University of Washington

Abstract

We evaluated the effects of using a commercially available video model to teach three preschoolers with autism to wash their hands. While one child learned 80% of the hand washing steps, 2 of the 3 children did not learn from the commercial model. All were subsequently exposed to a customized video model, which resulted in at least some acquisition of the skill for the two students who did not learn from the commercial model.

DESCRIPTORS: autism, adaptive skills, daily living skills, hand washing, video modeling

Video modeling is an instructional strategy in which a child watches a model perform a target skill on video and then practices the skill. A substantial research base supports the effectiveness of video modeling for teaching children with autism a variety of skills including communication skills (e.g., Charlop & Milstein, 1989; Sherer et al., 2001), daily living skills (e.g., Shipley-Benamou, Lutzker, & Taubman, 2002), play skills (e.g., D'Ateno, Mangiapanello, & Taylor, 2003; Taylor, Levin, & Jasper, 1999), social interaction skills (e.g., Nikopoulos & Keenan, 2003), and perspective taking (e.g., Charlop-Christy & Daneshvar, 2003; LeBlanc et al., 2003).

In addition to its demonstrated effectiveness, video modeling may have other compelling advantages over other teaching strategies. Charlop-Christy, Le, and Freeman (2000) showed that the video modeling resulted in faster acquisition of skills and was more cost effective than live modeling. Video modeling has also has been shown to promote generalization and maintenance of the skills taught (Haring, Kennedy, Adams, & Pitts-Conway, 1987; Charlop & Milstein, 1989) and to result in superior skill generalization compared to live modeling (Charlop-Christy et al., 2000). Some authors suggest that children with autism often enjoy video modeling and that the predictability and the avoidance of face-to-face social interactions when watching

Correspondence to Nancy Rosenberg, Experimental Education Unit, 4500 15th Ave. NE, Box 357925, Seattle, WA 98195. 425-898-8416. Email: nancyr@u.washington.edu.

videos may contribute to the reinforcing nature of the experience (Corbett & Abdullah, 2005; Charlop-Christy et al., 2000).

Despite these documented and potential advantages of video modeling and the large body of research showing its effectiveness, it has been our collective experience that video modeling is not widely used in public school environments. One potential obstacle to the use of video models may be the equipment and expertise necessary to make the video for the targeted skill. Although most schools and homes have the equipment to play a video recording, creating an appropriate video for the purposes of video model requires access to video recording equipment (i.e., camera) and the equipment and knowledge for editing the video footage and transferring it to an appropriate medium.

Obstacles associated with equipment and technical expertise can be circumvented by the use of commercially available video models of commonly taught skills. Several commercially produced video models are currently available on the Internet and are specifically targeted towards educational services for children with autism (e.g., http://www.special-kids.com/video.cfm, http://www.watchmelearn.com). However, no empirical evaluations of the effectiveness of commercially available video models currently exist. Previous video-modeling experiments have generally reported using custom made video models created specifically for the children in the studies (Charlop-Christy & Daneshvar, 2003; LeBlanc et al., 2003; Taylor et al., 1999). A commercial video might differ from custom tapes in important ways such as limited similarity between the model and the learner and depiction of different materials or setting than those available to the learner, among others. This study investigated the effectiveness of a commercially available video model for teaching children with autism a hand washing chain.

Methods

Participants

Three boys aged 3 to 5 years who were diagnosed with autism participated. The participants attended a half-day integrated preschool and an extended day program for children with autism spectrum disorders (ASD). Selection criteria included a diagnosis of autism, basic imitation skills, and absence of hand-washing skills. Although it was not a selection criterion, all three of the children were reported to enjoy watching videos by both teachers and parents. All three boys had Peabody Picture Vocabulary Test – Third Edition (Dunn & Dunn, 1997) age equivalence scores below 1.9 years indicating significant receptive

language delay. None of the three actively sought out or engaged with toys during unstructured time.

Charlie was 5 years, 2 months and functionally non-verbal, though he was learning to use an augmentative communication device. His receptive language was limited to simple commands. Charlie imitated gross motor actions and object actions on command. He never spontaneously imitated motor actions though he sometimes imitated peers' loud vocalizations. He could independently complete most classroom routines and transitions.

John was 4 years, 1 month and had emerging verbal skills in the form of single- word requests and a few two-word phrases. John could follow simple 1-step directions and could imitate motor and object actions on demand, but did not spontaneously imitate peers. John required prompting for most classroom routines.

Aaron was 3 years and 11 months. He could follow simple commands in context and imitate gross motor and object actions during direct instruction, but did not imitate peers or adults spontaneously. Aaron was not using language functionally to request or label, but he would script from videos in front of mirrors, reciting the dialog and sometimes acting out the actions. Aaron could follow classroom routines and transitions independently.

Setting

The participants attended a daily university-based, half-day integrated preschool with a 1.5-hour extended day program for students with ASD. This study occurred during the children's extended day program, which typically consisted of intensive discrete trial based intervention with a 1:2 adult to child ratio. Charlie and Aaron attended one extended day classroom while John was in a second classroom. Videos were viewed in a 11.5 ft x 9.5 ft room near one of the classrooms. The room contained a table, several child-sized chairs, and a 14-inch television with a built-in VCR. The television sat on the table directly in front of the seated child. The room also contained shelves with children's games that were used for other purposes.

Hand washing probes occurred in bathrooms used by all students including the three participants. The bathroom for Charlie and Aaron was down the hall from their classroom while John's bathroom was connected to his classroom. Generalization probes (across persons) occurred in the same bathrooms while probes for generalization across settings and persons occurred at the classroom sink for Charlie and John and in another school bathroom for Aaron. One-month maintenance probes occurred at school-based summer camp for John (bathroom in same school) and Charlie (different school) and in the same bathroom that was used during intervention for Aaron.

Materials

Commercial video. The commercially available video was from a series called "Special Kids," which is described by the creators as a "video modeling therapy program" for "children and teens with all types of developmental, cognitive and learning disabilities" (http://www.special-kids.com/video.cfm). Though general video modeling literature is cited on the website (Charlop-Christy & Daneshvar, 2003; D'Ateno et al., 2003; Kinney, Vedora, & Stromer, 2003; Wert & Neisworth, 2003), no experimental examinations of the effects of these particular videos are cited. Hand washing appears on several of the videos in the series but the "Day at School" segment was chosen as the best match for the study environment. One 25-second model of appropriate handwashing was selected from the 40-minute video. The model was a male child, approximately 8 years old, who is shown walking into the school and washing his hands. No verbal narration of the steps is provided in the tape; however, several admonitions are given: "always remember to wash your hands when you're done" and "and don't forget, dry those hands." In addition, the words "Wash" and "Dry" appear in the tape when the model is performing these actions.

Customized video. The researchers made customized tapes for each of the three participants ranging from 35-47 seconds in duration. Each child's tape included a familiar child as model. Two of the participants had a twin sibling who served as the model (Charlie, twin brother; Aaron, twin sister) while a favorite preschool peer served as the model for John. The tapes depicted the model washing his or her hands in the bathroom used for the data collection throughout the study. The video included narration accompanying each target step (i.e., "first, you wet your hands, then you get soap") and enthusiastic praise at the end of the hand washing sequence.

Measurement

The dependent measure was the number of correctly completed hand washing steps from a task-analysis based on the steps depicted in the commercial video. A trained observer scored nine target steps: turn on water, wet hands, get soap, rub hands together, rinse hands, turn off water, get paper towel, dry hands, throw away paper towel. A second independent observer scored child performance for 50%, 33%, and 45% of baseline sessions and 33%, 35%, and 25% of intervention sessions for Charlie, John, and Aaron, respectively. Interobserver agreement (IOA) was calculated by dividing the number of steps of the task analyses scored identically by the total number of steps and converting to a percentage. For Charlie, IOA averaged 96% (range

89%-100%) and for John IOA averaged 98% (range 89%-100%) whereas the agreement for Aaron was 100%.

Procedural reliability (Billingsley, White, & Munson, 1980) was assessed for 25% (Charlie), 22% (John), and 31% (Aaron) of all intervention sessions. An observer scored each step of a task-analysis of teacher behavior as correct or incorrect. Procedural reliability averaged 100% for Charlie and John and 95% for Aaron.

Design and Procedures

A concurrent multiple baseline across participants design was used (Baer, Wolf, & Risley, 1968). That is, the onset of the intervention was staggered across time for the three participants. The goal of this design is to demonstrate behavior change in a participant when and only when the intervention is implemented.

Baseline. The experimenter escorted the child to the bathroom and instructed the child to "wash your hands." If the child initiated using the toilet upon entering the bathroom, he was allowed to use the toilet before the direction was given. Toileting occurred in most sessions with John and Charlie but never with Aaron. No prompts occurred during hand washing and no feedback was provided during baseline. Thirty seconds were allowed for the child to complete a step and move to the next step of the hand washing sequence. If the child did not proceed to another step of the chain within 30 seconds, the session was terminated with no feedback. If necessary, the experimenter turned off the water and the child was taken back to class, where his hands were then dried. A child was not required to complete all previous steps to gain credit for a step (i.e., a child could turn the water on and off and receive credit for the "turn off step" even if the intervening steps were not completed).

Commercial Video Model. The experimenter escorted the child to a room to watch the commercial video model. The instructor stated, "We're going to learn how to wash hands" and played the model two times. Attending was praised intermittently and sitting was praised at completion, but no prompts were provided. The experimenter then escorted the child to the bathroom and stated, "wash your hands, just like on the tape." Similar to baseline, toileting was allowed if the child initiated, no prompts occurred, and 30 seconds were allowed for completion of a step and progression to the next step before the session was terminated.

Custom Video Model. The procedures were identical to the commercial video condition except for the content of the video model (see above) and the instruction to wash hands (i.e., "wash your hands, just like [model's name] did on the tape").

Tape fading. When a child completed all hand washing steps for five consecutive days, the video was shown on alternate days. When the child successfully completed 100% of the steps on a "no tape" day, video viewing was discontinued.

Generalization

Probes were conducted for skill generalization across persons and generalization across settings and persons. No video models were shown before these probes. In probes for generalization across persons, the primary classroom instructor escorted the child to the bathroom and provided the direction "wash your hands" at the same time of day as prior intervention sessions. In probes for generalization across persons and settings, the primary summertime instructor escorted the child to a different sink to wash their hands at an appropriate time (e.g., lunch time) and instructed, "Wash your hands."

Maintenance

Maintenance probes were conducted approximately 1 month after the intervention ended in a manner identical to baseline, though the bathroom differed for Charlie and John. No video models were shown.

Social Validity

A social validity questionnaire was given to each child's primary instructor and to the head teacher in his classroom. Questionnaires were returned to the researcher's mailbox with no identifying information. All questions were assessed with a Likert-type scale (range 0-4) and no identifying information for the teacher or student was included. Intervention acceptability questions sampled whether the student's participation was problematic for the teacher; whether the time spent in intervention was worthwhile for the student; and whether the teacher would nominate students to participate in the future. Treatment outcome questions sampled whether hand washing occurred independently before intervention; whether the child showed improvement in hand washing; and whether the intervention was successful.

Results

Performance on hand washing probes is depicted in Figure 1. Charlie (top panel) averaged 1.5 steps completed accurately during baseline. He would consistently turn on the water and play in it rather than completing subsequent steps in the hand washing sequence. Charlie showed minimal improvement in the commercial video model

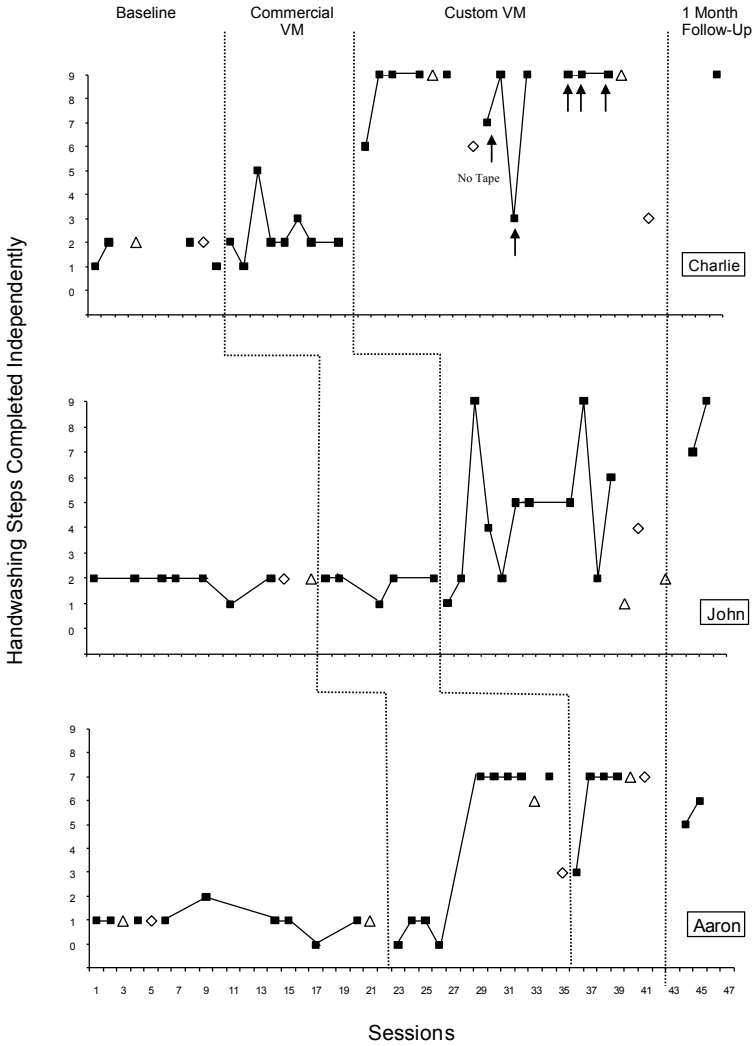


Figure 1: Number of independent handwashing steps performed by Charlie, John, and Aaron. Closed squares represent treatment probes; generalization probes are presented as open triangles (across persons), open diamonds (across persons and settings). Arrows indicate which performances occurred without prior viewing of a video model for Charlie.

phase (*M* = 2 steps). Charlie's performance immediately improved in the customized video model condition ultimately resulting in accurate completion of all nine steps. When viewing of the video model was discontinued, a slight decrease in performance (i.e., seven steps accurate) was evident, but alternation of days with and without viewing resulted in a return to mastery and maintenance. The complete hand washing sequence was evident in the probe for generalization across persons, but not in the probes for generalization across settings.

John (middle panel) consistently performed only two steps accurately during baseline. He also engaged in water play rather than completing the sequence. No improvement was evident during the commercial video model phase but improved somewhat with the customized tape (*M* = 4 steps; range 1-9 steps). The end of the school year precluded additional data collection in the customized video phase. John's scheduled generalization probes revealed no generalization across persons or settings; however, the probes at one-month follow-up resulted in improved performance in a different bathroom providing evidence for maintenance and generalization across settings. His teachers reported that he was consistently washing his hands independently in their classrooms.

Aaron (bottom panel) also performed poorly during baseline (*M* = 1 step). He typically turned on the water and engaged in hand flapping while looking at his reflection in the mirror or the faucet. He responded to the commercial video model after four sessions, consistently performing the same 7 of the 9 target steps accurately. No additional improvement was evident when a customized tape with his twin sister was introduced. As with John, the end of the school year precluded additional data collection in the customized video phase. The same seven steps were completed in probes for generalization across persons and settings and 5 and 6 of the 9 steps were performed accurately during the 1-month follow-up probes.

Five teachers completed the social validity questionnaire with uniform indication of a high level of satisfaction with the intervention and outcomes. All teachers indicated they "strongly agreed" that the child showed improvement and that the intervention was successful. All of teachers indicated that the intervention was never problematic; that it was "absolutely" worthwhile for the student; and that they would nominate students to participate in the video modeling intervention in the future.

Discussion

The question addressed in this study was whether the widespread success of video modeling as an intervention in the research

with custom made tapes could be duplicated when commercially made video modeling tape were used. In this study, two of the three children did not learn from the commercially made tape. With a custom made tape, these two children subsequently demonstrated at least some acquisition and one of those children immediately mastered the skill. These data suggest that it was the commercial tape specifically rather than the video modeling strategy, that was interfering with acquisition of the task. The third child, on the other hand, learned most of the hand washing skill from the commercial tape and demonstrated no further benefit from a custom made tape. These results provide preliminary evidence that different components of a video modeling tape may be critical for different children and that buying a generic video modeling tape to attempt to teach skills may not always be successful.

For the two children who required a personalized tape to show progress, it is unclear which component or combination of components of the custom made tape was responsible for its success. The custom made tape differed from the commercially made tape in four ways: first, it was a familiar peer or sibling modeling the behavior; second, the hand washing was performed in the target bathroom; third, the tape was narrated; and fourth, the child on the video was praised at the end of the tape for washing their hands. Any one or all of these components may have been essential for the success of the tapes for the two children who responded to them. For this study, the personalized tapes were designed only to assess whether the children who were not learning from the commercially made tape could actually learn this skill from a video modeling tape, and thus, the best possible personalized tape was made. For future research, however, manipulating fewer variables at a time on the personalized tape will be necessary to distinguish which component or components are critical to success and whether these crucial components differ from child to child.

One aspect of Aaron's performance that bears mentioning is that he did not show the immediate change in performance that Charlie and John showed. His performance stayed completely flat for four sessions of watching the tape before he began performing the steps. This is not, however, inconsistent with previous research, where some participants have responded immediately to the video modeling tape and some participants have shown flat performance for 4-5 sessions before responding (e.g., Sherer et al., 2001; Taylor et al., 1999). It does, however, raise the question of how long one should continue a video modeling intervention before either giving up or adding another component such as prompting. This would be an important avenue for further research.

Because hand washing is an activity that naturally occurs several times during a child's day, there is a possibility that additional practice of the skill throughout the intervention and also during the maintenance period contributed to the acquisition and maintenance of the skill for the children, rather than progress being attributed to the independent variable exclusively. To our knowledge, teachers and parents did not change their approach to hand washing during the study. As mentioned, baseline clearly indicates that these children had not acquired the skill through the many naturally occurring opportunities prior to the study, but it is possible that video modeling produced some repertoire that facilitated student learning from naturally occurring opportunities. While this issue could be addressed by replicating this study for skills that do not have additional natural occurring opportunities, it is also important to continue to study skills that are required on a daily basis as these are socially valid targets.

Limitations and Suggestions for Further Research

This study involved an investigation of one commercial tape to teach one skill Thus, the findings of this study should be considered preliminary; it is important to avoid a conclusion from this one study that commercial tapes do not work. Multiple studies attempting to use commercial tapes to teach other skills, as well as investigating other commercial tapes to teach hand washing, need to be conducted before firm conclusions can be drawn. In addition, with only three subjects in this study, caution should be used in generalizing the results with even this particular tape to other children, especially as the responses differed across the children. Further research should replicate these results across larger numbers of children.

Another limitation to this study is the possibility of a sequence effect involved in the success of the custom made tape for Charlie and John. Although these two children did not learn from the commercial tape, it is possible that the repeated viewing of the commercial tape affected their ability to subsequently learn from the custom made tape. Because of this possibility of a sequence effect, this study does not constitute a comparison of the two types of video modeling tapes. Further research should include comparisons of custom and commercial tapes using a research design appropriate for direct comparisons of interventions, such as a parallel treatment design.

As mentioned earlier, a critical avenue for further investigation is to distinguish the components of the custom made tapes that were responsible for successful learning in the two children who were unable to learn from the commercial tapes. This study presents preliminary evidence that currently available commercial tapes may not

always be successful with children; yet, the fact remains that if educators and parents need to make custom tapes every time they want to teach a skill, video modeling may remain an underused methodology. This study allows only speculation as to which components of a custom-made tape may have been important for student success. Studies designed specifically to analyze different components of video modeling tapes are needed. A better understanding of which components are critical in a video for this population might help to produce commercial videos which have a higher likelihood of success or may allow an instructor to make one custom video to use with several children, saving valuable instructor time. Additionally, if it is found that different components of video tapes are essential for different children (for example, that narration is helpful for some children and not for others), future research may determine how to match components of video modeling materials to the learning characteristics of individual children.

As increasing numbers of children are diagnosed with autism, the number of teaching products directed at parents and teachers for these children has skyrocketed. Many of these products are very expensive and many claim to be based on research. With many of these products, it is an empirical question as to whether they really will be as effective as the research they are based on would suggest. The products themselves may differ from those used in research in critical ways and the products may or may not be used under conditions similar to those in the research on which they were based. It may then become increasingly important to expand our research agenda in autism education to involve investigating these commercially available products, thereby helping teachers and families make informed decisions on how to best spend both their money and the time of children with autism.

References

Baer, D. M., Wolf, M. M., & Risley, T. R. (1968). Some current dimensions of applied behavior analysis. *Journal of Applied Behavior Analysis, 1*, 91-97.

Billingsley, F., White, O. R., & Munson, R. (1980). Procedural reliability: A rationale and example. *Behavioral Assessment, 2*, 229-241.

Charlop-Christy, M. H., Le, L., & Freeman, K. A. (2000). A comparison of video modeling with in vivo modeling for teaching children with autism. *Journal of Autism and Developmental Disorders, 30*, 537-552.

Charlop, M. H., & Milstein, J. P. (1989). Teaching autistic children conversational speech using video modeling. *Journal of Applied Behavior Analysis, 22*, 275-285.

Charlop-Christy, M. H., & Daneshvar, S. (2003). Using video modeling to teach perspective taking to children with autism. *Journal of Positive Behavior Interventions, 5*, 12-21.

Charlop-Christy, M. H., Le, L., & Freeman, K. A. (2000). A comparison of video modeling with in vivo modeling for teaching children with autism. *Journal of Autism and Developmental Disorders, 30*, 537-552.

Corbett, B. A. & Abdullah, M. (2005). Video Modeling: Why does it work for children with autism? *Journal of Early and Intensive Behavior Intervention, 2*, 2-8.

D'Ateno, P., Mangiapanello, K., & Taylor, B. A. (2003). Using video modeling to teach complex play sequences to a preschooler with autism. *Journal of Positive Behavior Interventions, 5*, 5-11.

Dunn, L.M., & Dunn, L.M. (1997). *Peabody picture vocabulary test -- third edition.* Circle Pines, MN: American Guidance Service.

Haring, T. G., Kennedy, C. H., Adams, M. J., & Pitts-Conway, V. (1987). Teaching generalization of purchasing skills across community settings to autistic youth using videotape modeling. *Journal of Applied Behavior Analysis, 20*, 89-96.

Kinney, E. M., Vedora, J., Stromer, R. (2003). Computer-presented video models to teach generative spelling to a child with an autism spectrum disorder. *Journal of Positive Behavior Interventions, 5*, 22-29.

LeBlanc, L. A., Coates, A. M., Daneshvar, S., Charlop-Christy, M. H., Morris, C., & Lancaster, B. M. (2003). Using video modeling and reinforcement to teach perspective-taking skills to children with autism. *Journal of Applied Behavior Analysis, 36*, 253-257.

Nikopoulos, C. K., & Keenan, M. (2003). Promoting social initiation children with autism using video modeling. *Behavioral Interventions, 18*, 87-108.

Sherer, M., Pierce, K. L., Paredes, S., Kisacky, K. L., Ingersoll, B., & Schreibman, L. (2001). Enhancing conversation skills in children with autism via video technology: Which is better, "Self" or "Other" as a model? *Behavior Modification, 25*, 140-158.

Shipley-Benamou, R., Lutzker, J. R., & Taubman, M. (2002). Teaching daily living skills to children with autism through instructional

video modeling. *Journal of Positive Behavior Interventions*, *4*, 165-175.

Taylor, B. A., Levin, L., & Jasper, S. (1999). Increasing play-related statements in children with autism toward their siblings: Effects of video modeling. *Journal of Developmental & Physical Disabilities*, *11*, 253-264.

Wert, B. Y., & Neisworth, J. T. (2003). Effects of video self-modeling on spontaneous requesting in children with autism. *Journal of Positive Behavior Interventions*, *5*, 30-34.