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January 01, 2009

The use of video modeling to increase food acceptance

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Recommended Citation

Allen, Stefanie, "The use of video modeling to increase food acceptance" (2009). Counseling Psychology Master's Theses. Paper 9. http://hdl.handle.net/2047/d10018554

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THE USE OF VIDEO MODELING TO INCREASE FOOD ACCEPTANCE

A Thesis Presented

by

Stefanie Allen

to

The department of Applied Behavior Analysis

In partial fulfillment of the requirements for the degree of

Masters of Science

in the field of Applied Behavior Analysis

Northeastern University

Boston, Massachusetts

May, 2009

Northeastern University

Bouvé College of Health Sciences Graduate School

Thesis Approval Form

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Acknowledgements

The author would like to thank her thesis committee, Dr. Myrna Libby, Dr. Karen Gould, Joe Vedora, and Dr. Robert Ross for their time, energy, and expertise. Additional thanks to the administration and staff at BEACON Services for making this work possible. Special thanks to the participant and his family for welcoming me into their home and allowing their son to participate in this study.

Finally, I would like to thank my mother for her love, patience, and tolerance over the past three years. You believed in me when I did not, smiled when I was discouraged, and supported me when I needed it the most.

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Abstract

A common problem in children with Pervasive Developmental Disorder is limited food intake. There is no published research to date that includes video modeling to increase food acceptance in a participant's home. The purpose of this study was to evaluate the use video modeling to increase food acceptance by one child in his home. A multiple-baseline design was used to evaluate the effectiveness of video modeling on increasing food acceptance. Video modeling was effective in increasing food acceptance with this one participant in his home. The results of this study suggest that this treatment program was responsible for the observed changes, which were maintained during 3, 4, 5, and 6th month follow-up.

Using Video Modeling to Increase Food Acceptance

Many children with Pervasive Developmental Disorder exhibit maladaptive feeding behaviors. These behaviors may include gagging at the site of certain foods, food refusal, expulsion, and limited intake (Munk & Repp, 1994). Parents of children with these problems are frequently desperate to get their children to eat and may go to great lengths to provide for their nutritional needs. Perhaps one of the most frustrating concerns for parents is the often limited support from the medical community to understand and address their children's refusal, when the child's weight falls within typical development norms. Many parents report that their children do eat "an adequate amount of food to maintain normal growth, but do not eat an adequate variety of foods" (Ledford & Gast, 2006, p. 155). Previous treatments for food refusal have included escape extinction (Kahng, Boscoe & Byrne, 2003), positive reinforcement (Piazza, Patel, Gulotta, Sevin, & Layer, 2003), parent training (Werle, Murphy, & Budd, 1993), differential reinforcement (Anderson & McMillion, 2001), peer modeling (Greer, Dorow, Williams, McCorkle, & Asnes, 1991), and picture activity schedules (Vedora, Ross, & Kelm, 2008). A closer look at all of these studies shows some parallels in their results and limitations.

The majority of research on food acceptance combines reinforcement with escape extinction, such as in the Kahng, et al. (2003) study. The researchers used a token economy with a Differential Reinforcement of Alternative Behavior (DRA) procedure, where the reinforcer was escape from food presentation, to increase food acceptance. Their results showed that the participant's food acceptance increased; however, it was unclear which treatment component was responsible for the success of the intervention. In this study, the participant traded in the tokens for escape; therefore, it is possible that the escape contingency was responsible for the success of this treatment. One possible limitation in this study is the fact that this intervention can be time

consuming, making them less likely to be implemented by staff and parents. The authors also stated that for this reason, interventions that involve negative reinforcement should only be used as a last resort.

Piazza et al. (2003) evaluated the effects of escape extinction with and without positive reinforcement to increase food acceptance. In their study, the reinforcement condition was not effective without extinction, but there was a decrease in other maladaptive behaviors when they combined escape extinction with reinforcement. One limitation to this study was the fact that a functional analysis was not conducted. The authors noted that escape from or avoidance of the spoon may have functioned as reinforcement for food refusal in some of the participants. This study highlights the fact that it is important to identify the function of the refusal when physical guidance and escape extinction are used as treatment components.

Munk and Repp (1994) set out to determine if they could develop a type of functional assessment that could be used to identify types of feeding disorders. Their categories were: total refusal, type selectivity, texture selectivity, and type and texture selectivity. They posited that a behavioral assessment could be used to select non-aversive treatments, when an intervention is warranted, yet many of the studies that they reviewed do not determine the function of the food refusal. This information should be used when developing an intervention, so researchers do not reinforce or punish the incorrect behavior. However, many of the published studies do not conduct a functional analysis or even include follow-up data. Ledford and Gast (2006) found that in the studies they reviewed there was no follow-up data regarding the effectiveness of the treatments. They stated that, "parent follow-up of clinically implemented treatments is crucial, because generalization of behaviors and maintenance of gains is unlikely without active programming" (p.162). The long-term efficacy of these types of treatment procedures is difficult

to determine without follow-up data. Although the studies reviewed thus far were effective in increasing food acceptance, Ledford and Gast argue that there is still a need for more published research in the participant's homes, which is typically where food refusal occurs.

Werle et al., (1993) armed with the knowledge that there was a dearth of research in the participant's homes, attempted to treat chronic food refusal in the participants' home using a video feedback system. The authors developed a treatment plan after viewing a previously recorded feeding session with the parent and child. Then they evaluated the effects of their parent-training program on the child's food acceptance. They used the results to develop a treatment that altered the antecedents as well as the consequences. The parents provided contingent attention for accepting bites on non-preferred food, as well as ignoring disruptive behaviors such as crying or refusal. The authors indicated that parent training was effective in increasing acceptance and decreasing non-compliance. All of the mothers were able to effectively feed their children previously rejected food, two mothers were able to increase their positive interactions with their child, and one mother dropped out of the study. While this study helped three children increase their food intake, the authors anecdotally noted that due to other family related pressures, it may not always be feasible for parents to implement such a difficult procedure on their own. The authors suggest that the intervention should initially be carried out by a trained feeding specialist, who does not have a previous feeding history with the participant.

Anderson and McMillion (2001) also used a video feedback system, but they took their study one step further, by using the video feedback system to review the effectiveness of the intervention and monitor treatment integrity. They then evaluated the efficacy of parent-implemented escape extinction. The parents not only increased the number of bites accepted by their children, but the levels of the participants' self-injurious behavior decreased to near zero

levels in the final phase of treatment. This study suggests that the participants' parents were able to implement escape extinction and DRA successfully. Although treatments such as escape extinction and differential reinforcement have been shown to be highly effective in clinical settings, there was little research on these types of treatments in homes with parents as change agents prior to this study. While this study pushed research in the field forward, there were limitations in that the procedure does not allow for immediate feedback and parents could be engaging in behaviors that are counterproductive for significant periods of time prior to receiving feedback.

Finally, Greer, Dorow, Williams, McCorkle, and Asnes (1991) successfully used peer models to increase food consumption in one participant's home and in a daycare. This study is interesting in the fact that the researchers were able to use a model to increase food acceptance in the family's home. They were able to alter the motivating operation, by reinforcing the sibling for bites accepted prior to asking the participant to eat the food. This procedure was effective and easy for parents to implement; however, not all families have a sibling available as a model.

While the preceding studies were effective at increasing food acceptance, there were several common limitations. The majority of them rely on parent questionnaires, the function of the food refusal is unclear, there are limited follow-up data reported, many of the published reports are not conducted in homes, and they rely on single subject designs, which limits the generalizability of the findings (Ledford & Gast, 2006). Galensky, Miltenberger, Stricker, and Garlinghouse (2001) indicated that direct observation was more reliable than questionnaires for assessing the function of mealtime behavior problems. It is well known that it is important to identify the function of any behavior before a treatment can be implemented or the problematic behavior could inadvertently be strengthened (e.g., Hanley, Iwata, & McCord, 2003). Caregivers

could be implementing an ineffective treatment and inadvertently reinforcing counter-productive behavior.

While, treatments that involve escape extinction or multiple treatment components are clearly effective, they might be too difficult and time consuming for many parents to implement (Freeman & Piazza, 1998). This issue was addressed by Vedora, Ross, and Kelm, (2008) who designed a study that was easy to implement and relied on positive principles of behavior to decrease non-compliance. They used a picture activity schedule to increase food acceptance in one child's home. The results of this study highlight the effectiveness of using visual supports for children with Pervasive Developmental Disorder. However, since only one subject participated, a replication is warranted with a larger number of participants to see if similar results can be obtained. This approach, although easy, might also be time consuming for some families to implement, because it is a more gradual systematic approach that involves behavioral momentum. However, this study is unique, because many of the food acceptance studies involve altering the consequences rather than the antecedents. One reason for this is that there is not a unifying conceptual system for interpreting the effects of antecedent events (Smith & Iwata, 1997).

Video modeling as an antecedent based procedure has been used to teach daily living (Shipley-Benamou, Lutzker, & Taubman, 2002), social initiation (Nikopoulos, & Keenan, 2004) and literacy skills (Kinney, Vedora, & Stomer, 2002). According to Corbett and Abdullah (2005) video modeling is hypothesized to work because children with Pervasive Developmental Disorder often show strengths in processing visual rather than verbal information; they have over-selective attention, restricted field of focus, and avoidance of face-to-face interaction. Video modeling procedures may actually provide for restricted fields of focus, and improve attention on

relevant stimuli, so extraneous visual and auditory stimuli are removed and the child can focus on the information on the screen (Corbett & Abdullah). Video modeling is an antecedent and consequent based strategy, which may exert stimulus control over behavior, because the behavior of the model becomes a discriminative stimulus for the observer's imitation of the modeled response after repeated exposure to reinforcing consequences (Nikopoulos, 2007). Furthermore, Nikopoulos suggests that the effectiveness of video modeling could also be explained as a motivating operation, because the video "momentarily alters the reinforcing effectiveness of other events and also the frequency of occurrence of that part of the organism's repertoire relevant to those events as consequences" (Nikopoulos, 2007, p. 201).

Shipley-Benamou, Lutzker, and Taubman (2002) taught daily living skills to three children with autism using video modeling. The researchers chose five tasks after conducting a task analyses. The difference between this study and others like it is that the videotapes were developed from the participants' viewing perspective with no model to emulate. Results from this study support the use of this type of video modeling to increase functional living skills in children with autism. The use of video modeling was effective for all three children during the post video phase and a one month follow-up. Unfortunately, it was unclear if the skills were maintained in the participants' home due to the short duration of the follow-up phase.

Another area that has been focused on using video modeling is social initiation and play skills. Nikopoulos and Keenan (2004) had the children watch a video of a peer model and the experimenter playing with a toy. All of the children who participated in the study increased their social initiation and reciprocal play skills. The authors also noted that the children maintained the skills at the one month and three month follow-up and that the removal of all but one of the toys may have functioned as a motivating operation. It would appear as though viewing the video

altered the reinforcing effectiveness of the toys, keeping the reciprocal play response in their repertoire throughout all of the conditions.

Video modeling has been successfully used to teach spelling as well. Kinney et al. (2002) used computer video models in combination with video rewards to teach generative spelling. The participant often refused to complete her work and several other methods aimed at decreasing non-compliance proved unsuccessful. However, her compliance improved once video modeling was introduced, a finding similar to that of other researchers who reported a reduction of problem behaviors when using video modeling (Nikopoulos, 2007). The use of video modeling may have removed the motivating operation for escape maintained behavior. The participant in this study not only increased her generative spelling performance, but she also generalized the new skills to many different settings over a long period of time. In this study the model was a familiar person who had a lengthy reinforcement history with the participant; it is unclear if they would have achieved similar results with an unknown model, who did not already exert stimulus control over instructional responses.

While there has been a considerable amount of research on both video modeling and food acceptance, there are no published data to date that includes video modeling to increase food acceptance in either a hospital setting or in a home. Aberrant feeding behaviors are a common problem in children with Pervasive Developmental Disorder. Although some children do not exhibit a failure to thrive, the potential medical implications of limited food repertoires make it imperative that behavior analysts find more effective ways to treat this problem. The purpose of the current study was to extend previous literature of both video modeling and food acceptance. Specifically, this study sought to evaluate video modeling to increase food acceptance by one child in his home as well as expand upon previous literature using video

modeling. Additionally, this study assessed food acceptance during follow probes conducted at 3, 4, 5, and 6 month intervals.

Method

Participant

The participant, Max, was a four-year-old boy diagnosed with Pervasive Developmental Disorder. At the onset of the study, Max's, food repertoire was limited to either crunchy, hard, starchy foods, or dairy products. Examples of accepted foods included; chips, grilled cheese, French fries, granola bites, cheez- its, and a yogurt drink. In addition to these foods, Max also received one can of PediaSure split between the morning and night. He also drank white grape juice, apple juice, milk, and water throughout the day. However, Max would not eat fruits, vegetables, pasta, rice, applesauce, sandwiches, and meat.

Max had a two-year history of gagging at the sight, taste, and smell of a variety of foods. He also verbally protested against eating and threw his food away in the trash. Max's food refusal was interfering with his growth and development. At the time of this study, his doctor reported that his weight was in the 95th percentile for his age, he was in danger of becoming overweight. His mother had him evaluated by the North Shore Multidisciplinary Feeding team two months prior to this study. Based upon that evaluation the feeding team developed a treatment that included touching, smelling, kissing, and licking food. The team members also suggested using a visual countdown board, positive reinforcement, and a first then board. When these methods proved unsuccessful in increasing Max's food acceptance video modeling was introduced. This procedure was selected because it had been used successfully to teach Max other activities of daily living.

Setting and Materials

The study was conducted in the participant's home at the dining room table. His mother was present for all of the sessions. The location of the video camera and food remained the same across all sessions and all conditions. The foods were introduced to the participant during one-half-hour sessions, one time a week, over twenty-three weeks.

The materials included a Sony Handy Cam Vision, a custom-made video of the experimenter eating the targeted foods, two paper plates, and portions of cucumber, grapes, French toast, and waffles. These foods were chosen due to their texture and type. Crunchy textured foods were used because it was hypothesized that the participant was more likely to eat them. The foods were also selected because his mother requested foods be used that he could eat at breakfast time. She also wanted fruits and vegetables added to his diet.

Dependent Variable and Measurement

The dependent variable was bites of food accepted. Food acceptance was defined as the participant placing a food item past the lips within five seconds of seeing/hearing the discriminative stimulus, "It's time to eat your ____, take a bite." The participant was required to swallow the food within thirty seconds, demonstrated by the consumption of the entire bite. The performance measure was number of bites accepted per session.

Interobserver Agreement

Interobserver agreement data were collected during 100% of all sessions and averaged 100%. It was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100%. An agreement was scored when both observers recorded the same information for each dependent measure. Procedural integrity was scored if the experimenter correctly implemented the procedure. Procedural integrity data were recorded for 100% of the sessions by a trained observer.

Experimental design

The design was a multiple baseline across foods. The target behavior food acceptance was first tracked for each food under existing baseline conditions. The treatment program was implemented with one of the foods, while the other foods continued under existing conditions. *Procedure*

Baseline. The experimenter and participant both sat at the dining room table; the experimenter was seated to the participant's left. Both the experimenter and participant had a plate of food in front of them with five pieces of the targeted food on it. The participant watched the experimenter eating the food that was presented to the participant on a separate plate and was told, "It is time to eat your____ take a bite." The participant was asked to take a bite of the same food five times during each session. There were no programmed consequences for either rejection or acceptance.

Video. The video camera was placed in front of Max, but behind the plate of food that was to be consumed by Max. There were five pieces of the targeted food on the plate in front of Max. Max viewed a video that showed the experimenter eating five pieces of the targeted food.
Before the experimenter consumed the food, she stated on the video "It is time to eat your take a bite." The video was turned off after the fifth bite was consumed by the experimenter.

Follow- up Probes. Each food was re-introduced without video modeling at three, four, five and six-month intervals to make sure that the participant continued to eat the foods after treatment. During the probe, a plate was placed in front of Max with five pieces of food on it and he was told to "eat his snack." There were no programmed consequences for acceptance or rejection.

Results

Data representing the number of bites consumed by the participant each session over the 24-week treatment period and at three, four, five, and six-month follow-up probes are presented in Figure 1. In the initial baseline condition for each food item, no food was consumed. The implementation of the video modeling intervention resulted in an increase in food consumption with all of the foods offered. He accepted all five bites of the cucumber in Sessions 4-6 during the video modeling condition. The participant accepted three bites of grapes in Session 7; however, he did accept all five bites of grapes in Sessions 8 and 9. He also accepted all five bites of the French toast during Sessions 10-12 and all five bites of the waffles during Sessions 13-15. Once video modeling was introduced his rate of acceptance increased for all of the foods presented.

Discussion

The present results suggest that video modeling was effective in increasing food acceptance, in a 4-year-old boy with Pervasive Developmental Disorder. Video modeling was utilized as an antecedent based approach and was an effective intervention for increasing food acceptance by the participant. This study adds to a body of literature that has demonstrated the effectiveness of several procedures including, escape extinction (Kahng et al. 2003) positive reinforcement (Piazza et al. 2003), parent training (Werle et al. 1993), differential reinforcement (Anderson et al. 2001), peer modeling (Greer et al. 1991), and picture activity schedules (Vedora et al. 2008) It is notable that these changes were stable over time (i.e., at 3, 4, 5 and 6 months of follow-up) without the continued use of the video modeling intervention.

This study addresses several limitations of previous studies on the treatment of food acceptance, and extends previous research in several ways. First, although there has been a considerable amount of research on both video modeling and food acceptance, there is no

published research to date that includes video modeling to increase food acceptance in either a hospital or a home. Second, this study was conducted in the participant's home with his mother present throughout the entire session. Third, there is also little research identifying the influence of antecedent variables on food preference (e.g., Vedora et al. 2008).

Video modeling can be considered an antecedent based procedure, which may help decrease non-compliance in individuals with Pervasive Developmental Disorder (e.g., Cuvo & Davis, 1998; Heflin & Alberto, 2001). Video modeling has been used to teach daily living (Shipley-Benamou et al. 2002), social initiation (Nikopoulos et al. 2004) and literacy skills (Kinney et al. 2002). This study has taken advantage of the fact that many children with Pervasive Developmental Disorder show strengths in processing visual rather than verbal information; they may have over selective attention, restricted field of focus, and avoidance of face- to-face interaction (Corbett et al. 2005). Prior to the introduction of video modeling the participant would cry, gag, and throw his food away in the trash. However, although no data were collected there is anecdotal evidence that the participant's non-compliance decreased once video modeling was introduced, a finding similar to that of other researchers, who have also reported a reduction in problem behaviors when using video modeling (e.g., Kinney et al. 2002; Nikopoulos, 2007).

Parents of children who exhibit food refusal are frequently desperate to get their children to eat and will go to great lengths to provide their nutritional needs, yet there are no simple, quick, effective techniques that parents can implement on their own. Although all of the food acceptance studies reported successful results, they may be too difficult or time consuming for parents and educators to implement, which means they might not be carried over in the home (Freeman & Piazza, 1998). When children do not accept food, a vicious cycle is perpetuated

between parent and child, the child refuses to eat the food, so the parent no longer introduces new foods into the child's diet. The participant in the present study would request video modeling with new foods once the study was completed. His mother no longer negatively reinforced his escape behavior, because she was able to successfully implement video modeling on her own. Another benefit to this type of treatment is that parents can be trained to implement video modeling in their homes, supporting the practicality and efficiency of this treatment (e.g., Nikopoulos, 2008; Brookman-Frazee, 2004).

Many of the food acceptance studies involve altering the consequences rather than the antecedents. They may also be too difficult and time consuming for parents to implement (e.g., Kahng et al. 2003). According to Charlop-Christy and Freeman (2000) video modeling is an antecedent based strategy, which may exert stimulus control over behavior. Antecedent based approaches have the additional benefit of decreasing non-compliance before it begins, because the procedures are proactively applied. Furthermore, the effectiveness of video modeling could also be explained as a motivating operation (Nikopoulos, 2007). Prior to the introduction of video modeling, the participant would not sit at the table with a non-preferred, he would cry, gag, and throw the food away in the trash. However, that behavior did not occur once video modeling was introduced. The video modeling procedure in the present study may have removed the motivating operation for escape maintained behavior. Consequently, his non-compliance decreased, which enabled the participant to focus on what the experimenter was doing on the screen and eat the food. The results of this experimental analysis support the effectiveness of video modeling for the treatment of food refusal in one child in his home environment.

Although the results of this study are encouraging there are several notable limitations.

This study only contained one participant and consequently it is not clear to what extent the

present findings apply to other students with Pervasive Developmental Disorder. A replication should be conducted with a larger sample of children of different cognitive levels, abilities, and ages. Another important limitation is that the function of the participant's food refusal was unknown. It may have been due to a variety of factors, such as attention, negative reinforcement, aversive flavor, smell, texture, or his ability to access other highly preferred foods throughout his day. Regardless of the function, the implementation of the video modeling intervention increased this participant's food acceptance. However, future research should identify if video modeling is effective for all types of behaviors that serve different functions. It was also unclear if the results would generalize to other settings. Furthermore, it is unclear if results would be similar using unfamiliar models, who did not already exert stimulus control over the participant's behavior. A further limitation of this study is that the model in the video had an extensive pre-existing reinforcement history with the participant. The experimenter was the participants' home-based service ABA provider for over one year prior to the study. The author exerted stimulus control over the participant's behavior. The participant also had a significant and effective history with video modeling procedures. This history may have increased the effectiveness of the procedures. It is not clear that the same results would have been achieved had a novel model been used or if the parent had been the model. An assessment to examine these potential confounding variables was not conducted; thus, future researchers should examine the role of the model and participant history with video modeling procedures. For example, would a parent model, who had a different history, be as effective? A replication could use other family members, siblings, or other peers. It still remains unclear what the pre-requisites for video modeling are. This participant had already been exposed to video modeling prior to the study and, it is not clear what impact this history

had on the effectiveness of the video modeling intervention. Thus, it is possible that video modeling may not be effective for all children.

The results of this study are socially significant to this child and his family. The positive impact on health and family quality of life should not be underestimated. This study has expanded on the literature using video modeling to teach children with Pervasive Developmental Disorder. Aberrant feeding behaviors are a common problem in children with Pervasive Developmental Disorder. Although some children do not exhibit a failure to thrive, it is still imperative that behavior analysts find more effective ways to treat this population. While there has been a considerable amount of research on both video modeling and food acceptance, there is no published research to date that includes video modeling to increase food acceptance in either a hospital setting or in a home. Despite the limitations to this study, the data supports the use of video modeling to increase food acceptance and demonstrates the effectiveness of video modeling as an antecedent and consequent based approach for one child with Pervasive Developmental Disorder.

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Figure Caption

Figure 1. Multiple-baseline design depicting number of bites accepted across four foods. The

X axis is the number of sessions and the Y axis is the number of bites accepted.

