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BRIEF PRACTICE

Evaluation of Instructions and Video Modeling to Train Parents to Implement a Structured Meal Procedure for Food Selectivity Among Children With Autism

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Abstract

We evaluated written instructions plus video modeling—and when necessary, in vivo prompting and feedback—to teach 3 parents to implement a structured meal procedure to decrease food selectivity among their children with autism. In addition to data on correct parent implementation, we also collected data on child bite acceptance. Results showed that instructions and video modeling were effective to achieve the mastery criteria for 1 parent; the other 2 parents required in vivo prompts and feedback. Two of the children exhibited an increase in bite acceptance during the structured meal procedure.

Keywords food selectivity · parent training · structured meal · video modeling

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Research Highlights
- Food selectivity is a common problem among young children with autism.
- In some cases, a structured meal procedure may be helpful to decrease food selectivity.
- Written instructions and video modeling may be useful to train some parents to implement a structured meal procedure.
- In vivo prompting and feedback may be effective to train parents when instructions and modeling are insufficient.

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Children with autism spectrum disorder (ASD) may exhibit selective food intake, food refusal, and problem behavior during mealtimes. Although outright food refusal is more concerning, food selectivity, or consumption of a very narrow range of foods, is exhibited by up to 90% of children with ASD at some point in their development (Volkert & Vaz, 2010). Despite this, most of the intervention research on feeding disorders has focused on food refusal and has examined procedures such as escape extinction (Piazza, Patel, Gulotta, Sevin, & Layer, 2003). Relatively few studies have evaluated interventions to address food selectivity exhibited by children with ASD.

One exception is a study by Werle, Murphy, and Budd (1993), which evaluated the effects of a structured meal protocol to treat food selectivity. Werle et al. (1993) taught parents to provide direct, clear prompts and to use differential reinforcement to increase bite acceptance. Werle et al. examined both parent and child behaviors; their dependent variables were the number of parent-delivered prompts and the number of child bites accepted. Their results support the use of the structured meal protocol.

More recently, Sharp et al. (2019) taught a version of a structured meal protocol to parents and compared it to a parent education program in which no information on meal structure was provided. The structured meal protocol was more effective. Despite its effectiveness, Sharp et al.'s training involved live (i.e., in-person) sessions, which take considerable time. This can limit the number of families that clinicians can treat.

The use of alternative training procedures, such as video modeling, may enable clinicians to assist more families.

Although video modeling has been used to teach caregivers a number of behavior-analytic procedures, including discrete-trial instruction (Catania, Almeida, Liu-Constant, & DiGennaro Reed, 2009), no research has examined the use of video modeling as a training component to teach feeding intervention skills. Thus, the purpose of this study was to evaluate written instructions and video modeling, as well as in vivo prompting and feedback, if necessary, to train parents to implement a version of the structured meal procedure. In addition, we collected data on bite acceptance among children as their parents implemented the structured meal procedure.

Method

Participants

Three parents and three children participated. All children had a diagnosis of ASD and met our criteria for mild food selectivity, which we defined as consumption of fewer than six proteins, six starches, six fruits, and six vegetables. One parent of each child dedicated 1 hr for at least 2 days a week over 8–10 weeks to act as the feeder in the clinic at which parent training sessions were conducted. All parents had a bachelor's degree and spoke English as their first language. Before participating, all child participants were cleared by a physician (i.e., they had no food allergies and no serious nutritional deficiencies and were physically capable of chewing).

Paula was 33 years old and mother to Phil, who was a 4-year-old boy. Paula reported that Phil ate only two proteins, three starches, two fruits, and two vegetables. Sara was 35 years old and mother to Sam, who was a 3-year-old boy. Sara reported that Sam ate three proteins, five starches, three fruits, and three vegetables. Jill was 38 years old and mother to Jack, who was a 6-year-old boy. Jill reported that Jack ate four proteins, three starches, three fruits, and three vegetables.

Setting and Materials

We collected data in a day treatment facility serving children with ASD. All sessions were conducted in a small treatment room equipped with a one-way mirror, which was connected to an observation room where data collection occurred. Inside the treatment room were a table, three chairs, any food and feeding utensils needed for the session, a scale, toys, and timers. Inside the observation room, the therapist collecting data used a pen, paper, timer, and video camera. A graduate student experimenter conducted all sessions with parents. A trained observer collected data during all sessions.

Dependent Variable and Interobserver Agreement

The primary dependent variable was the percentage of steps that parents performed accurately during each session. The structured meal protocol included 37 steps (see Appendix A), although there were multiple opportunities for some steps. In any given session, the number of steps to be conducted by each parent ranged from 17 to 31. The total number of steps in the protocol was always greater than the number of steps that could be conducted in a given session because some steps were not applicable (e.g., if, on a given trial, the child did not pack the bite, the parent's step of prompting "You need to finish swallowing" would be scored as "not applicable"). We calculated the percentage of steps implemented correctly by dividing the number of steps implemented correctly in a given session by the total number of steps to be conducted for that session and multiplying by 100.

We also collected data on child bite acceptance, which we defined as the child actively lifting the feeding spoon himself and depositing the entire bolus past the plane of the lips, and refusal, which we defined as the child not depositing the bolus past the plane of the lips. We collected data on the number of acceptances per session and converted that number into a percentage by dividing the number of bite acceptances by the total number of bites presented per session (five) and multiplying by 100. We also collected data on social validity (Appendix B).

A second observer collected interobserver agreement (IOA) data on at least 33% of sessions during each phase of the study. We used a trial-by-trial method to evaluate agreement. An agreement was defined as both observers recording correct or incorrect step implementation and bite acceptance or refusal. To calculate IOA, we divided the smaller count by the larger count and multiplied the result by 100. Finally, we summed the session means and divided by the number of sessions in the phase to determine mean IOA for each phase of the study.

Mean IOA for correct steps for Paula was 85% (range 80%–100%). Mean bite acceptance for Phil was 98% (range 80%–100%). For Sara, mean IOA was 95% (range 85%–100%). IOA for bite acceptance for Sam was 98% (range 80%–100%). For Jill, mean IOA was 93% (range 76%–100%). IOA for Jack for bite acceptance was 96% (range 80%–100%).

We used a nonconcurrent multiple-baseline design across participants to evaluate the effects of written instructions; video modeling; and if necessary, in vivo prompting and feedback, on the implementation of the structured meal procedure by parents.

Procedure

Baseline During baseline, parents were asked to present five bites of the same foods used during the structured meal procedure to their children but were given no other information.

Training Training occurred in two phases. The first phase consisted of written instructions and video modeling. The second phase, if needed, consisted of in vivo prompting and feedback during meal blocks. The experimenter began training with the parent immediately following baseline.

A binder including written instructions (similar to the description of parental responsibilities during each session, described next) for the structured meal procedure was provided to each parent 72 hr prior to when she was scheduled to conduct the first treatment session. Only written instructions included in the binder were provided to parents; no oral instructions were provided. The binder also included links to video models previously uploaded to YouTube. These videos consisted of the experimenter modeling the steps of the protocol for the parent to review outside of sessions. The video models depicted the correct implementation of each step of the structured meal procedure. A confederate played the role of the child in the videos. The videos did not include a voice-over component or incorrect examples. To verify that they could access the videos, the experimenter assisted the parents in locating the correct website and playing the videos (but did not observe participants watch the videos). Parents were instructed not to practice the protocol independently in their homes; they were simply instructed to read the instructions and watch the videos.

If parent participants did not achieve the mastery criterion (80% or greater accurate implementation across three consecutive sessions), a second training phase was conducted. The second phase consisted of the experimenter providing in vivo prompting and feedback directly to the parent during sessions. That is, the experimenter sat in the treatment room with the parent during meal blocks and provided prompting and direct vocal feedback during and following each session, based on the parent's performance. The feedback always began with a statement describing what the participant did correctly, followed by a statement describing how the participant could improve. The prompting and feedback were consistent with the instructions provided in the binder and the videos. As with the first training phase, the mastery criterion was three consecutive sessions at 80% accuracy or above.

Structured meal The structured meal procedure included the use of a timer, specific prompts, differential reinforcement of alternative behavior, and mouth-clean checks. Although Werle et al. (1993) physically blocked child participants from leaving the meal area, no form of escape extinction was used in the current study.

Prior to each session, parents were instructed to conduct a multiple-stimulus without-replacement preference assessment (DeLeon & Iwata, 1996), which was taught to parents before the study began. During all sessions, each parent presented five bites per meal block; each bite represented a different food group (i.e., fruit, starch, protein, and vegetable). The specific order of bites from the food groups was selected at random, but parents always began a session with a bite that was different from the last bite of the previous session. The foods presented by parents remained consistent throughout the study. Paula presented strawberries, rice, chicken, and green beans to Phil. Sara presented yogurt, potato, cauliflower, and blueberries to Sam. Jill presented chicken, blueberries, broccoli, and pancakes to Jack. In addition, all bites presented were 6 mm × 6 mm × 6 mm in size (the experimenter provided a tool for the parents to use to measure each bite) and were table texture. Parents waited approximately 30 s (as measured by the timer) between each bite presentation.

Parents presented the bite to their children by placing the food on the spoon, placing the spoon in a bowl, placing the bowl in front of the children, and saying, "Take a bite." If the child took the bite within 8 s of presentation, the parent said, "Good job taking your bite," and provided the toy that was chosen during the preference assessment. Parents then provided an additional 30 s to swallow, after which they prompted their children to "show me ahh," and proceeded to check children's mouths to verify that they had swallowed. If the child had swallowed all of the bite, the parent said, "Good job swallowing." If the child did not meet the definition of a mouth clean, the parent provided a prompt to finish swallowing. The parent then proceeded to the next bite in the session using this format until all five bites had been taken. After five bites, the session ended. If the child packed three bites (i.e., all three bites remained in the mouth), the parent did not move to the next bite presentation but instead continued to provide swallow prompts every 30 s until at least one of the bites was swallowed. The parent then presented the next bite in the session.

If the child did not accept the bite, the parent kept the bite in the bowl in front of the child for the remainder of the 30-s interval. Once this interval elapsed, the bite was removed, and the next bite was presented. If the child expelled the bite, no programmed consequences were delivered; the next trial was then presented. Sessions always ended after five bites, even if the child refused all five bite presentations in a given session. During all sessions, parents withheld attention for coughing, gagging, vomiting, crying, and hitting.

Results

The upper panel of Fig. 1 depicts the percentage of steps implemented correctly across parents. Paula implemented a mean of 1%, 32%, and 95% of protocol steps correctly across baseline, written instructions and video modeling, and in vivo prompting and feedback phases, respectively. Sara correctly implemented a mean of 1.5%, 72%, and 95% of steps correctly across baseline, written instructions and video modeling, and in vivo prompting and feedback phases, respectively. Jill implemented a mean of 1.7% and 94% of steps correctly across baseline and written instructions and video modeling phases, respectively.

The lower panel of Fig. 1 depicts the percentage of bite acceptances across child participants. During baseline and both of the training phases, Phil did not accept any bites. Sam accepted a mean of 0%, 66%, and 75% of bites during the baseline, written instructions and video modeling, and in vivo prompting and feedback phases, respectively. Jack accepted a mean of 78% and 100% of bites during the baseline and written instructions and video modeling phases, respectively.

We measured social validity using a questionnaire with a 5-point Likert rating scale. All parents *strongly agreed* that the

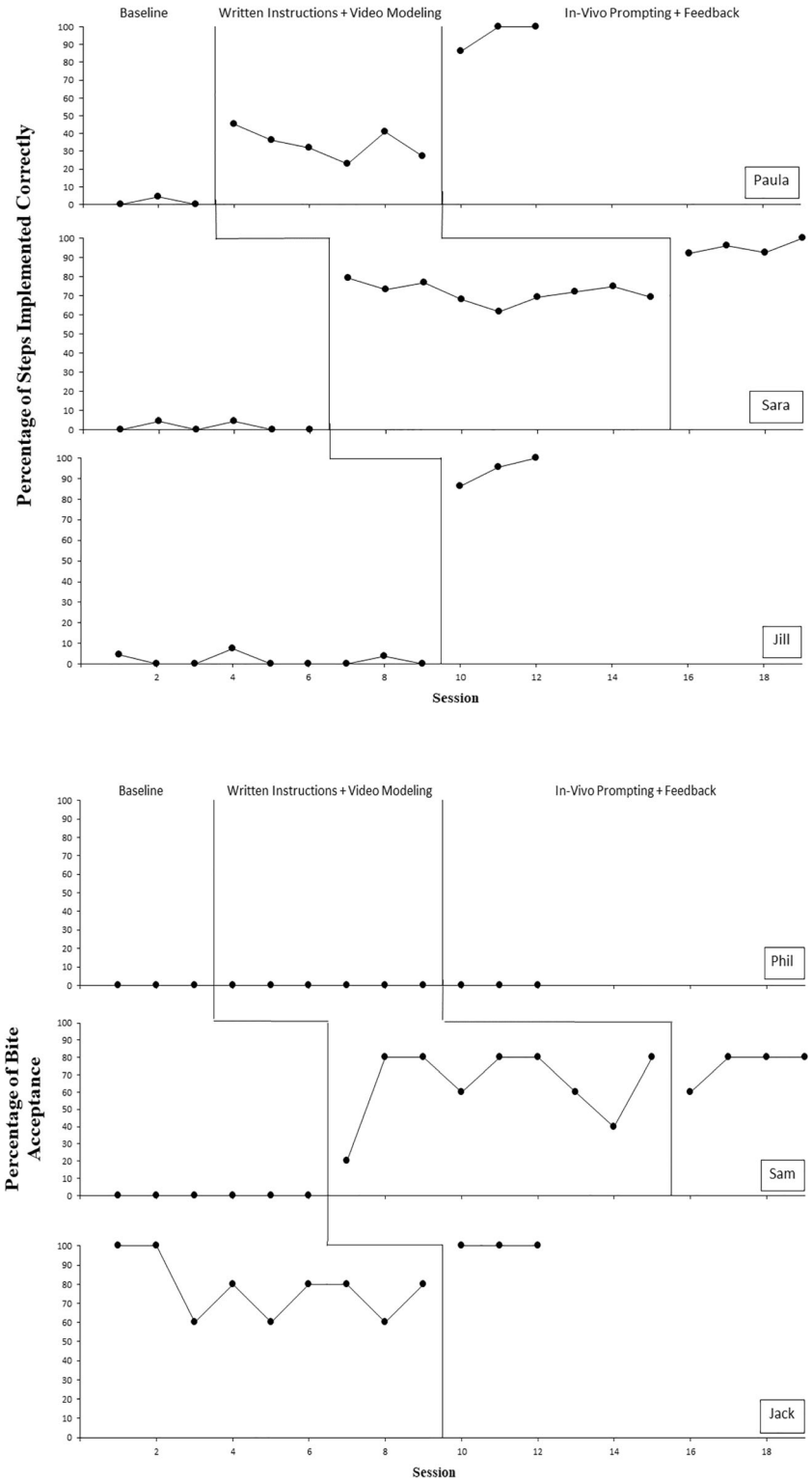

Fig. 1 Percentage of steps implemented correctly across parents (upper panel) and bite acceptance across children (lower panel)

video models were instrumental in learning the protocol (M = 5). They also *agreed* or *strongly agreed* that the protocol was reasonable to implement in other settings (M = 4.6).

Discussion

We evaluated the use of written instructions, video modeling, in vivo prompting, and feedback to train parents to implement a structured meal procedure to address food selectivity among children with ASD. All parents achieved the mastery criterion. One of the parents (Jill) reached the mastery criterion with written instructions and video modeling. The other two parents required in vivo prompting and feedback. These results suggest that clinicians might begin parent training with instructions and modeling but should be prepared to provide in vivo prompting and feedback when necessary. Written instructions and video modeling are easily created and might be particularly useful for families who are unable to schedule immediate clinic-based services.

Two of the children, Sam and Jack, exhibited an increase in bite acceptance during the written instructions and modeling phase and maintained these levels during the in vivo prompts and feedback phase. Phil did not exhibit an increase in bite acceptance. Although disappointing, this finding is not surprising. Of the three child participants, Phil consumed the smallest variety of foods at the outset of the study.

Although Sharp et al. (2019) demonstrated that parents can be taught to implement a structured meal procedure, the current study is the first to incorporate video modeling to teach parents to implement a structured meal. In addition, this study provides further evidence that the structured meal protocol can be effective to increase bite acceptance among *some* young children with ASD who exhibit food selectivity. The structured meal procedure might be particularly well suited to children who exhibit mild food selectivity. For children whose food selectivity and avoidance are more severe (e.g., Phil, in the current study), additional interventions (e.g., escape extinction) may be necessary to increase bite acceptance.

One limitation of this study is the lack of follow-up data. A second limitation is that bite acceptance did not increase for all participants. Future research should further examine the effects of structured meals on bite acceptance. Also, given the nature of feeding disorders and feeding interventions, professional supervision of parents' implementation of behavioral interventions may be required. Although most of the intervention components in the structured meal procedure are relatively harmless, at least some professional oversight is recommended. For more intrusive interventions (e.g., escape extinction, which was not implemented in this study), close professional oversight, and even professional implementation, may be necessary.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflicts of interest to report.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institution and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all individual participants included in the study.

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