

Parent-Implemented Procedural Modification of Escape Extinction in the Treatment of Food Selectivity in a Young Child with Autism

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Abstract

Food selectivity is characterized by the consumption of an inadequate variety of foods. The effectiveness of behavioral treatment procedures, particularly nonremoval of the spoon, is well validated by research. The role of parents in the treatment of feeding disorders and the feasibility of behavioral procedures for parent implementation in the home has not been investigated extensively. In this study, a procedural variation of escape extinction was used to treat the food selectivity of a young child with autism. Treatment occurred in the child's home and all procedures were implemented by his mother. At the conclusion of treatment, the child independently consumed all foods presented in regular family meals within an appropriate time period.

DESCRIPTORS autism, food selectivity, parent training, pediatric feeding disorders

Food selectivity is characterized by a failure to ingest a sufficient variety of foods. A considerable amount of research has documented the effectiveness of behavioral interventions for pediatric feeding disorders in general and for food selectivity in particular (Levin & Carr, 2001). Among the most well-researched behavioral treatment procedures for feeding disorders is non-removal of the spoon (NRS). NRS consists of the feeder presenting a bite of food on a spoon close to the lips of the child and keeping the spoon in that position until the child consumes the food (Ahearn, 2002; Hoch, Babbitt, Coe, Krell, & Hackbert, 1994). If the child engages in refusal behaviors, such as pushing the spoon away, crying, self-injury, aggression, or simply the absence of eating, the demand to consume the food is not terminated, in that the spoon of food is kept directly in front of the child's mouth until the bite is taken.

Ample research has demonstrated the effectiveness of NRS (e.g., Hoch et al., 2001; Piazza, Patel, Gulotta, Sevin, & Layer, 2003). NRS has been shown to increase food consumption and decrease meal-time problem behavior in an effective and efficient manner (Ahearn,

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Kerwin, Eicher, Shantz, & Swearingin, 1996). However, the procedure may be viewed by some as somewhat intrusive. The acceptability of NRS to parents has rarely been studied in research, but clinicians who treat pediatric feeding disorders often anecdotally report that NRS can be difficult for parents to watch, let alone implement themselves, perhaps partially because it looks intrusive to the untrained observer. Specifically, placing a spoon of food directly in front of a child's mouth, who is resisting eating to begin with, and leaving it there until he eats, may appear to the untrained lay community to be "forcing the child to eat." However, it must be noted that perceptions of intrusiveness are highly subjective and prone to influence by many known variables, so judgments regarding intrusiveness of particular interventions are largely speculative. The effectiveness of a procedure to solve a clinical problem should clearly be the primary concern, but nevertheless, parents and other people in the lay community are the ones who must eventually accept and implement behavioral procedures, if behavior change is to maintain outside the presence of the behavioral clinician. Therefore, it may be useful to evaluate additional behavioral treatment procedures that appear to be less intrusive, if such can be done without sacrificing treatment effectiveness.

It is likely that one of the reasons why NRS is effective is because it breaks the contingency where food refusal behavior (or simply the absence of eating behavior) is consequated by removal of the demand to eat. That is, food refusal is often maintained by escape from the demand to eat non-preferred foods (Hoch et al., 1994; Piazza et al., 2003), and one of the active ingredients of NRS is therefore likely escape extinction (Piazza, Patel, Gulotta, Sevin, & Layer, 2003). It follows, then, that other procedures for placing food refusal (or absence of taking bites) on extinction may be effective for treating food selectivity, but surprisingly few other procedures for doing so have been studied. One procedure that appears to be relatively common parenting practice in our culture is to require that a child finish his meal before he is allowed to leave the table. There appears to be no name for this procedure, so the rather awkward term "nonremoval of the meal" (NRM) will have to suffice for the current discussion. If NRM works, it may be partially due to the fact that it prevents escape from eating the presented food, that is, it places non-eating of food on escape extinction. In addition, if the mealtime is non-preferred for the child, then allowing escape from the meal only after eating has occurred may also constitute negative reinforcement of eating. There may also be positively reinforcing activities available outside of the mealtime that the child can only access when he/she is allowed to leave the table (e.g., watching television, playing with toys, etc.), therefore also possibly

involving positive reinforcement for eating the entire meal. Finally, it is possible that a “reinforcer sampling” effect may be partially responsible for improvements in eating. Specifically, when a child is induced to try new foods for the first time, because he/she cannot escape the meal without doing so, it may be the case that the child discovers new foods that he/she prefers.

If NRM works, it may enjoy several advantages. First, it is already fairly well-known in our culture so it may be less likely to appear odd or particularly intrusive to a parent who may be new to behavioral procedures. If this is the case, it may be less aversive for parents and therefore higher parental compliance with the procedure may be obtained. A second advantage may be that the procedure is fairly simple, in that it does not require multiple procedural details to which the parent must attend. The procedure does not require a timer, complex data sheets, or reinforcement intervals, etc. Although the actual behavioral mechanisms behind the procedure are likely complex (e.g., a combination of positive and negative reinforcement for eating, as well as extinction for food refusal), the actual implementation of the procedure is easily explained to a parent: “Don’t let Johnny leave the table until he’s done with his dinner.” In short, a potential strength of the procedure may be that it appeals to “common sense,” in that it is simple and it is already in common practice. Finally, NRM may appear to parents to be more appropriate for children that are capable of self-feeding (it does not involve holding a spoon in front of the child’s face) and that have a sufficient receptive repertoire to understand rules presented vocally.

Despite the apparently common status of NRM in our culture, the procedure has not been empirically researched. In a review paper on feeding disorders, Hoch et al. (2001) presented sample clinical data on an “exit criterion” procedure. In this procedure, the therapist presented a single bit of food on a spoon and the child was allowed to leave the meal and play with preferred toys contingent on consuming the bite. Meals were gradually increased to 50 bites. This exit criterion procedure is similar to NRM in the sense that the meal is only terminated and access to preferred activities is only granted after all presented food has been consumed. However, it is different in that it contains a demand fading component and because the child was spoon-fed. No research of which the current authors are aware has been done in simply requiring a child to sit at the table until the entire meal is consumed (NRM).

Research evaluating NRM may be valuable for two reasons. First, identifying any additional procedures for effectively treating feeding disorders would be useful, simply to expand the variety of treatment options available. Second, the fact that this practice may be

in common use already suggests that it would be beneficial to know whether it actually works. The fact that something is commonly done does not necessarily suggest that it is effective – verbal reprimands contingent on challenging behavior is a classic example of a culturally common response to challenging behavior that often only worsens the problem (Iwata et al., 1994). Finally, evaluating NRM in the context of family meals, in a child's home, with the parent implementing the treatment, is likely the best way to evaluate whether the procedure actually works in the real environment in which it is to be used, by the people who are actually to use it. In this case study, we evaluated the effectiveness of NRM for treating the food selectivity of a young child with autism. We assessed the effectiveness of presenting entire meals on a plate and allowing escape from the meal contingent on consumption of the entire meal. All procedures were implemented by the child's mother, in her home, during regularly scheduled family lunches and dinners.

Method

Participant and Setting

Ed was a 3-year old boy with autism. Ed had mild delays across developmental domains. Ed's mother reported that he ate a variety of starches but that he consumed few fruits, vegetables, or proteins without verbally protesting and she reported that he required continuous prompting ("constant nagging") from his mother. Ed's mother reported that his food selectivity began as soon as he started eating solid foods. Ed had no significant history of medical problems and was not underweight. Ed did not engage in particularly inappropriate or disruptive behaviors during meal-times (e.g., Ed typically just said "No," and simply did not eat, or ate excessively slowly). Nevertheless, Ed's mother reported that his food selectivity caused significant stress for the family, as is commonly reported by families of children with feeding disorders (Greer, Gulotta, Masler, & Laud, 2008). For example, Ed's mother reported having to prepare separate meals for Ed, because she had little success in coaxing him to eat what was served to the family. In addition, although Ed was able to self-feed, his mother often provided numerous verbal prompts to consume his meals in a timely manner, and often resorted to placing the food on the spoon for Ed in an effort to hasten the process. Finally, Ed's mother was seriously concerned over the nutritional adequacy of his limited diet, which consisted almost entirely of carbohydrates. Ed's mother expressed that her goal was to have him eat the regular family meal, regardless of what was served, so this outcome was set as the goal of the intervention.

All meals took place at the kitchen table where Ed normally ate, during his family's regular lunch or dinner time, and all procedures were implemented by Ed's mother. In addition, once the intervention phase was initiated, the contingencies were in place during all lunches and dinners at home.

Response Measurement and Interobserver Agreement

Ed's mother served as the primary data collector and therapist. Ed's mother measured the grams of food consumed by weighing the food before and after each meal. Napkins were also weighed in the event that thrown food would need to be cleaned up, but were never required during the course of treatment. Percentage of meal consumed was calculated by subtracting the grams of food remaining at the end of the meal from the total grams presented at the beginning of the meal, dividing the difference by the total grams of food at the beginning of the meal and multiplying by 100 percent. Meal duration was measured by measuring the number of minutes that elapsed from the beginning to the end of the meal. Data were not collected on disruptive or otherwise inappropriate behaviors, because their topographies were not particularly severe (e.g., they typically consisted of Ed saying "No" and simply not eating) and because Ed's mother was responsible for data collection and every effort was made to simplify procedures to the greatest extent possible. In addition, data were not collected on acceptance, mouth clean, gags, or vomits, because it was deemed unnecessarily difficult for the mother to implement, and because it was hoped that percentage of meal consumption would give an adequate estimate of the primary behavior of concern – meal consumption. Nevertheless, Ed's mother was instructed to note any concerns, including gags, vomit, or other challenging behavior, in the margin of the data sheet. One instance of vomiting was reported when Ed was suffering from a cold and appeared to be particularly congested (meal 20).

A behavioral consultant collected data independently from the mother during 20% of meals. Interobserver agreement (IOA) was calculated for grams consumed by dividing the smaller number measured by the larger and multiplying by 100%. IOA was calculated for meal duration by dividing the smaller duration by the larger and multiplying by 100%. Mean IOA was 95% for meal duration (range, 95%-100%) and 100% for grams consumed.

Procedures

An ABAB design with a brief reversal was used to compare baseline and intervention phases. During baseline, Ed's mother was

instructed to cook “whatever she wanted to for the family” and to avoid taking Ed’s food selectivity into account when selecting what to cook. She was advised to choose meals that had a healthy balance of starches, fruits, vegetables, and proteins, and to present a portion representative of the size she would like Ed to consume on a daily basis. As such, the proportion of preferred to nonpreferred foods was not dictated to Ed’s mother. In addition, she was instructed to interact with Ed “however you normally would during mealtimes.” The entire meal was presented on a plate, as might typically be done in a family meal setting. No programmed consequences were in place for eating or food refusal. Meals were terminated after Ed consumed 100% or after 20 min, whichever occurred first. The 20 minute duration was selected to avoid unnecessarily wasting Ed’s and his mother’s time when it was clear Ed was not going to finish his meal in an appropriate period of time.

Meal selection and presentation during intervention were identical to baseline. In addition, Ed’s mother delivered the following rule at the start of each meal “Ed, this is what’s for dinner/lunch. You cannot have anything else. If you eat your whole meal, then you can go play. If you don’t eat, then you just have to sit here. If you are not done with your meal by bedtime, then you need to eat it for breakfast the next morning.” In addition, she was instructed to state the contingencies every ten minutes, contingent on the absence of eating at that moment. Ed was required to remain seated at the table until he finished his meal, it was time for bed, or time for another activity that could not be rescheduled, such as school or swimming lessons. Ed was not toilet-trained and was in diapers at the time of treatment, thus, he did not need to leave the table to use the bathroom. Ed’s mother was told to take him to his room and change his diaper if at any time she felt it was necessary. If Ed attempted to leave the table, his mother used partial physical prompting to return him to his seat. At no time was more intrusive prompting required to keep Ed seated at the table. If Ed completed his meal fast enough so that there was spare time available before the next scheduled activity (e.g., before bedtime), then he was allowed to engage in a play activity, consisting of his choice among any toy or activity available in the house. If he did not consume his entire meal before it was time for another activity that could not be rescheduled (as occurred with the first treatment meal for lunch), the meal was terminated, the uneaten portion of food was stored in the refrigerator, and was represented at the next meal.

The intervention phase began during lunch on a Friday, and a consultant was present for up to 5 hours, depending on consultant availability, for the first four meals (excluding breakfast, because

breakfast foods were preferred for Ed and therefore not in need of intervention). During these visits, the consultant prompted and praised Ed's mother's correct implementation of the contingencies, and addressed any questions or concerns. On a very small number of occasions, Ed gently slid the plate of food further away from himself but on no occasion did he throw the plate of food or engage in excessively disruptive behavior of any kind. Throughout treatment, Ed always consumed his meals by bedtime, so his mother never implemented the contingency of presenting uneaten dinner for breakfast the next morning. After 13 meals of intervention, a brief reversal to baseline was conducted in order to demonstrate that the intervention was responsible for the improvement in eating observed. However, it was not deemed clinically appropriate to expose Ed to multiple sessions without treatment. In order to make the change from intervention to reversal more salient, Ed's mother was instructed to not tell him the rules describing the intervention contingencies, as was done during the intervention phase, but rather tell him "This is what's for lunch, you can eat it if you want to." All other conditions during the reversal were identical to baseline.

Results and Discussion

The Figure depicts the percentage of meals consumed (top panel), grams consumed (middle panel), and the duration of meals in minutes (bottom panel). During baseline, Ed ate a small percentage of his meals ($M = 29\%$). Although no formal data were collected, his mother reported (and the consultant anecdotally observed) that Ed only consumed preferred foods (e.g., rice) and did not consume non-preferred foods (e.g., broccoli). During the first intervention phase, Ed's consumption increased considerably ($M = 97\%$) and meal duration gradually decreased to levels with which his mother was reportedly satisfied (M duration for the last three meals = 42 min). During a brief reversal, Ed's consumption dropped to 17%. When intervention was reimplemented, Ed's consumption rapidly returned to 100%. After meal duration stabilized (M duration 25.4 min for the last five meals), consultants implemented follow-up by visiting Ed's home to observe meals at 1, 2, 4, and 9 weeks post treatment. During follow-up, Ed's consumption remained at 100% meal duration remained low.

The goals of the intervention were achieved, in that Ed was eating whatever his mother chose to prepare for a meal, regardless of its content. Because this case study was an empirical evaluation of a clinical service, the primary concern was to address whatever concerns Ed's family had regarding his eating. Therefore, during the follow-up period, we informally assessed the social validity of the results of

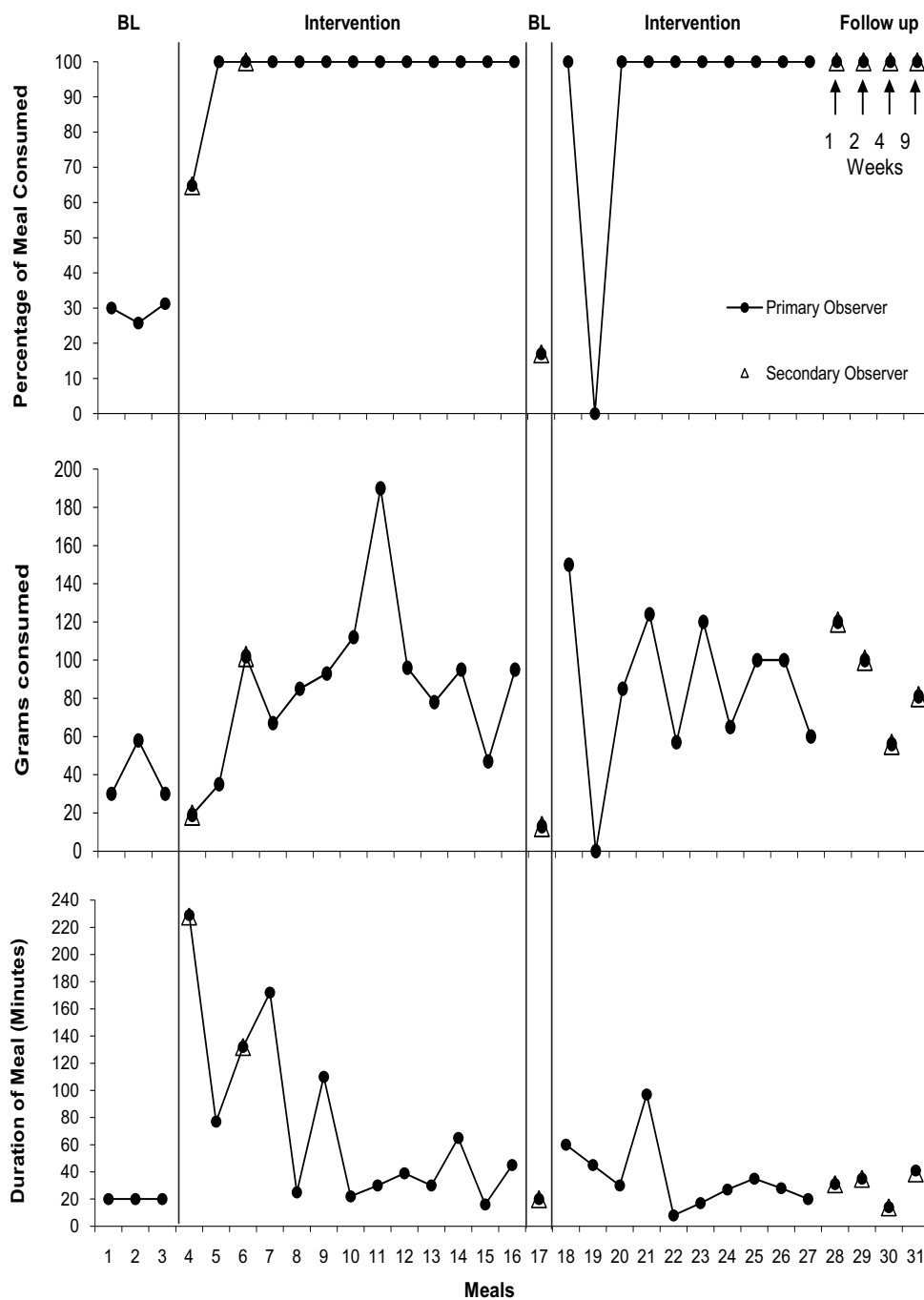


Figure 1. The percentage of meals consumed (top panel), grams consumed (middle panel), and meal duration (bottom panel). Data collected by both primary and secondary observers are graphed.

the intervention ([Wolf, 1978](#)), by directly asking Ed's mother if there was "any other aspect of Ed's eating that she would like addressed" and she replied "No." One potential concern with the results of the intervention was that during follow-up, Ed still required an average of 30.25 min to complete his meal, which may be prohibitively long for some families. However, Ed's mother expressed satisfaction with this meal duration so no attempt was made to increase the speed with which Ed completed his meals.

The results of this study provide preliminary evidence for the effectiveness of a procedural modification of escape extinction in the treatment of food selectivity. The primary features of this study that are different from research on NRS are that whole meals were presented, rather than single bites, and that plates of food were presented at the table, requiring the child to self-feed, rather than food being presented by the therapist directly in front of the child's mouth on a spoon. In addition, it was the entire meal and meal context that was "not removed" contingent on refusal, rather than individual bites presented on a spoon. One advantage of the procedure studied here is that it may be viewed by some as less intrusive than NRS, due to the increased distance between feeder and child and the absence of a spoon close to the child's face. Of course, one could also argue that requiring a child to sit at a table for prolonged durations could also be considered intrusive. Ultimately, the appearance of intrusiveness and parental preference among treatment procedures may be largely subjective and may vary widely from family to family. It is of course possible that some families would prefer NRS to the NRM procedure, and in those cases the clinician would do well to provide access to NRS instead. As is the case with any behavioral intervention, it is crucial for the clinician to consider the contextual fit of the intervention and family and to recommend only those treatments which take into account the unique variables which characterize the family system in which the treatment is to be carried out. In this study, no data were collected on parental preference of the current procedure, much less in comparison to NRS, so such possibilities remain purely speculative. Future research should specifically compare parental preference for NRS versus NRM.

An additional contribution of the current study is that the participant's mother implemented all procedures during all meals in the home. Most behavioral feeding research has included trained experimenters as feeders, often in clinical or hospital settings. A small amount of research has been published which includes parents as feeders (e.g., [Anderson & McMillan, 2001](#); [Najdowski, Wallace, Doney, & Ghezzi, 2003](#)) and on training parents to implement feeding procedures ([Mueller et al., 2003](#)) but more research including parents is needed, given

that parents are the individuals who must ultimately implement feeding treatments if treatment effects are to be maintained.

Some limitations warrant discussion. First, this study included only one participant, so its external validity should be interpreted with caution. Second, the participant in this study did not display severe disruptive behavior, so it is unknown whether the current procedure would work in more severe cases. Third, the behavioral mechanisms responsible for the success of the procedure remain unknown. Our data do not allow for an empirical evaluation of the behavioral mechanisms at work, but in the interest of remaining conceptually systematic (Baer, Wolf, & Risley, 1968), some speculation may be in order. Refusal to eat or the absence of eating did not produce escape from the meal, so it is possible that the treatment worked due to escape extinction for food refusal behavior. Additionally, no other food was available for lunch or dinner, so it is possible that food deprivation, as an establishing operation, contributed to meal consumption by increasing the value of food as a reinforcer (Linscheid, 2006). Furthermore, if Ed did not consume all of a meal, then the leftover portion was presented at the following meal. Anecdotally, consultants reported that Ed expressed dissatisfaction with the idea of eating dinner foods for breakfast when his mother described this contingency to him (e.g., "I don't want to eat broccoli for breakfast"). In addition, Ed's mother no longer prepared separate meals of preferred foods for him. It is possible that preparing separate meals of preferred food, contingent on the occurrence of food refusal behavior, served to positively reinforce his refusal in the past. If this is the case, then the discontinuation of this practice may have eliminated this potential source of reinforcement for the behavior. Finally, Ed's mother's behavior was changed in that "constant nagging" was replaced by the simple restatement of rules at ten minute intervals, thereby reducing the amount of attention Ed received contingent on not eating. It is possible that any or all of these components contributed to the success of the intervention and future research should attempt to identify which are necessary.

In conclusion, this study presents initial evidence for the effectiveness of a common procedure which has not been previously researched for the treatment of food selectivity. The treatment was implemented in the child's home, during regularly scheduled mealtimes, and all procedures were implemented by his mother. The inclusion of only one participant requires that all conclusions be tentative but it appears likely that the procedure may be practical for other parents to implement in the future. Future research should attempt to identify the behavioral mechanisms responsible for the procedure's success and should attempt to replicate it across additional children.

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