INCREASING THE PACE OF SELF-FEEDING IN CHILDREN WITH FEEDING PROBLEMS

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by
Allyne Marcon-Dawson

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Department of Psychology
Abstracts

of

INCREASING THE PACE OF SELF-FEEDING IN CHILDREN WITH FEEDING PROBLEMS

by

Allyne Marcon-Dawson

The purpose of the present study was to identify the treatment components necessary to decrease mealtime duration by introducing each component in a sequential fashion.

Participants included 2 boys between the ages of 4 and 5 who took 45 minutes or longer to complete meals. Treatment components included differential reinforcement and verbal prompts. In all phases of treatment, a visual timer was included and the child was told that he would earn access to a preferred item/activity (selected prior to the meal) contingent on finishing within the allotted time. For one participant, mealtime duration decreased during the first treatment phase consisting of differential reinforcement, and for the second participant, mealtime duration decreased with the use of differential reinforcement of alternative behavior (independently taken bites) plus verbal prompts.

____________________________, Committee Chair
Dr. Becky Penrod

____________________
Date

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Behavioral interventions have been used to address many issues in children with pediatric feeding disorders, such as inappropriate mealtime behaviors (Bachmeyer, Piazza, Fredrick, Reed, Rivas, & Kadey, 2009), food selectivity (Piazza, Patel, Santana, Goh, Delia, & Lancaster, 2002; Najdowski, Wallace, Doney, & Ghezzi, 2003), packing—holding food in the mouth for an extended period of time—(Gulotta, Piazza, Patel, & Layer, 2005; Patel, Piazza, Layer, Coleman, & Swartzwelder, 2005), severe food refusal (Gulotta et al., 2005; Mueller, Piazza, Patel, Kelley, & Pruett, 2004; Shore, Babbitt, Williams, Coe, & Snyder, 1998), swallowing problems (Lamm & Greer, 1988; Greer, Dorow, Williams, McCorkle, & Asnes, 1991), and lack of self-feeding (Luiselli, 2000; Collins, Gast, Wolery, Holcombe, & Leatherby, 1991). Interventions that have been successful in treating these feeding disorders include antecedent interventions and consequence based interventions. Antecedent interventions include: a) fading procedures, such as bite fading (Penrod, Wallace, Reagon, Betz, & Higbee, 2010), b) modifying the properties of the food, for example, using texture fading procedures (Shore et al., 1998), and c) alternating the way in which food is presented such as presenting preferred and non preferred foods simultaneously (VanDalen & Penrod, 2010; Piazza et al., 2002). Consequence based interventions include: a) differential reinforcement (Girolami, Kahng, Hilker, & Girolami, 2009), b) escape extinction (Didden, Seys, & Schouwink, 1999), c) physical guidance (Luiselli, 1988), and d) response cost (Kahng, Tarbox, & Wilke, 2001).
In general, most of the behavioral interventions mentioned above have been used to address inappropriate mealtime behaviors and skill deficits that interfere with food consumption. Although these interventions have been successful, some problems continue to persist or are manifested after the quantity and/or variety of foods the child will consume has been increased. One such problem, which was the focus of the current study, is eating too slowly. The slow pace of self-feeding has been the focus of a very limited amount of research. To date, only two behavioral studies have been published addressing the problem (Luiselli, 1988; Girolami et al., 2009). Eating too slowly can be problematic when the child has a limited amount of time to eat (e.g., at school lunch), which may result in a deficiency in caloric intake to sustain the child’s growth; the slow pace of self-feeding can also be problematic when a child’s mealtime is so lengthy that it affects his/her appetite at the next meal. Meal duration can be extended for various reasons such as prolonged interresponse time (the child takes a long time between the acceptance of one bite and the next bite), packing, refusal behaviors (e.g., verbal protesting), oral-motor deficiencies (e.g., poor tongue lateralization skills, poor chewing skills, etc.), and lack of self-feeding skills (e.g., fine or gross motor skill deficiencies).

In the study conducted by Luiselli (1988), three multihandicapped children with feeding problems were treated; two of these children had problems with pacing: one ate too rapidly and the other ate too slowly. For these two participants, paced physical prompts were used to teach the children how to eat at an appropriate speed. For the third participant, physical prompts were used to teach the child how to feed herself independently. This study was conducted in a residential treatment facility for persons
with sensory impairments (e.g., deaf/blind individuals). A major strength of the study was that all interventions were conducted by direct-care staff who worked with the participants routinely; however, although the author referred to paced prompting as a “practical” and “easily managed” procedure, the study was limited in that the intervention required constant monitoring and no follow-up sessions were conducted. It is unknown whether staff members continued to provide treatment after the research was formally concluded.

Girolami et al. (2009) evaluated the effects of differential reinforcement of high rate behavior (DRH) to increase the pace of self-feeding. A 9-year-old boy diagnosed with failure to thrive, gastroesophageal reflux, attention deficit hyperactive disorder (ADHD), and gastronomy tube dependence participated. The authors reported that the participant did not consume enough food to sustain growth and, despite lengthy meal times, the participant only consumed a few bites of food. At each meal a timer and verbal prompts were used to increase the pace of food consumption; the participant was provided with 10 min of a favorite video if he finished eating his food within 30 min. Although this treatment was shown to be effective, the generalizability of the treatment is not known given that the study was conducted in a hospital facility and follow-up and generalization sessions were not conducted.

Linscheid (2006) stressed the need for studies showing interventions that address feeding problems “in the real world” (p. 6) considering that results of studies conducted in well-supported treatment facilities may not be generalizable. Therefore, the purpose of the present study was to implement a treatment in the participants’ natural environment
(where meals typically occurred) to increase the pace of self-feeding in children who were considered to be “slow eaters.” The study also attempted to identify the treatment components necessary to decrease mealtime duration by introducing each component in a sequential fashion (Cooper, Wacker, McComas, Brown, Peck, Richman, et al., 1995).
Participants and Settings

Two children who had previously received feeding therapy (one for severe food refusal and food selectivity and the second for food selectivity) participated in this study. Criteria for participation included the following: (a) children had to be between the ages of 3 and 8, (b) they had to have the ability to self-feed, (c) they had to be “slow eaters,” defined here as children who took 45 min or longer to complete meals, (d) they had to be able to consume/swallow the texture presented during sessions promptly, (e) there could be no oral-motor deficiencies that impacted the child’s ability to eat the texture presented during sessions, and (f) there could be no packing behavior. Parents of potential participants were interviewed and a typical meal was observed by the experimenters to determine whether or not participants met these criteria. The 2 children who participated in this study were Allan and Larry.

Allan was a 5-year-old boy diagnosed with autism. He had a history of severe food selectivity, emesis, poor weight gain, and failure to thrive. Prior to receiving feeding therapy, Allan’s meals were unstructured - his parents reported they would chase him around the house with a spoon and a bowl trying to feed him, and meals commonly lasted over 2 hours. Allan also engaged in severe refusal behaviors during meals that included head turns, verbal protesting, pushing the spoon and bowl away, etc. prior to receiving feeding therapy. During the intensive feeding therapy program, the family began
conducting structured meals in which Allan was required to be seated for mealtimes. Escape extinction combined with non-contingent reinforcement (NCR) were used to increase acceptance and consumption of new foods and decrease inappropriate mealtime behaviors. Although meal duration was reduced to approximately 20-30 min, Allan still relied on a feeder to bring the spoon to his mouth and would refuse to self-feed even though he had the skills to do so. When feeding therapy was discontinued, the family was working on taking turns during meals consisting of Allan self-feeding a bite and then they would feed the next bite; however, his parents reported that when it was Allan’s turn to take a bite, he would engage in non-compliance, verbal protesting, and would take several minutes before consuming a bite by himself. Allan’s parents also reported that meals lasted 45 min to 90 min when conducted in this fashion. Furthermore, it is important to note that although Allan was able to chew on a chewing tube very efficiently (10-20 strong consecutive chews on each side of his mouth), he was not able to engage in the entire chew-lateralize tongue-swallow chain with regular texture foods, probably due to lack of experience and history of gagging/vomiting with higher texture foods. He also did not perform multiple swallows and would immediately swallow the food once deposited in his mouth (“gulping” motion). Allan consumed a total of 9 foods from all food groups, all of which were pureed to a smooth and thick (humus like) texture or presented at a wet ground texture. He was no longer failure to thrive at the onset of the study. Experimental sessions were conducted in the living room where meals typically took place. Allan was seated in a Rifton® chair with a lap seatbelt system and a coffee table was positioned directly in front of him. His food was served on the coffee table.
Larry was a 4-year old boy with a history of food selectivity. He also had received in-home feeding therapy to address the problem with food selectivity prior to participating in this study. Mealtimes were structured in the sense that Larry was required to be seated and consume the entire portion presented before being excused. After feeding therapy, Larry was consuming an age appropriate variety of foods; however, his mother reported that frequently meals lasted over 1 hour. His mother also reported that Larry had some difficulty remaining on task during daily activities (e.g., putting clothes on) and that he possibly had an attention deficit disorder. Larry self-fed his entire meal and was able to consume foods served at a regular texture. Experimental sessions were conducted in the eat-in-kitchen area and Larry was seated in a regular dinning chair with a booster seat equipped with a tray.

For both participants, feeding sessions were conducted during one meal per day (lunches only for Larry, lunch or dinner for Allan), 1-2 times per week. Experimental sessions were terminated when the entire portion served was consumed or once 15 or 30 min had elapsed for Allan and Larry, respectively, whichever came first. All sessions were videotaped for data collection, treatment integrity, and interobserver agreement purposes.

**Parent Interview and Preference Assessment**

After the observation of 2 typical meals (one with each parent) for Allan and 1 typical meal for Larry, the food to be presented during experimental sessions was identified in conjunction with the parents. At the start of the study, Allan was only eating a mixture of rice and lentil with yellow curry sauce (he had rejected previously consumed
foods following an illness), hence this was the food selected to present during experimental sessions. By session 20, Allan had started consuming the foods he previously rejected while sick, outside of experimental sessions. Consequently, and in an effort to promote generalization, the same food Allan was accustomed to eating during his morning snack and lunch at school was presented during session 20 and during a subsequent session conducted at school to assess generalization across settings (Allan’s eating pattern at school was similar to the manner in which he ate at home at the onset of the study – rotating self-fed bites with bites presented by a feeder).

For Larry, his mother had a set of foods she would present solely during lunch times and another set that was presented during dinner times; Larry’s mother reported that she thought he had a preference for peanut butter and jelly sandwich, as this food was generally consumed within a shorter duration of time (30 min) relative to the time it took Larry to consume other foods. For all the other foods presented during lunches, Larry’s mother reported he did not appear to show a preference for one food versus another and meals were extended in duration. Since the availability of the experimenters and the family to conduct experimental sessions coincided mostly with the days she presented turkey and cheddar sandwich, it was decided that this food would be the food presented during experimental sessions. Larry was presented with 8 Cheez-It® crackers, a turkey and cheddar sandwich made in soft bread without crust cut into 15 squares (bites were cut, as much as possible, in equal sizes), and 4 bites (cut into squares, same size as sandwich bites) of either apple or pineapple during all sessions of the study (a total of 27 bites).
Parents were asked to identify 5-7 preferred items to be included in a paired choice preference assessment (Fisher, Piazza, Bowman, Hagopian, Owens, & Slevin, 1992) prior to beginning the study; however, neither one of the participants’ parents were able to identify that many items. Allan’s parents reported that Allan sometimes showed some interest in playing with blocks and trains, but this was rare. They described that Allan seemed to really enjoy reading a few children’s books, playing with a digital photo/video camera, watching musical video clips on youtube.com, and playing games on pbskids.org. Children’s books were not selected, as this was not a stimulus the experimenters or parents wanted to restrict, and further, Allan had free access to children’s books at home and at school. Also, the family requested that we not restrict access to musical videos on youtube.com because on some occasions they played these videos for him during mealtimes in an effort to make mealtime a more pleasant experience. Therefore, we requested that the family restrict access to the digital video camera and games on pbskids.com during all times other than experimental sessions.

For Larry, his mother expressed that he seemed to like playing with his trains and Cars®; however, she reported she had tried using them to motivate him to do things and “it never worked.” She also expressed she would prefer to not restrict his access to trains and Cars. Other than these 2 items, she was not able to identify any other item that Larry seemed to enjoy playing with. When asked about preferred activities, Larry’s mother was also not able to identify any activity that Larry seemed to like and could potentially be used for experimental sessions. We suggested a few age appropriate activities/items such as bubbles, play-doh®, rocket balloons, and she stated that Larry would probably enjoy
those activities since they were novel. Therefore, we decided to make a prize bag for Larry with several age appropriate toys/activity items. The items in the prize bag were used solely during experimental sessions.

**Response Measurement and Data Collection**

**Baseline and Intervention**

Following completion of the parent interview, baseline and intervention were initiated. Data were collected on meal/session duration, number of bites consumed, volume of food consumed (Allan), as well as number of bites consumed independently and following a verbal prompt (Larry). Rate of bites per minute was calculated by dividing the number of bites consumed during a session by the session duration in seconds then multiplied by 60. Bites consumed independently and following a verbal prompt were reported in percentage, which was calculated by dividing the number of bites consumed independently/following a verbal prompt by the total number of bites consumed and multiplying by 100.

Data were also recorded on whether refusal behaviors/verbal protesting were ignored during all phases; whether any verbal prompts were provided during phase 1 as there should be no verbal prompts during this phase; whether the rule describing what the child needed to do in order to get access to their chosen item was stated at the beginning of the session and then every 5 min; whether a verbal prompt was delivered if 1 min elapsed since the child’s last acceptance and then every 30 s if the child did not follow the verbal prompt; and (on Larry’s last session) whether praise was provided immediately after a bite was independently taken. Sessions were divided into 30 s intervals; an interval
was considered ‘incorrect’ whenever an antecedent or consequence intervention was not correctly implemented within that 30 s period. Data were converted into a percentage of procedural integrity per session by dividing correct intervals by correct plus incorrect intervals and multiplying by 100%. Percentage of procedural integrity for Allan was 99% (range, 80% to 100%). For Larry, percentage of procedural integrity was also 99% (range, 96% to 100%).

**Interobserver Agreement**

A second observer independently watched the videotaped sessions and collected data on meal/session duration, number of bites consumed, and calculated rate of bites per minute. For meal duration, it was considered a “100% agreement” if the difference between values obtained by both observers did not exceed 10 seconds. When the values exceeded 10 seconds, agreement was calculated by dividing the smaller value by the larger value and multiplying by 100%. Agreement on rate of bites per minute was calculated by dividing the smaller value by larger value and multiplying by 100%. For Allan, interobserver agreement (IOA) data were collected during 100% of baseline sessions with 100% agreement for both, session duration and rate of bites per minute. IOA data were collected during 43% of Allan’s treatment sessions with 97% agreement for session duration (range, 93% to 100%) and 97% agreement for rate of bites per minute (range, 93% to 100%). For Larry, IOA data were collected during 40% of his baseline sessions with 100% agreement on both session duration and rate of bite per min. IOA during the first phase of treatment was collected during 60% of the sessions with 99% agreement obtained on session duration (range, 98% to 100%) and 99% on rate of bites
per minute (range, 98% to 100%). IOA data were collected during 66% of the second phase of treatment for Larry. For this phase, IOA data were also collected on percentage of bites consumed following a prompt; agreement for this dependent variable was calculated by dividing the smaller value in percentage by the larger value in percentage and multiplying by 100. IOA in the second treatment phase was 100% for session duration as well as rate of bites per minute, and 95% on percentage of bites consumed following the verbal prompt (range, 90% to 100%).

**Experimental Design**

Effects of each treatment component (described below) were evaluated using a reversal design for both participants.

**Procedures**

At least one caregiver (father or mother) and one experimenter were present during all sessions for both participants. The experimenter initially implemented the procedures; our goal was to train caregivers to implement the procedures once an effective treatment in increasing the pace of self-feeding was found. During all sessions the caregiver and experimenter talked normally with each other and with the child, as it would be during a regular meal.

**Baseline**

In this condition, the food selected for each participant was presented (placed in front of the child). No consequences were provided for taking bites or when refusal behaviors occurred. Initially, the goal was to end experimental sessions after 30 min had elapsed or after the child had consumed his entire portion of food; however, for Allan, the
duration of experimental sessions was decreased to 15 min due to the fact that he did not take any bites during the first baseline session and also engaged in high levels of refusal behaviors (verbal protesting, screaming, crying) once the food was placed in front of him, which the parents expressed was very difficult for them to watch.

**Phase 1: Timer + Access to Item**

During this phase each participant was asked to select an item that he would like to play with before the food was presented. A picture with the restricted items was shown to Allan and he made his choice at the beginning of the session by pointing to which item he wanted. Larry was allowed to select an item from his prize bag that had several age appropriate toys/activity items (e.g., sword, large bubble maker, rocket balloons plastic flying discs, etc.); Larry’s mother would tell him what they could do with each item in an enthusiastic manner (“We can make really big bubbles with this outside!”). A visual timer (in the shape of a clock with the countdown represented by the color changing from yellow to grey as time went by) was placed in front of the child, approximately 1 meter away and was visible throughout the entire session. The timer was set for 15 min for Allan and 30 min for Larry. During the first treatment session with Allan, the following rule was stated: “If you finish eating your food before the yellow is all gone (pointing at the timer), you can play with the camera.” However, as previously mentioned, Allan did not eat any bites during that session and cried and screamed for an extended period of time (over 20 min) once he found he would not get access to the camera. Thereafter, the rule was changed to “If you finish eating your food before the yellow is all gone you can play/do X; if you do not finish before the yellow is all gone you cannot play/do X.” This
same rule was stated at the beginning of the session and then after every 5 min (whenever applicable) for both participants. The food was placed in front of the child once the rule was stated the first time and the timer was started. No consequences were provided for taking bites or when refusal behaviors occurred. Prompts to consume bites also were not provided. Access to the chosen item was provided for 15 min if the participant consumed the entire portion within the allotted time.

**Phase 2: Timer + Access to Item + Verbal Prompts**

This phase was a systematic replication of the study conducted by Girolami et al. (2009). The same procedures implemented during the previous phase were implemented during this phase; however, the verbal prompt, “take a bite” was provided if 1 min elapsed since the acceptance of a bite and the child did not independently take the next bite. If the participant (Larry only) did not follow this verbal prompt the first time, then the same prompt was provided after every 30 s. For Larry, the procedures were slightly modified due to the observation that he generally did not comply with the verbal prompt the first time it was provided; furthermore, it seemed that he was becoming prompt dependent as he tended to take a bite after a prompt was provided a second or third time and was taking fewer bites independently. To address this issue, descriptive praise was provided each time Larry took a bite independently (e.g., “Wow! You took a bite all by yourself!” “Check you out! You ate by yourself again!”). No consequences were provided when he consumed a bite following a verbal prompt.
**Generalization**

A generalization session was conducted with Allan only. The session was conducted at his school. Before the study, Allan’s meals at school were conducted in a secluded area of the classroom and a teacher sat next to him; the teacher would read a page of a children’s book (generally 2 sentences) for each bite Allan self-fed and they would take turns. It was reported that this process would take 35-45 min for Allan to consume a small portion (3 oz). During generalization session Allan was seated in regular child sized chair at a large table with his classmates. The visual timer was presented on the screen of a cell phone and Allan was told he could read books and have more recess time if he finished consuming the portion within the time allotted.

**Follow-up**

A follow-up session was conducted with Allan 3 weeks after the study was concluded. The session was conducted at his home and the same procedures described in Phase 1 were implemented. Because Allan consumed 3 oz garbanzo mixture + 3 oz rice and lentils mixture during lunch and dinner (follow up session was a lunch meal), we allowed Allan to choose which food he wanted to consume while procedures were implemented.
Figure 1 below depicts mealtime duration in minutes (y-axis) and rate of bites per minute (z-axis) for Allan. The bold circles represent mealtime duration and the open squares represent rate of bites per minute.

Figure 1. Mealtime Duration in Minutes and Rate of Bites per Minute for Allan

Note that Allan did not consume any bites during baseline sessions and during the first treatment session in Phase 1. As previously mentioned, Allan cried and screamed once the food was placed in front of him during the first baseline session. These behaviors did not occur during the following two baseline sessions or during the first treatment session. During the last two baseline session, he remained seated the entire 15 min session, stirred the food up with the spoon a few times, but most of the time he looked away from the food; he repeated lines from movie announcements (e.g., “coming
soon to DVD and videos…” and hummed songs that are presented with movie logos at the beginning of movies. During the first treatment session, Allan watched the timer changing colors during most of the session and smiled once the yellow color completely disappeared and a red light blinked with a beep sound. At that point, he was told that he would not play with the camera because he did not finish eating his food within the allotted time, at which point he began crying and screaming that he wanted the camera; he forcefully held his mother’s arm several times and screamed he needed the camera. These behaviors persisted for over 20 min, and Allan’s mother expressed she felt he should be given the camera because he was getting “very upset.” The experimenter asked that the camera not be given to Allan and helped redirect Allan’s attention to another activity. Once Allan had calmed down and he was fully engaged in another activity, the experimenter reminded his mother to not allow Allan access to the camera outside of experimental sessions. Allan consumed his entire portion during the second treatment session and all treatment sessions thereafter. His rate of consumption (bites per minute) ranged from 0.94 bites to 8.8 bites. Meal duration ranged from 1.25 min to 14.83 min. During the sixth session, Allan spent the majority of the session time stirring up the food and then consumed the entire portion toward the end of the session. This behavioral pattern occurred again during session 15 when the amount of food served was increased from 2 oz to 3 oz (further described below). Treatment was withdrawn twice (sessions 9, 10, and 19) and during both times, Allan’s behaviors were similar to those observed during the initial baseline (namely baseline sessions 2 and 3 previously described). Allan’s father was trained to implement the procedures and from session 12 on Allan’s
father conducted sessions. Because Allan was presented with 3 oz of food during mealtimes at school, it was important that he had an opportunity to practice eating this volume at home before we conducted a generalization session; therefore, as previously mentioned, on session 15 the amount of food presented was increased from 2 oz to 3 oz. During that session Allan stared at the food, stirred the food up many times, and repeated several times, “It is so much.” After this session we reduced the amount of food to 2.5 oz (session 16) and increased the volume by 0.25 oz from session to session. From session 18 on, Allan was presented with 3 oz of food. Meal duration was 6.3 min during the generalization session at school and the rate of bites per minute was 5.6. Meal duration was 4 min during a follow-up session and the rate of bites per min was 4.5.

Figure 2 below depicts session duration (y-axis) and rate of bites per minute (z-axis) for Larry. The bold circles represent session duration and the open squares represent rate of bites per minute.

*Figure 2. Session Duration in Minutes and Rate of Bites per Minute for Larry*
Larry was served with 27 bites during all sessions. The order in which he consumed his food was constant during all sessions: he began the meal by consuming the Cheez It crackers (which would take him 2 to 5 minutes to consume all 8 crackers), then the bites of sandwich and lastly, the bites of fruit. The total number of bites consumed during sessions varied from 15 bites (session 9) to all 27 bites (sessions 4, 5, 6, 7, 11 and 18). Larry’s rate of bites per minute ranged from 0.5 bites to 1.24 bites. Session duration ranged from 21.75 min to 30 min. Larry consumed the entire portion served within the allotted time during the first 4 treatment sessions, after which treatment was withdrawn. His pace decreased during the 2 baseline reversal sessions (sessions 8 and 9). Once treatment was resumed, Larry’s pace increased again; however, he only finished his entire portion during 1 out of the 6 treatment sessions. On session 13 we observed that Larry’s pace was decreasing to a rate similar to baseline levels; it was suspected that perhaps Larry was no longer interested in playing with the toys in his prize bag; thus, on session 14 new toys were added to the bag. Anecdotal observations suggested that Larry was very interested in playing with the new toys; however, his pace remained close to baseline levels. Procedures described in Phase 2 were implemented during sessions 16 and 17. Larry’s pace continued at approximately the same level as the last 2 sessions of Phase 1; furthermore, 55% and 62% of the bites consumed followed the verbal prompt on sessions 16 and 17, respectively. On session 18 we began providing praise for bites taken independently. Larry consumed the entire portion during that session in 25.2 min and 26% of the bites were taken following the verbal prompt versus 74% independently taken bites.
Unfortunately, due to family circumstances, Larry was withdrawn from our study a few days after session 18 was conducted.
Chapter 4
DISCUSSION

Results of this study indicated that a visual timer plus access to a preferred item alone was sufficient in increasing the pace of self-feeding for one participant. Allan chose to play with the camera during most of the experimental sessions (he chose to play games on the computer during 2 sessions), and finished consuming his entire portion within the allotted time during 16 out of the 17 treatment sessions. This demonstrates that the camera effectively competed with escape as a reinforcer. One concern was that Allan would lose interest in the camera once the procedures were conducted daily in that he would have access to it more than once a day. This was a concern since Allan had a limited number of preferred items from which to select to use during experimental sessions. During our 3-week follow-up session, Allan’s parents reported they implemented the procedures during 2 meals on weekdays (afternoon snack and dinner) and 4 meals on weekends (morning snack, lunch, afternoon snack, and dinner – Allan drank a high calorie/nutritionally complete formula for breakfast daily) and Allan continued to consistently finish consuming his food within the allotted time. On main meals (lunch and dinner), Allan’s portion was 6 oz; however, the family followed the procedures for the first 3 oz, allowed Allan to play with the selected item for 15 min, and then finished the meal by feeding him the other 3 oz. It was reported that Allan continued to choose the camera on most occasions and because he enjoyed playing with it in various manners (he would go through the kitchen cabinets and videotape products while
reading their labels; he enjoyed videotaping himself singing or humming songs from movie companies; he enjoyed videotaping his parents, his toys, things inside closets, etc.; and he also enjoyed spending time watching his productions on the camera), and access was limited to a maximum of 1 hour per day (all 4 meals on weekends), the camera continued to function as a powerful reinforcer for self-feeding. It is interesting to note that rates of refusal behaviors in the form of verbal protesting may have continued had we not isolated the treatment components and simply replicated Girolami et al. (2009) procedures (timer + verbal prompts + access to item), given Allan’s history of non-compliance and verbal protesting when he was asked to take bites. In the first parent conducted session, immediately after Allan’s father stated the rule (“If you finish eating your food before the yellow is all gone you can play/do X; if you do not finish before the yellow is all gone you cannot play/do X”) Allan looked at his father and asked, “why?” His father was beginning to answer (“because…”) when the experimenter requested that he did not respond to any questions about the rule, and simply turn on the timer once the rule was stated and proceed with the meal. Allan’s history of questioning or verbal protesting was probably a form of delaying/avoiding eating and, had we implemented the procedures described Girolami et al. (2009), the verbal prompt, “Take a bite” would possibly function as a discriminative stimulus for refusal/avoidance of bite consumption.

Another interesting point is that, when Allan consumed smaller bites at a time, meal duration was short and the rate of bites per min was high. For instance, session 11 was the shortest in duration in the study; Allan consumed the entire 2 oz in 1.25 min during that session and his rate of bites per min approached 9 bites per min (highest
during the entire study). In a study conducted by Kerwin, Ahearn, Eicher, and Burd (1995), the experimenters demonstrated that participants’ acceptance, expulsion, and mouth clean were related to the cost/effort corresponding to spoon volume (empty, dipped, quarter, half, and leveled) – the larger the amount of food on the spoon, the higher the cost/response effort. A direction for future research could be to control for bite sizes and, by systematically increasing bite size, test how the different sizes impact pace of self-feeding. Also in terms of volume, it was interesting to observe Allan’s behavioral pattern when we increased the quantity of food from 2 oz to 3 oz during treatment sessions. He spent most of the time staring at the food, stirred the food up, and repeatedly stated that it was so much food; he then consumed the entire volume toward the end of the session. These behaviors were not seen when we slowly increased the volume up to 3 oz. In a study conducted by Luiselli (2000), self-feeding and oral consumption were established in a 3 year-old boy with chronic food refusal and gastronomy tube dependence. In that study, the participant was presented with a sheet with numbered circles representing the number of bites he had to consume in a 25 min period to get access to “reward time” (playing with preferred toys for 30 min; these toys were kept in a special toy bag accessible to the participant only when he achieved the response requirement). Each circle was checked by one of the parents once the participant consumed the corresponding bite. The study was conducted using a changing criterion design, criterion starting from one bite and systematically increasing (demand fading) to 10 bites. The participant continued to be 100% tube dependent at the end of the study and, since the purpose of the study was to establish self-feeding and oral-consumption, the
number of bites required were not further increased. A direction for future research could be to evaluate pace of self-feeding using a changing criterion design by beginning with a small response requirement and then slowly/systematically increasing the criterion for reinforcement (i.e., the portion the child is required to consume) to an age appropriate quantity (volume and calories) once the child is eating at an appropriate pace.

For Larry, it was interesting to observe that timer + access to item was effective during the first 4 treatment sessions and, once Phase 1 was re-implemented (after the second baseline phase), timer + access to item no longer produced the same effect. It was suspected that the toys in the prize bag were no longer motivating Larry to eat at a faster pace; therefore, new toys were added to evaluate if that was the case; however, Larry’s pace did not increase even when new toys were added to the bag. It is possible that in Larry’s case, the novelty of being exposed to the procedures (the timer itself and access to items at the end of the meal) functioned as a reinforcer for increased pace and lost its reinforcing efficacy once he had been exposed to the procedures multiple times and they were no longer novel. Also, we observed that Larry was becoming prompt dependent when we replicated procedures similar to the previous research conducted by Girolami et al., (2009). Independently taken bites increased once we provided descriptive praise contingent upon independently taken bites (DRA); Larry’s pace also increased and meal duration decreased when praise was provided for independently taken bites. It is possible that the more immediate reinforcement throughout the session helped keep Larry on task (he tended to play with his fingers, make “binoculars” with his hands and look through them around the room, make “buildings” with the food, etc. during meals) and increased
his pace of self-feeding. Larry appeared to be very sensitive to adults’ attention and responded well to praise; however, it is unknown if these procedures (timer + access to item + verbal prompt + DRA) would continue to be effective long term or if it would be short lived as was the timer + access to item. It is important to note that the treatment components for this study were based on components present in previous research on pace of self-feeding (Girolami et al. 2009). However, by observing Larry’s behaviors outside session times and looking from a clinical standpoint, Larry probably would benefit from a different treatment procedure. Larry was still required to finish consuming his portion once experimental sessions ended. Once the timer went off, if Larry did not finish consuming the food, his mother would take over and conduct the meal as she generally did, which encompassed coaxing him to eat and provide “encouragement” (“Come on, you have 3 more to go. Eat the next one…”). Larry still had 6 bites to consume at the end of session 17; at that point, the experimenter coached the mother to test (instead of providing verbal prompts, encouragement, and coaxing) picking up a bite from the plate and offering it to Larry with no verbal instructions. It is possible that in Larry’s case, the verbal/auditory stimulation functioned as a reinforcer in the form of attention (provided contingent upon all behaviors incompatible to eating, such as playing with the food), which also helps explain why he was becoming prompt dependent during Phase 2. When the bites were offered without any verbal instruction, Larry promptly consumed 4 of the 6 bites; the other 2 bites he held for approximately 1 min; after which the experimenter recommended to gently push his hand (with as minimal touching as
possible) up to his mouth. He promptly consumed the bites with the gentle physical
guidance.

When Larry’s mother contacted us to inform us that they would need to
discontinue Larry’s participation in the study, the experimenter recommended that the
family follow the above mentioned procedures during meals combined with praise
contingent upon independently taken bites. A direction for future research could be to test
different forms of prompts (e.g., modeling) to increase pace of self-feeding, and also
other procedures that perhaps will facilitate the child self-managing his/her own pace
while eating.

This study was a component analysis in which each treatment component was
sequentially introduced. Two other phases were planned in case participants did not
respond (mealtime duration did not decrease) to the treatments described. Phase 3 (Timer
+ Access to Item + Token Board) was a phase designed to provide participants with more
immediate reinforcement throughout the session in case the components present in the
previous phases did not effectively increase their pace of self-feeding. The proposed
procedures for this phase were that participants would select a small item/food/activity at
the beginning of the session as well as an item they would have access to at the end of the
session if they finished the food within the time allotted. A token would be provided for
each bite consumed independently and after the child earned enough tokens to complete
the board (would begin with a few tokens and then progressively increase from session to
session up to 10 tokens on a board), s/he would have access to a small preferred
item/food/short activity (for instance, a small piece of candy, read a page of a preferred
book, sing part of a song, etc.). All other components from previous phases would continue to be implemented. Phase 4 (Timer + Access to Item + Token Board + Response Cost), had this phase been implemented, all components employed during previous phases would remain; however, the session would begin with a few tokens already on the board and space for the child to earn the following tokens. If the child did not take a bite within 10 s from the verbal prompt, then a token would be immediately removed (response cost). To date, there has not been any published studies using response cost procedures to increase pace of self-feeding; however, Kahng et al. (2001) published a study evaluating the use of a multicomponent treatment for food refusal. The treatment consisted of providing access to highly preferred tangible items and removing them contingent upon problem behavior or the non-acceptance of a bite, as well as differential reinforcement of alternative behavior (e.g., acceptance). The study was conducted with a 5-year old boy diagnosed with mild to moderate mental retardation. Results showed an increased in food acceptance to 100% and a significant decrease in rates of problem behavior.
References


