Simultaneous Presentation to Decrease Packing in a Child With a Feeding Disorder

Heather Whipple^{1,2} · Ryan Scherr¹ · Alison M. Kozlowski^{1,2}

Published online: 29 May 2019

© Association for Behavior Analysis International 2019

Abstract

Children with feeding disorders may pack food (i.e., hold food in the mouth for a prolonged period of time). Treatments to target packing exist, including reinforcement contingencies, redistribution, and chasers, but these strategies are not always effective. Simultaneous presentation has also been used to reduce packing; however, it has not been faded out. The current study expanded this literature by using a treatment package, which included simultaneous presentation, to decrease packing in a 4-year-old boy with autism and food selectivity who packed nonpreferred foods. The simultaneous presentation component was then systematically faded out until generalization occurred.

Keywords Fading · Feeding disorder · Packing · Simultaneous presentation

Food selectivity is a common referral for children with feeding disorders (Piazza et al., 2002), and multiple behavioral treatment approaches have been evaluated to successfully increase acceptance of a variety of foods and decrease food refusal (Bachmeyer, 2009). However, once acceptance for nonpreferred foods increases, new problem behaviors may emerge (Gulotta, Piazza, Patel, & Layer, 2005). Eating is a complex process involving a chain of behaviors, including sitting and remaining seated during mealtimes, placing the food in the mouth as either a self-feeder or non-self-feeder,

lateralizing the food to the molars if it needs to be chewed, chewing, re-collecting the bolus on the tongue, and propelling the food backward to swallow the bite. Problem behavior interfering with consumption may emerge during any stage of this chain of behaviors. One such behavior that may occur after the bite is placed in the mouth, packing, is defined as holding food in the mouth for a long period of time. Packing is problematic for several reasons, such as increased meal duration, decreased caloric intake, and increased risk for aspiration (Gulotta et al., 2005). Several treatments have been evaluated and found to be effective at decreasing packing when reinforcement procedures are not effective, including redistribution of packed food (Gulotta et al., 2005; Sevin, Gulotta, Sierp, Rosica, & Miller, 2002), using chasers (Vaz, Piazza, Stewart, Volkert, & Groff, 2012), and reducing texture (Patel, Piazza, Layer, Coleman, & Swartzwelder, 2005). Yet, there are limitations worth noting with these procedures. First, redistribution and texture-reduction procedures require specialized training and may not always be feasible or acceptable to caregivers. Additionally, redistribution and the use of chasers cannot always be implemented with regular-texture foods safely if the child does not masticate the food because this may result in the child swallowing food whole, which poses a choking risk. However, decreasing texture may not be acceptable to caregivers.

Simultaneous presentation, which involves presenting nonpreferred foods together with preferred foods, is a strategy that has not frequently been evaluated to decrease packing but

Research Highlights

- Simultaneous presentation may be useful as a component within a treatment package to decrease packing in children with feeding disorders.
- Compared to some other packing interventions, simultaneous presentation can be implemented with both regular and texture-modified foods.
- Although embedded within a treatment package in the current study, simultaneous presentation in and of itself requires less advanced training than other packing interventions; therefore, it may be more accessible to clinicians and caregivers, especially in an outpatient setting where advanced feeding-specific interventions may not be easily implemented.

✉ Alison M. Kozlowski
Kozlowski@kennedykrieger.org

¹ Kennedy Krieger Institute, 707 N. Broadway, 2nd Floor,
Baltimore, MD 21205, USA

² Johns Hopkins University School of Medicine, Baltimore, MD, USA

has been used to address other feeding concerns. Several studies have evaluated its use to increase acceptance of nonpreferred foods (i.e., the child taking the bite within 5 s of the bite presentation). Ahearn (2003) used simultaneous presentation with condiments to increase acceptance of vegetables. Additionally, Kern and Marder (1996) compared simultaneous presentation to increase acceptance of fruits and sequential presentation, presenting the preferred food after the nonpreferred food, to increase acceptance of vegetables in one participant. Simultaneous presentation was more effective at increasing acceptance quickly; however, both interventions completely faded the preferred foods around the same time. Piazza et al. (2002) also compared simultaneous and sequential presentation and found simultaneous presentation was more effective for all three participants; however, the preferred foods were never faded out. Additional studies have examined the use of blending nonpreferred and preferred foods together and systematically increasing the ratio of nonpreferred to preferred food until only the nonpreferred food is presented (Mueller, Piazza, Patel, Kelley, & Pruett, 2004).

One study has evaluated the use of simultaneous presentation to decrease packing specifically (Buckley & Newchok, 2005; see Silbaugh, Swinnea, & Penrod, 2018, for a systematic synthesis of the behavioral intervention literature on packing). This study involved a reversal design with one participant to examine the effects of three treatment conditions: (a) differential reinforcement of mouth cleans plus response cost for packing, (b) simultaneous presentation with a bite of ground cookie, and (c) differential reinforcement plus response cost and simultaneous presentation. Each session consisted of four bites of four separate foods at ground texture. Treatments including simultaneous presentation were the most effective; however, there were limitations worth noting. Although packing decreased, it still took the child an average of 5 min to complete four bites, which is not conducive to consuming an age-appropriate meal in a reasonable amount of time. Also, the study did not control for order effects. Finally, the preferred food was never removed.

The current study aimed to expand the previous literature on simultaneous presentation as a treatment approach to decrease packing. More specifically, this study adds to the literature by systematically fading out the preferred food. Additionally, this study included regular texture rather than lower textured foods.

Method

Participant, Setting, and Materials

Marcus was a 4-year-old boy diagnosed with autism who was admitted to an intensive day treatment feeding program for the treatment of food selectivity. Marcus was nonverbal but able

to follow simple, one-step demands, including first/then contingencies. When Marcus started the program, he only consistently consumed snack-type foods and water. During Marcus's initial evaluation, the nurse practitioner conducted a medical exam and reviewed all relevant records. Marcus was previously evaluated by a pediatric gastroenterologist who found his bloodwork to be normal and noted no inflammation of the gastrointestinal tract. The nurse practitioner ruled out medical factors contributing to Marcus's food selectivity. Upon his admission, Marcus's oral motor skills were evaluated by an occupational therapist and speech-language pathologist. Marcus demonstrated mild deficits in oral motor skills in that he engaged in appropriate chewing coordination (i.e., rotary chew) but only with his preferred foods. During the evaluation, Marcus was observed to take dime-sized bites of preferred foods using a rotary chew; however, over time, he engaged in a vertical (i.e., munching) chew likely due to underlying weakness and fatigue. Due to oral motor therapists indicating that Marcus was capable of consuming dime-sized bites of regular-texture foods, this was the bite size selected for treatment. Previous treatments during his admission included nonremoval, noncontingent access to preferred videos, and response cost. Initial treatment components increased acceptance of nonpreferred foods; however, packing increased and time cap was met for all sessions.

Trained therapists conducted all sessions in a 3 m × 3 m treatment room. The room was equipped with a one-way window, table, chair, small Mothercare spoons, small Rifton chair, timer, napkins, plates, Chucks (i.e., cotton-lined pads to protect from leakage; these were present in case of emesis), first/then board, and iPad with preferred videos. Sessions took place during scheduled meal blocks three to four times per day. One to four sessions were conducted per meal block with brief breaks between sessions.

Response Measurement, Interobserver Agreement, and Procedural Integrity

Trained therapists collected data during live or videotaped sessions on laptop computers using Instant Data version 1.4 for PC. Data were collected on the frequency (i.e., count or instances) of packing for the primary dependent variable and on the frequency (i.e., count or instances) of expels and inappropriate mealtime behavior (IMB), as well as meal duration, as secondary dependent variables. Although the focus of this intervention was packing, expels and IMB were selected as secondary dependent variables to provide a clearer picture of Marcus's problem behaviors during mealtimes, and meal duration was selected to demonstrate the severity of Marcus's packing behavior (i.e., the impact packing had on the length of meals due to the amount of time he would pack bites). *Packing* was defined as having a piece of food larger than the size of a pea in the child's mouth 30 s after the bite was

accepted. Frequency was converted to a percentage by dividing the number of packs by the total number of bites accepted (i.e., deposited into the mouth). *IMB* (i.e., the child turning his head away from food, covering his mouth, or pushing the food or feeder's hand away) was converted to a rate by dividing the frequency by the total time that a demand was being placed (i.e., when Marcus was instructed to take a bite until he swallowed the bite). *Expels* (i.e., a previously accepted piece of food larger than the size of a pea was present outside of the mouth) were converted to a rate by dividing the frequency by the total mealtime. *Meal duration* was defined as the time in minutes from presentation of the first bite until the last (fifth) bite was swallowed, or 45 min if the time cap was met before all bites were swallowed.

Interobserver agreement (IOA) was calculated for all dependent variables for 38.2% of sessions, selected at random across all phases. Partial occurrence IOA was calculated for packing, IMB, and expels. Each session was divided into 10-s intervals, the smaller number of recorded responses was divided by the larger number within each interval, and then the average of the quotients across intervals was converted to a percentage. IOA was 99.80% (range 96.88%–100%) for packing, 93.79% (range 72.58%–100%) for IMB, and 98.50% (range 90.38%–100%) for expels. To calculate IOA for meal duration, the shorter meal duration was divided by the longer meal duration and converted to a percentage; IOA for meal duration was 100%.

Procedural integrity and IOA for procedural integrity were calculated for 40.0% of baseline and 37.0% of treatment sessions, selected at random. Procedural integrity was calculated by dividing the number of correct implementations of each intervention component (i.e., prompts, praise, incorrect attention, removal, re-presentations, reinforcer deliveries, and finger prompts) by the total number of opportunities present in each session, and then converting to a percentage. Correct implementation was defined as performing the appropriate component within a 3-s window of accuracy. Procedural integrity averaged 95.7% and 99.1% for baseline and treatment sessions, respectively. IOA for procedural integrity averaged 94.5% and 92.1% for baseline and treatment sessions, respectively. Due to experimenter error (i.e., not creating a specific key for simultaneous presentation in the data collection software), procedural integrity and IOA for procedural integrity for the simultaneous presentation component was only able to be calculated for 10% of baseline and 11% of treatment sessions using videotaped sessions. Procedural integrity and IOA for procedural integrity for the simultaneous presentation component were both 100%.

Procedure and Experimental Design

At the onset of Marcus's admission, therapists conducted an edible paired-stimulus preference assessment (Fisher

et al., 1992) with preferred and nonpreferred foods identified by Marcus's caregiver during a structured interview. We used the information from this preference assessment and the structured interview to identify the preferred and nonpreferred foods used during treatment throughout Marcus's admission. Additionally, therapists conducted a paired-stimulus preference assessment with toys. We used an A-B-A-B-A design to demonstrate the effectiveness of simultaneous presentation, embedded within a treatment package, and the systematic fading of simultaneous presentation. Therapists rotated through eight foods at regular texture throughout the treatment evaluation (i.e., grilled chicken, eggs, sweet potato, avocado, broccoli, cauliflower, orange, and apple), presenting four foods during each meal block. Trained therapists wearing gloves implemented all sessions.

Baseline Therapists presented Marcus with five dime-sized bites of nonpreferred foods. Therapists utilized a first/then board while reviewing the rules with Marcus. The feeder presented bites one by one as single, prescooped bites as a self-feeder (i.e., placing the bite on a spoon on a plate in front of Marcus) while instructing Marcus to "take a bite." Following 5 s of nonacceptance, the therapist picked up the spoon and presented the bite to Marcus's mouth as a non-self-feeder, implementing nonremoval of the spoon (NRS; i.e., placing the spoon at Marcus's upper lip and following his mouth until the bite was accepted). After an additional 5 s, if Marcus still did not accept the bite, the therapist implemented a finger prompt with side deposit (FP+SD) by inserting a straightened index finger on the opposite hand at the corner of Marcus's mouth along the upper gumline, gently pivoting the straightened finger away from the gumline horizontally to create a space, and depositing the bite in the cheek (Rubio, Borrero, & Taylor, 2015). Once the bite was accepted, the therapist conducted mouth-clean checks every 30 s by verbally prompting Marcus to "show me ahh" while implementing a finger prompt. Mastication checks were not implemented due to observed chewing. Therapists implemented differential reinforcement of alternative behavior (DRA) in which Marcus received 30 s of iPad time for swallowing at any time to ensure Marcus would contact the contingency. An iPad was used based on the results of the toy preference assessment in an effort to increase the likelihood he would swallow bites quickly. If Marcus packed the bite, he was verbally prompted to swallow in order to earn his iPad while showing him the first/then board. The feeder conducted mouth-clean checks every 30 s, and no additional bites were presented until Marcus swallowed. A one-bite pack rule was implemented to increase the likelihood of Marcus contacting the DRA contingency, as well as to ensure Marcus's safety (i.e., prevent him from having too much food in his mouth at once, which

would increase the risk of choking). If Marcus expelled the bite at any time, therapists re-presented the bite using an FP+SD. A session ended once Marcus consumed all five bites or when the 45-min time cap was met. If food remained in Marcus's mouth when the 45-min time cap was met, the therapist removed the food from Marcus's mouth.

Treatment (simultaneous presentation) The exact procedures listed previously were implemented except that preferred foods (i.e., chocolate chips) were presented simultaneously on the spoon with the nonpreferred foods. Therapists placed chocolate chips on the spoon surrounding the nonpreferred food, with one chocolate chip in front of the nonpreferred food and one behind it. The chocolate chips were systematically faded during treatment, starting with 2 chocolate chips and decreasing in 0.5 increments. When the chocolate chips were faded to 1.5 chocolate chips, one chocolate chip was cut in half so that 1 chocolate chip was presented behind the nonpreferred food and 0.5 chocolate chips in front of it, or vice versa. When the chocolate chips were faded to only 1 chocolate chip, the therapist presented 0.5 chocolate chips behind the nonpreferred food and 0.5 chocolate chips in front of it. Visual inspection of graphical data was used as the criteria for fading chocolate chips such that packing remained 0% for at least two consecutive sessions; however, expels and IMB data were also reviewed in terms of documented rate and therapist-reported intensity to further determine whether it was appropriate to fade the chocolate chips following two consecutive sessions of packing remaining at 0%.

Results

Figures 1 and 2 depict percentage packing and meal duration, respectively. Figure 3 depicts the rate of IMB and expels across sessions and conditions. During baseline, Marcus packed 100% of bites, meal duration was 45 min, and IMB and expels were high and variable. During baseline, the time cap was met for all three sessions, resulting in fewer trials (range 2–3 bites). Packing and meal duration immediately decreased with the introduction of simultaneous presentation with two chocolate chips, though packing still occurred. However, because of the immediate reduction in packing with the introduction of simultaneous presentation, the parent requested decreasing the number of chocolate chips in Session 8 to only one chocolate chip; therefore, this change was implemented. Although packing remained stable with only one chocolate chip compared to two, meal duration, IMB, and expels increased significantly; therefore, chocolate chips were increased back to two in Session 12. With continued implementation of simultaneous presentation with two chocolate chips, packing decreased to 0%, and meal duration, IMB, and expels also decreased; therefore, chocolate chips were faded to 1.5 in Session 19. Packing remained at 0% with fading from 2 to 1.5 chocolate chips, and meal duration, IMB, and expels also remained low.

During a reversal to baseline, packing initially remained low but steadily increased to be high and stable. Meal duration followed a similar pattern but never increased to initial baseline levels. When simultaneous presentation was reintroduced, only one chocolate chip was utilized to continue fading the simultaneous presentation. Packing immediately decreased and became

Fig. 1. Percentage of bites packed across sessions in baseline and treatment conditions

Fig. 2. Total mealtime duration across sessions in baseline and treatment conditions

stable at 0%, and meal duration also decreased. Following 0% packing across several sessions, another return to baseline was implemented to fade out simultaneous presentation completely, and packing remained at 0%, meal duration remained low ($M = 4.97$ min), and IMB and expels remained low.

Discussion

For this child, simultaneous presentation, embedded within a treatment package, was an effective intervention component at decreasing packing and also meal duration. It is hypothesized

Fig. 3. Responses per minute of IMB and expels across sessions in baseline and treatment conditions

that the use of simultaneous presentation may have functioned as an establishing operation for chewing and swallowing. More specifically, the pairing of the preferred foods with nonpreferred foods may have evoked chewing of the nonpreferred foods and increased the reinforcing value of swallowing the nonpreferred foods. Nonpreferred foods presented alone may have abated chewing for this participant (i.e., packing bites). An alternative explanation is that pairing the preferred with nonpreferred foods may have resulted in Marcus developing a preference for the nonpreferred food over time. This alternative explanation is supported by early theories of flavor-flavor learning, which include conditioning sessions by presenting preferred foods simultaneously with a flavor and then conducting a test with the flavor alone to determine if preferences for the flavor develop (Capaldi, 1996; Kern & Marder, 1996).

The results from the current study support and extend previous packing intervention literature (Silbaugh & Swinnea, 2019; Silbaugh et al., 2018). Research on packing specifically is limited. Like most research on packing, the participant in the current study engaged in packing after an initial treatment evaluation was conducted on acceptance (Silbaugh et al., 2018). The current study extends previous literature by including data on mealtime behaviors, which were only included in one study (Silbaugh & Swinnea, 2019). Additionally, only one other study assessed the use of simultaneous presentation to decrease packing (Buckley & Newchok, 2005; see Silbaugh et al., 2018, for a review of behavioral packing interventions). This study expands the results of that study by systematically fading the use of the preferred foods. Furthermore, during a synthesis of behavioral interventions to address packing, Silbaugh et al. (2018) found the studies were classified as “suggestive” primarily because of the lack of IOA and treatment fidelity data collected. The current study expands research on packing by including IOA and fidelity data. Of note, packing rather than chewing had been the target of the current intervention. Although Marcus did not chew the bites he packed, he demonstrated the ability to chew a variety of regular-texture preferred foods and was not identified to have any oral motor deficits interfering with consumption of a wider variety of foods. For children presenting with chewing deficits, it is likely that other treatment strategies specifically targeting an increase in chewing would be more appropriate (e.g., Volkert, Piazza, Vaz, & Frese, 2013).

Simultaneous presentation was selected over other packing interventions for several reasons in Marcus’s case. As noted previously, redistribution and chaser procedures are most appropriate for lower texture or masticated foods, and because Marcus did not chew the bites he packed, these procedures were inappropriate for him. It is important to note that redistributing bites to Marcus’s molars could have been considered; however, with the FP+SD, the bite was positioned close to Marcus’s molars and no chewing was observed.

However, no formal data were collected on chewing because, as mentioned previously, there were no concerns regarding oral motor deficits for Marcus. Marcus was observed chewing his preferred foods without any difficulties. Additionally, anecdotally, Marcus did not swallow bites whole during this treatment evaluation. However, for other children this is a possibility, so mastication checks and formal chewing data may be helpful. Marcus engaged in more passive refusal in that he would sit, tap his fingers, and look up or close his eyes. Although reducing the texture of food may in and of itself decrease packing (Patel et al., 2005), or allow for the use of redistribution or providing chasers, Marcus’s caregiver was not in agreement with texture manipulation because Marcus had the oral motor skills to chew regular-texture foods. Furthermore, decreasing texture requires additional time and resources for meal preparation, which may also not be acceptable to or possible for caregivers.

Caregiver input was an important component of the decisions made in the current study to increase the social validity of procedures (i.e., significance of goals, appropriateness of procedures, and importance of effects; Wolf, 1978). At the end of Marcus’s admission, his caregiver completed a 20-item questionnaire to assess satisfaction with behavioral psychology services received through the program. On a scale of 1 (*extremely dissatisfied*) to 5 (*extremely satisfied*) with treatment, treatment outcome, training, and behavioral psychology staff demeanor, Marcus’s caregiver reported a mean score of 4.52. Additionally, therapists collected data on caregiver training with the final treatment package, generalization, and maintenance. Once Marcus’s caregiver was trained on the final treatment package, she implemented the mealtime protocol in areas outside the treatment room to ensure the protocol would be successful in other settings. She implemented procedures with 98.28% accuracy in all meals. Furthermore, during a 1-month follow-up, caregivers reported continued success with the protocol at home.

However, because this study only included one participant, more research is needed on simultaneous presentation to decrease packing. Future research could isolate simultaneous presentation to determine whether a DRA component is necessary. Because Marcus’s treatment package contained multiple components, with DRA also targeting packing, it is unknown whether simultaneous presentation alone would have been effective in decreasing packing. Even if DRA is considered to be an essential component, future studies could evaluate thinning the reinforcement schedule. In Marcus’s case, within this study, it still took about 5 min for only five bites because Marcus received iPad access for a total of 2.5 min in each session between bites. However, anecdotally, the reinforcement schedule was thinned later during Marcus’s admission. Future research could also conduct a component analysis examining other variables to determine which components of a treatment package have the most impact on behaviors.

One limitation of this study includes the lack of concrete criteria for fading the chocolate chips. It is important to note that this research was conducted as part of a clinical case, and although criteria were established, a few barriers led to more quickly making or delaying changes. For instance, Marcus's caregiver requested fading chocolate chips from two to one before data were stable. Additionally, there were many other goals for Marcus's admission; therefore, it was clinically important to progress as quickly as possible to focus on additional goals (e.g., assess self-feeding, increase variety to 12 foods at age-appropriate volume, generalize). Although returning to treatment with only 1 chocolate chip as opposed to 1.5 chocolate chips is a limitation of this study, this was implemented to further support the fading of preferred foods. Future studies should include more stringent criteria for fading preferred foods. Another limitation is that we initiated the fading process by fading the chocolate chips to 1.5 prior to the reversal, which could have impacted the meal duration data because Marcus had already been exposed to fewer chocolate chips. Future studies should conduct the reversal prior to initiating fading of the preferred foods. By conducting the reversal prior to fading, the internal validity of our study could have been strengthened.

Overall, based on the current data, simultaneous presentation may prove to be a useful tool to decrease packing in children with feeding disorders. Simultaneous presentation possesses several advantages over other packing interventions. Although Marcus's IMB initially increased significantly when we implemented simultaneous presentation, this intervention component by itself is theoretically noninvasive and therefore less likely to be accompanied by an exacerbation of problem behaviors when implemented alone, which may make it more acceptable to caregivers and more feasible in an outpatient setting where there is generally the goal of caregivers implementing strategies at home between appointments. One explanation for the increase observed in this study is this study examined the use of simultaneous presentation within a treatment package. For example, therapists needed to deposit a larger bite size with the FP+SD (i.e., the nonpreferred and preferred foods together), which took longer and created more opportunities for Marcus to engage in IMB. In addition, certain other packing interventions, such as redistribution, require specialized training; therefore, these procedures should only be used by those who have been appropriately trained. Although other components of this packaged treatment require specialized training (i.e., NRS, FP+SD) and consideration of safety and hygiene issues (e.g., wearing finger guards to prevent injury from possible biting, wearing gloves), the simultaneous presentation component is a simple intervention that does not require as advanced training or many of these same safety and hygiene considerations. This makes this intervention more accessible to clinicians and caregivers alike.

Author Note We conducted this research at the Kennedy Krieger Institute in Baltimore, Maryland.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee 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.

References

- Ahearn, W. H. (2003). Using simultaneous presentation to increase vegetable consumption in a mildly selective child with autism. *Journal of Applied Behavior Analysis*, 36, 361–365. <https://doi.org/10.1901/jaba.2003.36-361>.
- Bachmeyer, M. H. (2009). Treatment of selective and inadequate food intake in children: A review and practical guide. *Behavior Analysis in Practice*, 2, 43–50. <https://doi.org/10.1007/BF03391736>.
- Buckley, S. D., & Newchok, D. K. (2005). An evaluation of simultaneous presentation and differential reinforcement with response cost to reduce packing. *Journal of Applied Behavior Analysis*, 38, 405–409. <https://doi.org/10.1901/jaba.2005.71-04>.
- Capaldi, E. D. (1996). Conditioned food preferences. In E. D. Capaldi (Ed.), *Why we eat what we eat: The psychology of eating* (pp. 53–80). Washington, DC: American Psychological Association.
- Fisher, W., Piazza, C. C., Bowman, L. G., Hagopian, L. P., Owens, J. C., & Slevin, I. (1992). A comparison of two approaches for identifying reinforcers for persons with severe and profound disabilities. *Journal of Applied Behavior Analysis*, 25, 491–498. <https://doi.org/10.1901/jaba.1992.25-491>.
- Gulotta, C. S., Piazza, C. C., Patel, M. R., & Layer, S. A. (2005). Using food redistribution to reduce packing in children with severe food refusal. *Journal of Applied Behavior Analysis*, 38, 39–50. <https://doi.org/10.1901/jaba.2005.168-03>.
- Kern, L., & Marder, T. J. (1996). A comparison of simultaneous and delayed reinforcement as treatments for food selectivity. *Journal of Applied Behavior Analysis*, 29, 243–246. <https://doi.org/10.1901/jaba.1996.29-243>.
- Mueller, M. M., Piazza, C. C., Patel, M. R., Kelley, M. E., & Pruett, A. (2004). Increasing variety of foods consumed by blending nonpreferred foods into preferred foods. *Journal of Applied Behavior Analysis*, 37, 159–170. <https://doi.org/10.1901/jaba.2004.37-159>.
- Patel, M. R., Piazza, C. C., Layer, S. A., Coleman, R., & Swartzwelder, D. M. (2005). A systematic evaluation of food textures to decrease packing and increase oral intake in children with pediatric feeding disorders. *Journal of Applied Behavior Analysis*, 38, 89–100. <https://doi.org/10.1901/jaba.2005.161-02>.
- Piazza, C. C., Patel, M. R., Santana, C. M., Goh, H., Delia, M. D., & Lancaster, B. M. (2002). An evaluation of simultaneous and sequential presentation of preferred and nonpreferred food to treat food selectivity. *Journal of Applied Behavior Analysis*, 35, 359–270. <https://doi.org/10.1901/jaba.2002.35-259>.

- Rubio, E. K., Borrero, C. S. W., & Taylor, T. (2015). Use of a side deposit to increase consumption in children with food refusal. *Behavioral Interventions*, 30, 231–246. <https://doi.org/10.1002/bin.1404>.
- Sevin, B. M., Gulotta, C. S., Sierp, B. J., Rosica, L. A., & Miller, L. J. (2002). Analysis of response covariation among multiple topographies of food refusal. *Journal of Applied Behavior Analysis*, 35, 65–78. <https://doi.org/10.1901/jaba.2002.35-65>.
- Silbaugh, B. C., & Swinnea, S. (2019). Clinical evaluation of a behavioral intervention for packing. *Behavior Analysis: Research and Practice*, 19, 60–71. <https://doi.org/10.1037/bar0000150>.
- Silbaugh, B. C., Swinnea, S., & Penrod, B. (2018). Synthesis of applied behavior analytic interventions for packing in pediatric feeding disorders. *Behavior Modification*, 42, 249–272. <https://doi.org/10.1177/0145445517724541>.
- Vaz, P. C. M., Piazza, C. C., Stewart, V., Volkert, V. M., & Groff, R. A. (2012). Using a chaser to decrease packing in children with feeding disorders. *Journal of Applied Behavior Analysis*, 45, 97–105. <https://doi.org/10.1901/jaba.2012.45-97>.
- Volkert, V. M., Piazza, C. C., Vaz, P. C. M., & Frese, J. (2013). A pilot study to increase chewing in children with feeding disorders. *Behavior Modification*, 37, 391–408. <https://doi.org/10.1177/0145445512474295>.
- Wolf, M. M. (1978). Social validity: The case for subjective measurement or how applied behavior analysis is finding its heart. *Journal of Applied Behavior Analysis*, 11, 203–214. <https://doi.org/10.1901/jaba.1978.11-203>.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.