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Effects of Clinic and In-Home Treatment on Consumption and Feeding-Associated Anxiety in an Adolescent With Avoidant/Restrictive Food Intake Disorder

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The current study describes a combined behavioral and cognitive–behavioral treatment with an adolescent boy diagnosed with avoidant/restrictive food intake disorder. Treatment included a clinic and an in-home component to increase his consumption of nonpreferred foods and eliminate feeding-associated anxiety. The behavioral treatment components included gradually increasing feeding demands and reinforcing consumption. Through cognitive–behavioral therapy, the boy was taught to use a relaxation procedure, guided imagery, and positive self-statements during meals. Results of changing criterion and multiple baseline designs indicated that treatment improved consumption of previously avoided foods and lowered subjectively perceived anxiety. These findings were maintained posttreatment, and both the participant and his mother rated the procedures and outcome favorably.

Keywords: avoidant/restrictive food intake disorder, food selectivity, feeding anxiety, cognitive–behavioral treatment

Food selectivity in children is a common problem that is frequently referred to pediatric primary care settings (Cohen, Piazza, & Navathe, 2006; Manikam & Perman, 2000). Selective eating typically presents when a child consumes a restrictive range of food preferences based on texture, taste, and other sensory characteristics. The sequelae from chronic food selectivity can be health threatening, for example, weight loss, dehydration, and gastrointestinal problems may arise (Råstam, 2008). In addition, children and youth may experience socialization difficulties with peers because of unusual eating habits. Unfortunately, food selectivity and negative effects can persist for many years if not treated successfully.

Recently, avoidant/restrictive food intake disorder (ARFID) was added to the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-5*; American Psychiatric Association, 2013) "to improve clinical utility and capture a population of young people who had an eating disorder, experienced medical and psychological comorbidities, and who might otherwise be excluded from the DSM diagnostic criteria" (Fisher et al., 2014, p. 2). Characteristics of ARFID include a lack of interest in eating or food, eating avoidance based on the sensory features of food, and concern about the aversive consequences of eating. Furthermore, children and youth with ARFID must manifest significant weight loss (or failure to achieve expected weight gain), nutritional deficiency, dependence on supplemental feeding, and impairment to psychosocial functioning. The eating disturbance cannot be attributed to cultur-

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ally sanctioned practices, lack of available food, anorexia nervosa, bulimia nervosa, or a concurrent medical condition. In a retrospective study at seven adolescent-medicine eating disorders programs among patients 8 to 18 years old (N = 712), Fisher et al. (2014) found that approximately 14% of new referrals met the diagnostic criteria for ARFID.

Most food selectivity intervention research has targeted children with autism spectrum disorder (ASD) and related developmental disabilities (Barahona, DuBard, Luiselli, & Kesterson, 2013; Bui, Moore, & Anderson, 2013; Kozlowski, Matson, Fodstad, & Moree, 2011; Piazza et al., 2002). As well, the majority of feeding treatments have focused on young children. For example, in a recent review of larger-scale treatment studies, the mean participant age was between 17 months and 6 years (Lukens & Silverman, 2014). Although treatment of food selectivity has extended to typically developing children (Beighley, Matson, Rieske, & Adams, 2013; Wardle et al., 2003; Williams, Gibbons, & Schreck, 2005) and adolescents with ASD (Råstam, 2008), there are no large-scale feeding outcome studies, either randomized controlled trials or nonrandomized controlled trials, with typically developing adolescents (Lukens & Silverman, 2014). Thus, it is unclear which feeding treatment approaches are most beneficial for this population.

Although children typically eat in the home setting, feeding treatment is usually provided in behavioral health clinics or specialty inpatient programs (Milnes & Piazza, 2014), rarely with an in-home component (Najdowski, Wallace, Doney, & Ghezzi, 2003). Although several studies have utilized parents and teachers as change agents to deliver feeding treatment components in natural settings (Barahona et al., 2013; Gentry & Luiselli, 2008; Wardle et al., 2003), this approach is not currently standard practice. Existing feeding treatment studies with an in-home component target younger children with developmental disabilities (Gentry & Luiselli, 2008; Lukens & Silverman, 2014). Although a number of feeding interventions include parent training, several have not demonstrated a change in feeding behavior (Sharp, Burrell, & Jaquess, 2014), or outcome measures are based on a parent perspective rather than objective data (Morawska, Adamson, Hinchliffe, & Adams, 2014). Continued evaluation of feeding treatments for food selectivity that can be supported in natural settings, particularly in the home environment, is needed.

A recent review of feeding treatment outcomes indicated that all well-controlled single-case feeding treatments for children with severe feeding disorders, either typically developing or with developmental disabilities, used a behavioral approach (Sharp, Jaquess, Morton, & Herzinger, 2010). Behavioral strategies to treat feeding disorders often include contingency management, systematic desensitization, escape extinction, and positive reinforcement (Bui et al., 2013; Clawson & Elliot, 2014; Gulotta & Girolami, 2014; Piazza et al., 2002). Although many larger-scale treatment outcome studies for pediatric feeding interventions are multidisciplinary and include components such as nutrition counseling and oral motor intervention, the contributions of additional components are unclear (Lukens & Silverman, 2014).

Compared with patients with anorexia nervosa and bulimia nervosa, patients with ARFID have higher rates of anxiety disorders. A sample of 712 children ages 8 to 18 with ARFID found that 58% met criteria for an anxiety disorder (Fisher et al., 2014). Despite a high rate of comorbid anxiety disorders, none of the pediatric feeding interventions thus far have incorporated cognitive–behavioral therapy (CBT) as a treatment modality. CBT seems like an appropriate adjunct to behavioral therapy for children with ARFID who present with comorbid anxiety. It is currently unknown if CBT strategies such as relaxation strategies, identifying negative beliefs, and developing positive self-statements could be beneficial for children and adolescents with a history of feeding selectivity.

In the present study, we evaluated the effects of an intervention that incorporated a clinic and in-home treatment component on chronic food selectivity in a typically developing adolescent with ARFID. The treatment illustrated in this case study incorporated a cognitive–behavioral treatment component as an adjunct to behavioral therapy to address the participant's long-standing anxiety associated with eating certain foods. Other clinical attributes of the study were integration of self-recorded outcome measures, direct observation in the clinic, clinician and parent-delivered intervention procedures, and assessment of posttreatment maintenance.

Method

Participant and Settings

Mike (a pseudonym) was a 16-year-old male with a history of food avoidance and anxiety toward eating. At the time of the study, he was an 11th grade student at a public high school. Mike performed well academically, did not have any learning challenges, and planned to attend college after high school. He reported having a consistent group of friends that he socialized with in and out of school.

Mike's developmental history was significant for feeding difficulties. During first and second grades, he received outpatient counseling to address "fear of eating." Mike's mother was unable to recall the specific theoretical orientation of this feeding treatment; however, from parent report, it seemed as though the intervention was play-based and ineffective. In middle school, a psychologist saw him for 6 months to decrease anxiety, anger, and internalizing symptoms. Feeding was not addressed during this course of treatment. Most recently, for 10 months, a nutritionist provided recommendations of foods for Mike to eat to improve his dietary intake and to establish a healthier diet. Despite these services, his mother reported that Mike still had extreme food selectivity and associated feeding anxiety. He had no known medical problems, other than occasional constipation and low energy because of his poor dietary intake. Mike did not have any oral-motor skill delays or broad sensory sensitivities; however, he did show some acute sensory aversion to certain foods. After a recent pediatrician visit, Mike was referred to an outpatient behavioral health clinic at an urban interdisciplinary center. Feeding intervention was conducted at this clinic and also in Mike's home.

Pretreatment Assessment

The senior author (hereafter, "clinician") performed a clinical interview with Mike preceding treatment. Mike confirmed that he avoided fruits, most vegetables, and many proteins. He also acknowledged previously failed treatments, but emphasized that he was eager to reduce his distress about eating and improve his diet. He reported that he was anxious about trying new foods and typically experienced negative thinking, had elevated physiological responses (e.g., trembling, increased heart rate, perspiration), and showed somatic symptoms (e.g., stomachaches). He further complained that when thinking about trying new or nonpreferred foods, he would avoid eating in social situations, such as sitting with classmates in the cafeteria, participating in school trips, and going to restaurants. Based on his limited diet, avoidance of certain foods, impaired psychosocial functioning, and worry about the consequences of eating foods with a specific texture, Mike met the *DSM-5* diagnostic criteria for ARFID (American Psychiatric Association, 2013).

The clinician also conducted pretreatment preference assessment to determine foods that Mike enjoyed and consumed regularly. His diet consisted predominantly of pizza, pasta with tomato sauce, chicken nuggets, and several snack items. When requested to rank-order his most preferred snacks. Mike endorsed pizza-flavored Goldfish crackers, Doritos tortilla chips, KitKat candy bars, and Snyder's pretzel sticks. These foods were subsequently provided to him as reinforcement during treatment sessions (described in Table 1).

In a second phase of pretreatment preference assessment, the clinician presented Mike with bite-size portions of protein (e.g., bacon), vegetable (e.g., carrots), and fruit (e.g., apple). Mike was requested to consume these foods and his responses were recorded. These data revealed that Mike took a few bites of protein but did not consume any of the vegetables or fruits. The assessment results were used to order the presentation of food groups during clinic sessions and in-home meals.

Measurement

During clinic sessions, the clinician presented Mike with foods to consume and recorded bite frequency. A bite was defined as Mike placing the food portion in his mouth, chewing it, and swallowing. Thus, to be recorded as a bite, Mike had to ingest food without expulsion. Following each bite, the clinician asked Mike to rate his subjective units of distress according to a 10-point scale (0 = *not worried*, 10 = *extremely worried*). The clinic data were converted to the number of bites Mike consumed and his distress rating for each bite per session.

Table 1
Foods Presented During Clinic Treatment Sessions

Session	Food group	Protein	Vegetable	Fruit
1	Protein	Chicken nuggets	Carrot	Apple
2	Protein & vegetable	Turkey meatball	Carrot	Apple
3	Protein, vegetable, & fruit	Hot dog	Snow pea	Apple
4	Fruit			Orange
5	Fruit			Strawberry
6	Fruit			Cantaloupe
7	Fruit			Blueberry & honeydew melon
8	Fruit			Raspberry
9	Fruit			Kiwi
10	Fruit			Assorted dry fruit
11	Fruit			Mango & cherry tomato

At home, Mike used a self-monitoring form to record bite frequency according to the same definition as clinic sessions. He also documented his distress ratings similarly. Mike's mother recorded bite frequency simultaneously—her data served as the primary dependent measure for evaluating in-home treatment. The bite frequency data that Mike's mother recorded were converted to a percentage metric based on the proportion of bites he consumed out of the number of bite opportunities, which varied per meal.

Interobserver Agreement (IOA)

IOA was assessed during 63% of in-home meals by comparing the bite frequency data that Mike and his mother recorded. Using a point-by-point agreement ratio (Cooper, Heron, & Heward, 2007), IOA was 100% on all occasions.

Experimental Design and Procedures

We evaluated the effects of clinic and in-home treatment in a combined multiple baseline and changing criterion design (Kazdin, 2011). Clinic treatment featured a changing criterion design applied to protein, vegetable, and fruit food groups. At home, treatment was introduced in a multiple baseline design across the three food groups and a within-group changing criterion format. The changing criterion format, described by Hartmann and Hall (1976), demonstrates experimental control when rates of responding match the desired criterion level. There is no hard-and-fast rule about changes in criterion; however, Hartmann and Hall suggest a minimum of two changes in criterion, with additional changes increasing the internal validity of the intervention. When considering the magnitude and the appropriate time to change of the criterion, a clinician should ensure that the behavior is stable (i.e., tracking the current criterion) before changing the criterion and the magnitude should be "large enough to ensure that the changes in the rate of the target behavior are detectable" (Hartmann & Hall, 1976, p. 531). Clinicians considering this format for treatment should have a foundational understanding of single-subject research design methodology. Mike's family was instructed to increase the difficulty (i.e., criterion level) after he had successfully consumed a certain number of bites, per food group, across meals. This criterion change was applied when Mike consumed his required portion of each food group for at least three consecutive meals. However, because of the time between therapy sessions, or weekly phone calls during breaks, criterion levels were maintained until the experimenter could verify the data logs and change the criterion level.

Clinic Treatment

All clinic treatment sessions were conducted in a small room with only Mike and the clinician present. They sat facing each other at opposite ends of a table. Mike had a plate in front of him, with accompanying utensils, and a glass that was filled with water. Food items that were presented as reinforcement were also located on the table.

During clinic treatment sessions, the clinician placed one bite of food from the protein, vegetable, and fruit food groups on Mike's plate. Table 1 shows the foods that were presented

during the 11 sessions that comprised clinic treatment. In all sessions, the clinician encouraged Mike to eat all of the foods and implemented procedures according to the treatment conditions that were in effect, which are listed in Table 1. Although Mike was very compliant during clinic sessions and finished his required tastes, the sessions were limited by the 50-min duration of the therapy session. If Mike did not comply with the requests within the session time frame, the experimenter would have terminated services for that day.

Behavioral treatment (BT). In the first of three BT sessions, Mike received one piece of a preferred food each time he consumed one bite of the protein food from his plate. The clinician reinforced Mike's consumption of food with accompanying verbal praise. However, there was no reinforcing consequence in effect if Mike consumed a vegetable or fruit food item. In the second BT session, these procedures were implemented for protein and vegetable food groups. That is, Mike's consumption of food was reinforced when he consumed one bite of both a protein and vegetable. Finally, the clinician delivered reinforcement in the third BT session contingent on Mike consuming one bite of protein, vegetable, and fruit.

Behavioral treatment and cognitive-behavioral treatment (BT + CBT). We added eight sessions of CBT to BT because Mike continued to display considerable anxiety and difficulty eating fruit. Thus, in this phase of clinic treatment, only fruit food items were put on his plate during sessions. With BT still in effect (i.e., Mike receiving reinforcement when he consumed bites of fruit), the clinician simultaneously implemented several CBT procedures. First, the technique of *diaphragmatic breathing* was introduced to Mike in one session. He was instructed to engage in diaphragmatic breathing prior to each meal, in clinic and home settings. The beneficial effect of relaxation training, including diaphragmatic breathing, has been exhibited in various studies, including a meta-analysis of 48 studies evaluating relaxation in patient populations (effect sizes ranged from .43 to .66). The evidence demonstrates that relaxation strategies reduce anxiety and somatic complaints (Hyman, Feldman, Harris, Levin, & Malloy, 1989).

Because changes in children's self-talk mediates treatment outcome for youth with anxiety (Treadwell & Kendall, 1996), two CBT treatment sessions focused on *identification and self-monitoring of negative thoughts* and *cognitive distortions*, such as "black and white thinking" and "catastrophizing." Mike also generated *positive self-statements* to utilize when experiencing anxiety about eating. An example of a self-generated positive self-statement for Mike was, "I can eat the fruit and everything will be okay." Mike created similar written statements on a piece of paper and referenced them during clinic sessions and meals at home. Lastly, *visualization* was also introduced during the fourth CBT session. Mike was instructed to generate positive images of himself successfully consuming fruits without difficulty. Following the introduction and practice with each CBT strategy in session, Mike was instructed to continue to utilize the strategies before and during meals across clinic and home settings.

In-Home Treatment

In-home treatment occurred concurrently with clinic sessions. During his dinner meal at home, Mike's mother prepared a plate with portions of protein, vegetable, and fruit. A portion was defined as 10 pieces of food, or the equivalent in multiple smaller pieces (e.g., blueberries) that were 1 in. in diameter.

Baseline. Mike was presented the prepared plate of protein, vegetable, and fruit portions. As well, his mother prepared a second plate of preferred foods, which typically consisted of a grilled cheese sandwich, pasta with and without tomato sauce, pizza, and chicken nuggets, per Mike's request. Both plates were set in front of Mike and he could choose to eat from either one. His mother did not instruct him about eating any of the foods and did not respond if he consumed bites of protein, vegetable, or fruit. The meal concluded when Mike indicated that he was "finished."

Treatment. Mike's mother presented the prepared plate of protein, vegetable, and fruit, then instructed him to eat a specific number of bites in order to receive his preferred meal. The number of bites Mike had to consume was designated for each of the three food groups and were slowly advanced, contingent on his increased consumption over successive meals. To illustrate, for the protein food group, Mike had to initially eat three of the 10 bite-size pieces on

his plate (30%), and thereafter, five pieces (50%), seven pieces (70%), and 10 pieces (100%). For the vegetable food group, the criteria were two pieces (20%), five pieces (50%), and 10 pieces (100%). The criteria for the fruit food group were two pieces (20%), four pieces (40%), six pieces (60%), eight pieces (80%), and 10 pieces (100%).

The CBT component of treatment was introduced at home concurrently with clinic sessions. Recall that the clinician taught Mike various CBT strategies, including diaphragmatic breathing, positive self-statements, and visualization, to address his continued anxiety about eating fruit. The clinician instructed Mike's mother to prompt him to practice these strategies at home during the dinner meal. She also continued to provide reinforcement when he consumed protein, vegetable, and fruit.

Treatment Integrity

The clinician and Mike's mother documented treatment integrity (DiGennaro Reed & Codding, 2011) on a self-recording form within every clinic session and in-home meal. The clinic form had five steps that the clinician marked as "completed" following implementation: (a) prepare plate with specified foods, (b) record bite frequency, (c) provide reinforcement contingent on consumption, (d) cue Mike to record subjective units of distress rating following each bite, and (e) prompt Mike to use CBT procedures. At home, Mike's mother completed a form that had the following five steps: (a) place designated bites of food on plate, (b) provide reinforcement contingent on consumption, (c) deliver instructions for CBT procedures, (d) cue Mike to record subjective units of distress rating following each bite, and (e) record bite frequency. Treatment integrity was measured during 100% of the clinic sessions and in-home meals and averaged 100% and 94.2% (60% to 100%), respectively. The low treatment integrity percentages at home were the result of Mike's mother occasionally failing to place certain foods on his plate.

Maintenance

In-home maintenance data were recorded 1 week after Mike had demonstrated 100% consumption of the three food groups during three consecutive meals. All previously described procedures were in effect during the maintenance phase, with the exception that Mike no longer received a preferred meal as reinforcement. One and 3 months later, Mike's mother recorded his consumption of the three food groups for 1 week under the same conditions.

Social Validity Assessment

Following the study, Mike and his mother completed the Intervention Rating Profile-15 (IRP-15; Martens, Witt, Elliott, & Darveaux, 1985) that was modified to reflect appropriate questions about feeding interventions. Average scores between 5 and 6 on the IRP-15 indicate good intervention acceptability. Additionally, we posed the following open-ended statement to Mike and his mother: "Describe the benefits of participating in this intervention regarding your health, socialization with peers, and energy."

Results

Results of the three clinic BT sessions are presented in Figure 1. Mike consumed seven bites of protein in the first session, receiving reinforcement after each bite. He did not take any bites from the nonreinforced food groups. His distress ratings were variable but gradually decreased and stabilized at a low level of 3 out of 10. In the second clinic session, with the clinician reinforcing consumption of both protein and vegetable, Mike took eight bites from each food group. His distress ratings for protein were relatively stable, between 4 and 5 out of 10, and decreased slightly for vegetables, from 6 to 4 out of 10 as the session progressed. During the third clinic session, in which consumption of all three food groups was reinforced, Mike ate six bites of protein, vegetable, and fruit. Subjective units of distress ratings for protein were initially 5 out of 10 but decreased to 3 out of 10. Mike's ratings for vegetable decreased but remained elevated and stable for fruit.

Shown in Figure 2, Mike bit and spit out two bites of fruit in the initial session of BT + CBT. His distress rating for the first trial was 8 out of 10, and then 7 out of 10. During the second session he licked, bit and spit out, and consumed three bites of fruit. His distress rating when required to lick the fruit was initially 9 out

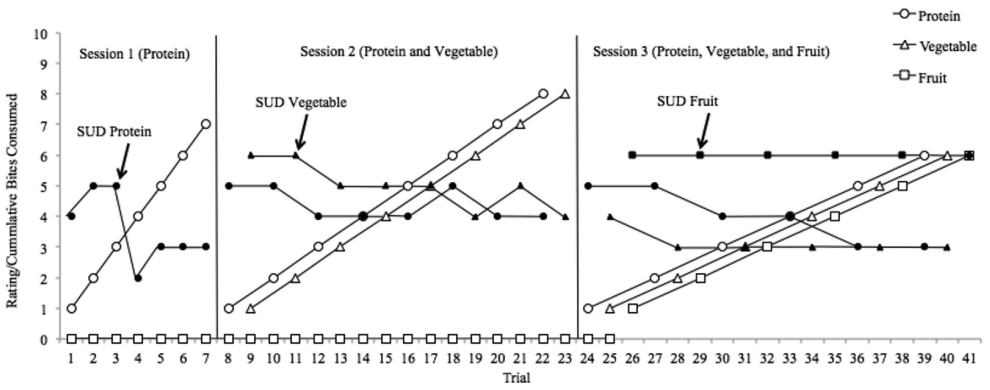

Figure 1. Bites consumed and subjective unit of distress ratings per trial during behavioral treatment clinic sessions. SUD = subjective unit of distress.

of 10, which decreased to 8 out of 10; he indicated the same ratings after biting and spitting out the fruit. Mike's rating when consuming fruit was consistently 9 out of 10. In the third BT + CBT session, Mike licked the fruit three times, bit and spit out the fruit once, and consumed the fruit once. His distress ratings when required to lick the fruit was initially 8 out of 10, and eventually 7 out of 10. He had ratings of 9 out of 10 after biting and spitting out, and after consuming, fruit.

Mike did not attend clinic treatment sessions for 6 weeks because of a vacation from school and scheduling conflicts. However, his mother continued to implement treatment at home. When he returned to the clinic for his fourth treatment session, Mike consumed eight bites of fruit and his distress ratings were stable at 5 out of 10. Thereafter, in Sessions 5 through 8, he consumed between 6 and 12 bites of fruit per session, and his distress ratings were in the range of 5 to 8 out of 10.

Figure 3 presents the results of in-home treatment. For the protein food group (top panel), Mike consumed 10% of the presented food during two of the three baseline meals. With BT, he gradually consumed more protein foods at each meal, meeting the imposed criterion, and eventually achieving 100% consumption within all meals. For the vegetable food group (middle panel), Mike did not consume a bite during the baseline phase. With one exception, he achieved the imposed bite criterion every time during BT, starting at 20%, then 50%, and stabilizing at 100%. In the case of the fruit food group (bottom panel), Mike did not consume a bite during the baseline phase. He consumed 20% in the first BT meal, but none thereafter. During the next five sessions, Mike's mother did not provide the standard portion of fruit at meals because she observed that he was displaying increased anxiety and was concerned about his lack of progress eating fruit. With the addition of CBT at home, Mike was gradually able to consume increasing amounts of fruit, beginning at 20% and advancing through 40%, 60%, 80%, and 100% of his meal.

Figure 4 represents Mike's distress ratings following in-home treatment meals. During the first three meals (targeting protein only), he rated distress as a 5 to 6 out of 10. Next, treatment was applied to protein and vegetable during meals and his ratings initially decreased to 4 out of 10, increased for one meal, and decreased again. When all three food groups were targeted, Mike's distress ratings remained at 3 out of 10 before increasing to 8 out of 10, then gradually decreasing to 2 to 3 out of 10. During intervention for fruit, Mike rated his distress at 9 to 10, but these ratings slowly decreased and, with continued treatment, dropped to a level of 5 out of 10. His distress ratings for protein and vegetable remained at 3 out of 10 during the beginning CBT treatment for fruit before reaching a zero level. At the end of treatment, Mike was still given his preferred meal after completing the required portions, which he ate.

Mike consistently consumed 100% of the required portions of protein, vegetable, and fruit

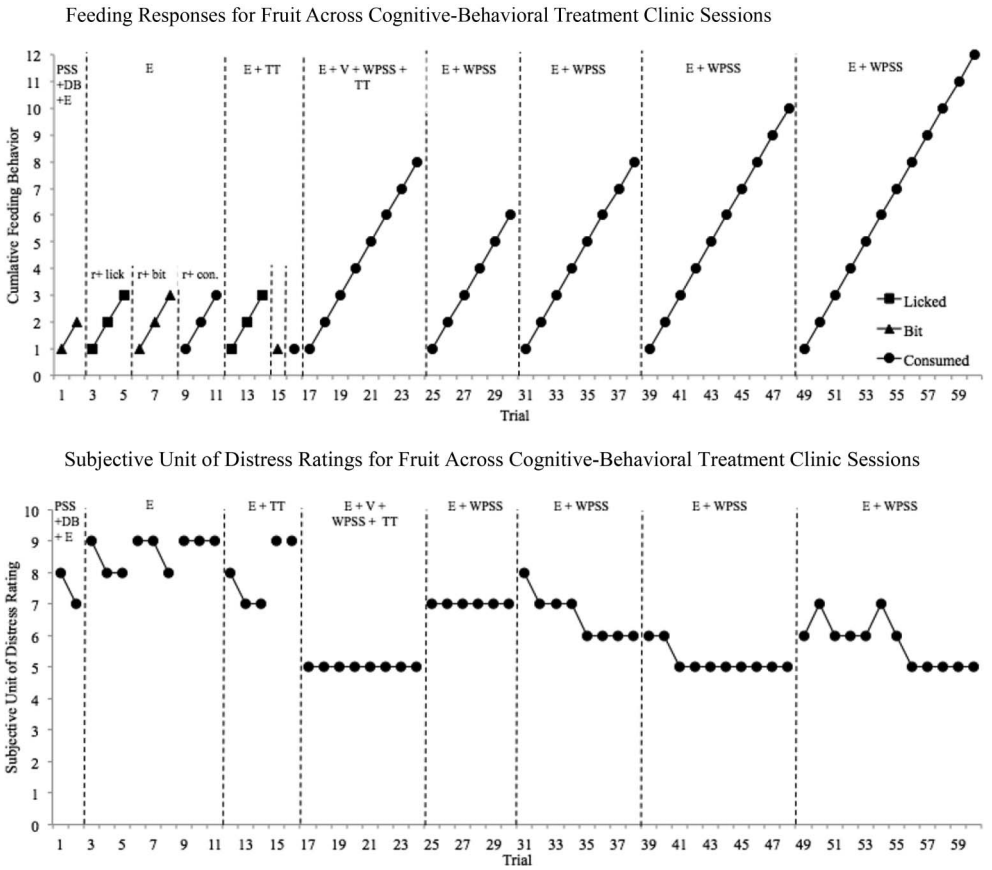

Figure 2. Feeding responses, bites consumed, and distress ratings for fruits per cognitive–behavioral treatment clinic sessions. PSS = positive self-statements; DB = diaphragmatic breathing; E = exposure; TT = discuss thought traps; V = visualization; WPSS= written positive self-statements, r+ = reinforcement provided; lick = participant licked fruit; bit = participant bit and spit out fruit; con = participant consumed fruit.

during maintenance and follow-up phases. During maintenance and follow-up, the plate of preferred food was removed. His distress ratings were 0 for the protein and vegetable food groups. For fruit, his maintenance ratings were 4 to 5 out of 10. During the 1- and 3-month follow-up, his distress ratings for fruit declined further to a range of 0 to 2 out of 10.

Both Mike and his mother reported high acceptability of the feeding intervention, with scores of 5.73 and 5.80 on the IRP-15, respectively. Mike stated that treatment "allowed me to go out and eat with family and friends without anxiety, learn new ways to handle my anxiety, and not worry about eating new foods." He also indicated that he was no longer constipated, had daily bowel movements, and experienced more energy than before. His mother commented that treatment "helped my son feel that he can eat in a group environment and made him more social in eating situations." She further believed that Mike now had more confidence and that feeding intervention "has been the best thing I have done for my son."

Discussion

The combination of clinic and in-home treatment effectively increased consumption of previously rejected foods and decreased associated feeding anxiety in an adolescent with ARFID. Preceding treatment, Mike ate limited protein

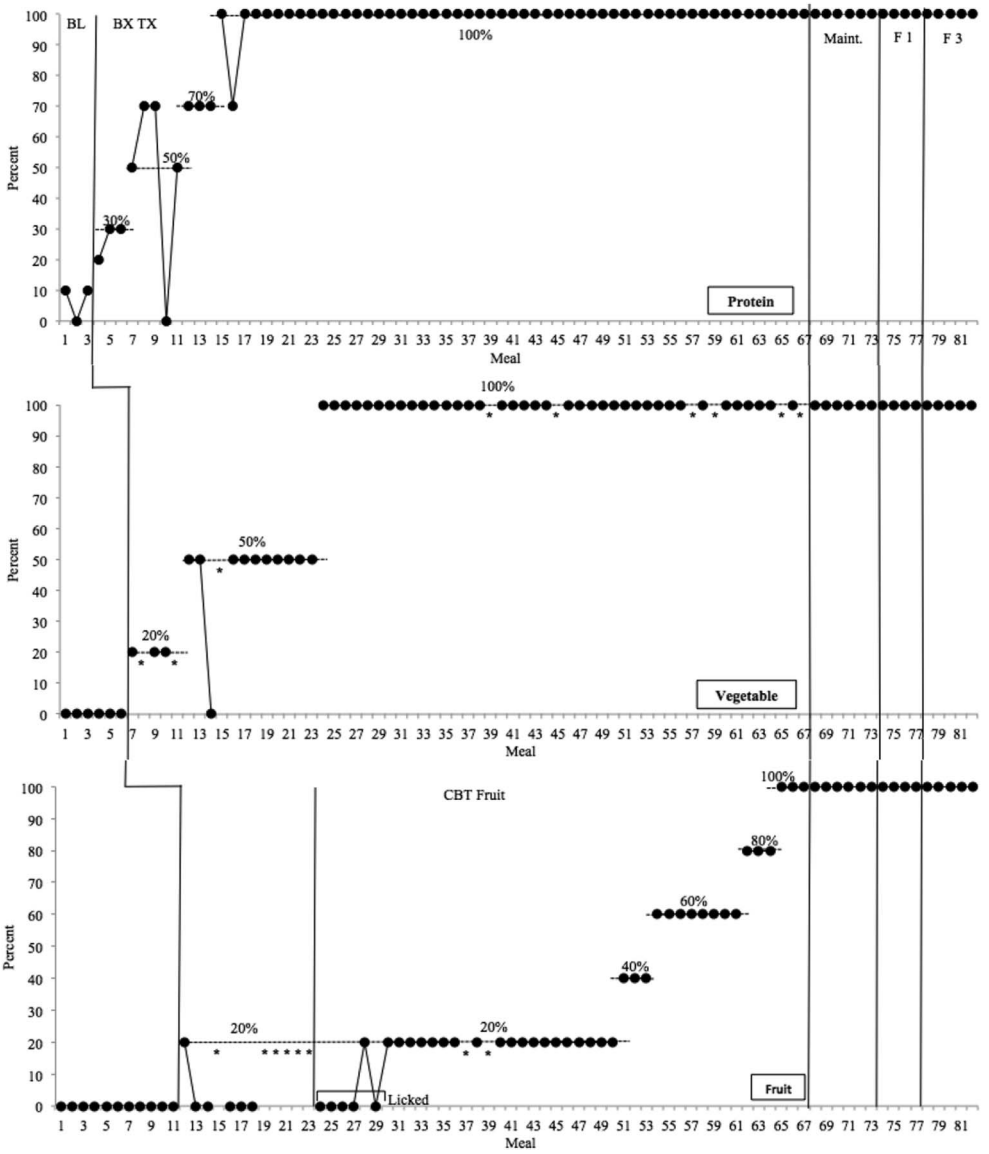

Figure 3. Percent of foods consumed per in-home meal across food groups. BL = baseline; BX TX = behavioral treatment; CBT Fruit = cognitive–behavioral therapy targeting fruits; Maint. = maintenance; F1 = 1-month follow-up; F3 = 3-month follow-up; * = food missing from plate.

products and avoided vegetables and fruits. His chronic food selectivity made him socially uncomfortable, led to an unhealthy diet, and caused physical complications (e.g., constipation). Through BT and CBT, Mike was able to consume a greater quantity and variety of foods. Notably, these positive results were maintained posttreatment. Finally, both Mike and his mother judged the procedures and outcome to be highly acceptable.

The basis of clinic sessions was to introduce treatment under the most controlled conditions and to evaluate procedures accordingly. The clinician was able to conduct preliminary assessment, which informed later treatment implementation. This intervention was effective

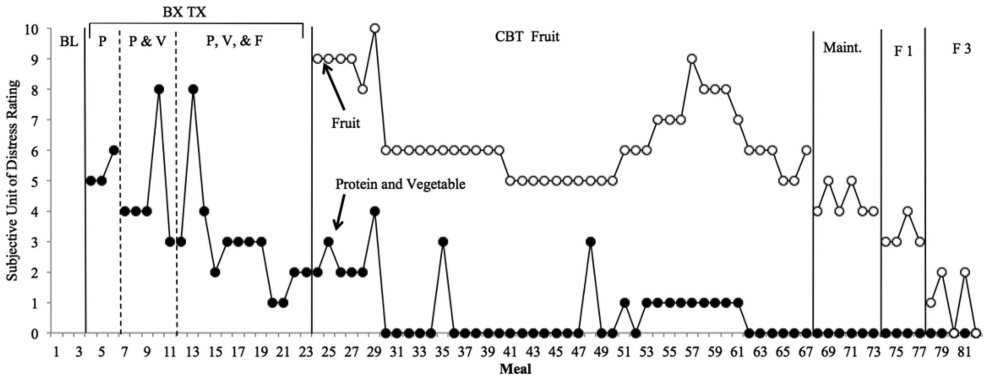

Figure 4. Distress ratings per in-home treatment meals. BL = baseline; BX TX = behavioral treatment; CBT Fruit = cognitive–behavioral therapy targeting fruits; Maint. = maintenance; F1 = 1-month follow-up; F3 = 3-month follow-up; P = protein targeted; V = vegetable targeted; F = fruit targeted.

with protein and vegetable food groups (BT), and additional procedures (CBT) were effective in decreasing feeding anxiety associated with eating fruit. Notable aspects of clinic treatment were gradually increasing feeding demands in the context of a changing criterion design, teaching Mike to successively approximate consumption of fruit, and incorporating subjective units of distress ratings as a corollary measure of treatment outcome.

There is compelling evidence that the effects of BT do not transfer to other settings unless strategically programmed (Stokes & Baer, 1977). Therefore, another facet of clinic treatment was identifying procedures that could be extended successfully to Mike's home. The clinician instructed Mike's mother how to implement BT and CBT during clinic visits with her son. Although it was not possible to observe the parent applying the procedures in the home, we provided her with a self-monitoring procedural checklist to support treatment integrity. Certainly, the multiple baseline evaluation revealed that treatment increased Mike's consumption of the three food groups at home and with accompanying anxiety reduction. Nonetheless, future research should consider methods for independently confirming the treatment integrity of care providers in order to best interpret the results of intervention plans.

As noted previously, the BT procedures in this study have been applied frequently in feeding intervention for food selectivity, particularly with children and youth who have developmental disabilities (Gulotta & Girolami, 2014). Virtually all plans have included reinforcement of nonpreferred food consumption through access to pleasurable stimuli such as toys, sensory stimulation, or, as in Mike's case, preferred food. Making reinforcement contingent on progressively more bites or food quantity is also a method of demand fading that has empirical support (Luiselli, 2000; Volkert & Piazza, 2012).

Mike and his mother were motivated to improve his feeding status and decrease persistent worry about eating certain foods. However, various strategies were utilized to help maintain client motivation throughout treatment. For instance, Mike's preferences were assessed at the beginning of treatment to utilize as reinforcement. In addition to client variables, psychotherapy outcome research indicates that the therapeutic relationship and therapist variables are associated with positive therapeutic outcomes (Zirkelback & Reese, 2010). Although similar results may not have been achieved with a client who was less motivated at the beginning of treatment, Mike likely maintained motivation for a variety of reasons, including treatment-specific and nonspecific factors. To help maintain motivation throughout treatment, it is imperative to conduct a preference assessment at the beginning of treatment via self-report, performance rating scales, or several stimulus presentation-choice formats (Tiger & Kliebert, 2011).

An important consideration of the treatment efficacy was Mike's 6-week absence from clinic treatment sessions. During that time, Mike's mother spoke with the clinician once, and, by parent report, his mother continued to provide the treatment at home and collect data. In the conversation with Mike's mother, she was not provided with additional guidance, but she was able to review the previously implemented procedures. Because Mike's behavior at home sessions improved during the break from clinic treatment, it was hypothesized that continued exposure to foods reduced his SUD ratings and increased his consumption. It is recommended that practitioners using the intervention from the current study encourage parents to continue to implement treatment (even if on a break from clinic sessions), collect data, maintain correspondence with parents, and reduce the latency between sessions if possible.

Mike responded positively to CBT procedures for reducing his anxiety about eating fruit. Consistent with a diagnosis of ARFID (Fisher et al., 2014), pretreatment assessment revealed that he avoided fruit because of high anxiety regarding anticipated and negatively perceived sensory effects, such as a "squishy" sensation in his mouth. Even after initiating CBT, Mike still had to approximate actual consumption by first licking a piece of fruit, then taking a bite, and spitting it out. Of course, it is not possible to isolate which of the CBT procedures contributed most to anxiety reduction. The primary therapeutic objective was to provide Mike with several CBT strategies in hopes of achieving the most potent effect. His gradually decreasing distress ratings in the clinic and at home support the conclusion that he experienced less anxiety contemporaneously with increased fruit consumption. These findings suggest that CBT may be a useful approach for treating youth with ARFID in which anxiety is a dominant symptom that causes them to avoid eating.

Clearly, future research is required in order to replicate the results of this study and generalize findings across children and youth with similar food selectivity. We further note that IOA assessment was limited to in-home meals and that, on several occasions, Mike's mother did not provide the correct portion of fruit on his plate.

Despite these limitations, this study illustrates the process of conducting a clinical case study for a pediatric problem, namely, ARFID, using an integrated model of clinic-home treatment, combined application of BT and CBT methods, social validity assessment, and durable posttreatment outcome. Further extension of this research is necessary to document effective feeding interventions with typically developing youth, and specifically individuals with AFRID. Continued exploration and development of feeding treatments that address comorbid psychological factors, such as anxiety, among youth with ARFID are likely to be of benefit to this population.

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