5-2023

A Multi-level Comparison of Increasing Training Modalities to Train Behavior Analysts to Conduct an Intensive Pediatric Feeding Intervention

Ronald Joseph Clark

A multi-level Comparison of Increasing Training Modalities to Train Behavior Analysts to Conduct an Intensive Pediatric Feeding Intervention

by

Ronald Joseph Clark

A dissertation submitted to the College of Psychology and Liberal Arts of

Florida Institute of Technology

in partial fulfillment of the requirements

for the degree of

Doctor of Philosophy

in

Behavior Analysis

Melbourne, Florida

May, 2023

We the undersigned committee hereby approve the attached dissertation,
"A multi-level Comparison of Increasing Training Modalities to Train Behavior Analysts to Conduct an Intensive Pediatric Feeding Intervention."

by

Ronald Joseph Clark

_____

David A. Wilder, Ph.D., BCBA-D
Professor
School of Behavior Analysis
Major Advisor

_____

Vida L. Tyc, Ph.D.
Professor
School of Psychology

_____

Kimberly N. Sloman, Ph. D., BCBA-D
Associate Professor
School of Behavior Analysis

_____

Elbert Blakely, Ph. D., BCBA-D
Assistant Professor
School of Behavior Analysis

_____

Robert A. Taylor, Ph.D.
Professor and Dean
College of Psychology and Liberal Arts

Abstract

Title: A multi-level Comparison of Increasing Training Modalities to Train Behavior Analysts to Conduct an Intensive Pediatric Feeding Intervention

Author: Ronald Joseph Clark

Advisor: David A. Wilder, Ph.D., BCBA-D

A common focus within behavior analytic clinical practice is to incorporate training with caregivers to promote successful transition of clinical services. In the pediatric feeding literature, for example, training caregivers to ensure maintenance and generalization of the intervention is expected. However, training staff members to provide specific behavioral interventions has received less attention. The current study systematically implemented three levels of training to evaluate the level of intensity required to train behavior analytic staff (i.e., behavior technicians, Registered Behavior Technicians®, and Board-Certified Behavior Analysts®) to implement a feeding protocol with a role play partner. Only one participant met the mastery criteria following the first training phase, which included written instructions and video modeling. Following seventy-two hours of exposure to the instructional materials, participants were provided an opportunity to ask clarifying questions on the procedure (second training phase). Only one participant met mastery in this phase. Four other participants required in-vivo feedback and modeling (third training phase) to master the protocol. Clinical implications and future research directions are discussed.

Table of Contents

List of Figures

Acknowledgement

I would foremost like to express my appreciation to my academic advisor, Dr. David A. Wilder, for his support with this project and your continuous mentoring throughout my program. I would also like to thank my dissertation committee for their guidance. I am deeply grateful to all the faculty I met during my time at Florida Tech for their passion and continuous support throughout my academic pursuits. I'd also like to thank my feeding colleagues for their encouragement and trust in learning what it takes to become a strong feeding clinician.

I would like to extend an enormous thanks to all my classmates, cohort members, research assistants, and all the students I met along my graduate journey. It has been a privilege to grow alongside you as we worked towards achieving the most in ourselves and the individuals we helped. I would not be where I am now if not for each of you who supported and encouraged me.

Finally, I would like to thank my family for their support as I went off to chase my dreams and goals. Although it has taken longer than anticipated to reach this milestone, I could not have accomplished such a feat without you. From near or far, I appreciate all your love and belief in my abilities. It helped me more than you know.

Dedication

This project is dedicated to my father and mother, who with love have supported my efforts and academic pursuits for many years. I very much appreciate everything you have done for me.

Chapter 1
Introduction

Behavior analysis is a scientific field of study that consists of four domains. The first domain, radical behaviorism, focuses on the philosophy and conceptual analysis of behavior. This domain informs practitioners and researchers of the concepts and philosophical underpinnings that behavior analysis as a science includes. The second domain focuses on basic behavioral processes and is called the experimental analysis of behavior. Scientists interested in this domain commonly work towards understanding and extending behavior analytic knowledge of behavioral principles. The third domain is called applied behavior analysis. Researchers in this domain typically work to apply behavioral principles to solve socially significant issues (e.g., food refusal). Finally, the fourth domain is service delivery. This domain is the application of science to clientele to treat clinical issues. The field of behavior analysis is growing rapidly; all four domains are experiencing this development.

Behavior analysts focus on the environment of an organism to evaluate the contingencies affecting that organism's behavior. It is through this naturalistic approach to behavior that behavior analysts are able to identify, assess, and develop interventions for a wide range of topics (Baer et al., 1968). These applications of behavior analysis have resulted in effective procedures for the assessment and treatment of severe problem behavior (e.g., aggression), self-injurious behavior (e.g., eye gauging, hand-to-head slapping), as well as the acquisition of socially important developmental behaviors (e.g., language, communication, dressing; Kelley et al., 2022; Mitteer et al., 2022; Saini et al., 2015). Behavior analysis has also been successfully applied to business and organizational practices through performance management, systems and process analysis, and behavioral

safety (Green et al., 2002; Schulz & Wilder, 2022). Although behavior analysts have emphasized the extension of their work into clinical and organizational avenues, the field continues to expand into novel areas of practice and research (Alligood & Gravina, 2021). One of those areas is in the treatment of pediatric feeding disorders.

Pediatric feeding disorders have been a specialized area of focus for many behavior analysts. These Board-Certified Behavior Analysts (BCBA®) and Board-Certified Behavior Analyst – Doctoral (BCBA-D®) practitioners have dedicated resources and knowledge in applying the principles of behavior to assess and treat children who present with a wide range of feeding difficulties. Treatments have focused on decreasing the emission of disruptive inappropriate mealtime behaviors such as head turns, swatting the eating utensil, and throwing of food. Behavior analysts have intervened on challenging behaviors exhibited by children who present with food selectivity, total food refusal, avoidant restrictive food intake disorder (ARFID), oral aversion, and other feeding concerns. The goal of feeding therapy is to increase the child's self or nonself consumption of these foods and progress to age-appropriate eating skills (e.g., chewing).

Feeding concerns affect upwards of 90% of children with autism spectrum disorder (ASD) and 25% of typically developing children (Marshal et al., 2014; Volkert & Vaz, 2010). Children with feeding disorders (e.g., food selectivity, ARFID) struggle with these persistent feeding concerns. If left untreated, these concerns can lead to severe consequences (e.g., malnutrition, diabetes, reliance on external enteral feedings). Behavior analysis is the most empirically supported approach to the treatment of feeding concerns. A meta-analysis of intensive multidisciplinary intervention for pediatric feeding disorders by Sharp et al. (2017) showed that of the 11 articles included, eight (73%) included behavioral interventions in the treatment of the feeding concerns.

One common feeding disorder observed in the pediatric population is food selectivity. Selective eating occurs when a child eats an insufficient variety of foods and is observed in up to 70% of children diagnosed with autism spectrum disorder who present with feeding concerns (Twachtman-Reilly et al., 2008). Often, children with food selectivity consume diets that are high in unhealthy foods, such as foods high in fat, sugar, and salt (Peterson et al., 2016). These children are at a higher risk of being diagnosed with additional health concerns due to chronic exposure to unhealthy eating patterns. Behavior analysts focused on the treatment of food selectivity often target an increase in novel foods in the client's diet and an increase in the volume of oral consumption (Peterson et al., 2016). Target foods typically consist of foods across the primary food groups (i.e., protein, carbohydrates, fruits, vegetables). These children are often seen in day treatment or outpatient feeding programs that employ staff that specialize and have intensive training in behavioral feeding therapy.

Children who present with total food refusal are also treated in these types of clinics but may be more likely to need day treatment services. This group of children avoid consumption of most, if not all, food items. This population often present with high levels of inappropriate mealtime behaviors while caregivers' attempts to feed them do not result in any caloric intake. Children with severe food refusal often rely on enteral supplemental feedings in the form of a feeding tube (i.e., gastrostomy tubes, nasogastric tubes). For these children, intensive behavioral treatment is a last resort for increasing oral nutrition and a lifetime of feedings via supplemental nutrients. The intensity and commonality of these cases has resulted in a growing focus on research and treatment.

Research in this area has demonstrated the benefits of behavioral treatments on a wide range of challenging feeding behaviors and feeding skills such as self-drinking

(Peterson et al., 2015), syringe fading (Groff et al., 2014), packing (Volkert et al., 2011), and texture manipulations (Kadey et al., 2013). Research continues to expand the variety of treatments for many behavioral feeding concerns. Pediatric feeding therapy is a well-supported approach to a wide range of pediatric feeding concerns (Peterson et al., 2016; Peterson et al., 2019; Piazza et al., 2003). However, the focus on effective training procedures within the feeding literature has been almost exclusively on caregiver training. This is a logical first step to effective treatment; following successful intervention by a trained therapist, it is important that caregivers are able to maintain these results outside of the clinic. However, in some settings and situations, it may be equally important to train staff members in clinics, schools, and group homes to implement feeding protocols.

In the field of behavior analysis, there are limited opportunities for professionals to acquire adequate training in behavioral feeding therapies. Additionally, as is clear in the literature, the components that are most successful to train caregivers to high integrities are not always consistent with the most effective interventions for training behavior analytic staff. A needed step in behavioral feeding research is to analyze and assess the variables that promote efficient and effective skill acquisition across behavior analytic staff members. It is important to begin to assess what training components are required and necessary to increase the opportunities and understanding that behavior analysts face during feeding difficulties in their own professional practices. According to Clark et al. (2023), 93.35% of respondents (i.e. behavior analysts) stated that they have faced a feeding concern exhibited by a client in the past 12 months. Few studies have focused on the training of behavior analysts in the implementation of feeding assessment and interventions. If variations in interventions are required depending on which population is being trained, it is crucial that researchers begin to understand how to introduce more

therapists to feeding training so that more clientele can be treated using a behavior analytic approach.

Staff Training

Ibañez et al. (2023) conducted a study evaluating the effects of behavioral skills training on the implementation of one condition in a standard outcome baseline for feeding. These researchers used a a nonconcurrent multiple baseline design across participants to evaluate the effects of behavioral skills training (BST) on three areas of the protocol: (1) bite presentation, (2) acceptance versus no acceptance, and (3) post-acceptance. Each component of the intervention was categorized into these three areas and then trained in isolation. The implementation of behavioral skills components were implemented sequentially and consisted of: (a) written instructions, (b) modeling, and (c) rehearsal plus feedback. All training occurred during role-play with the participant utilizing a role play partner acting as the child. Additionally, two of the participants experienced in-situ training in which they were exposed to implementation of the standard outcome baseline with current pediatric clients. Results showed that BST was successful in training all eight participants in the study to implement a structured mealtime protocol; procedural integrity reached 100 percent for all participants. This is currently the only staff training study to evaluate various training components on the skill acquisition of behavioral staff to implement a feeding assessment protocol.

Caregiver Training

Training is a key component of successful behavioral interventions. Deficiencies in treatment integrity can have a detrimental effect on the performance of both the caregiver and client (Mitteer et al., 2021). Therefore, many clinicians and researchers have focused their efforts on identifying the procedures that are most effective at increasing treatment

integrity across implementors. This focus has extended across clinical areas and includes pediatric feeding disorders. In the feeding literature, caregiver training has been studied across interventions and context. Researchers have established that training caregivers (e.g., parents) to implement effective interventions has a direct effect on maintenance of previously mastered goals (Clark et al., 2020). Unfortunately, feeding researchers have not yet identified the key components in effective staff member training. Typically, studies focused on feeding interventions state that a "trained therapist" implemented the intervention. However, no studies have analyzed what methods are required for the training of behavioral staff implementing intensive feeding protocols. It is important to understand what has been effective at increasing caregiver implementation to directly compare and extend our understanding of these methods when training future behavior analysts within this specialized area of intervention.

Werle et al. (1993) were among the first to evaluate caregiver training to treat chronic food refusal in children. The study was completed within the participant's homes and included three caregiver-child dyads. All children had been identified and referred as participants from an outpatient clinic due to chronic problems regarding food refusal. Data were collected via a nonconcurrent multiple baseline design across dyads. During baseline, caregivers were instructed to feed their child "as they typically would". Following baseline, all caregivers were exposed to a behavioral training program. The program consisted of multiple components and began with basic educational information on child nutrition and suggestions on how to introduce novel foods. Within the training program information, caregivers were instructed how to provide contingent attention throughout the meal. This included teaching caregivers' direct prompts, delivery of rewards, ignoring certain maladaptive behaviors (e.g., crying), and two mild corrective procedures contingent

on attempts to elope from the eating surface and food expulsions. Additional training components included instructions, discussions, handouts, role playing, verbal feedback following meals, and periodic videotape reviews. Training was implemented for the first five to 13 sessions of the initial treatment phase. The duration of this phase was dependent on the dyad's behavior during mealtimes. During treatment sessions, the authors reviewed the training targets with the caregivers, which was then followed by a brief discussion and videotaped observations. Each pre-session training was conducted for 20 to 30 minutes. The results of the intervention focused on both caregiver and child behavior. For caregivers' behavior, two of the three participants exhibited an increase in correct delivery of positive attention during the treatment phases. The third participant dropped out of the study after five treatment sessions. When focusing on the second caregiver-focused dependent variable, an increase in trained prompts was observed with clear differentiation between the rate of trained prompts versus vague prompts emitted by caregivers during mealtimes. These data suggest that the training program was effective at improving caregiver targets during the study. Additionally, child behaviors also improved; an increase in the number of bites swallowed was evident across all child participants.

Anderson and McMillan (2001) evaluated the use of escape extinction and differential reinforcement as treatment for food selectivity with caregiver implementers. In this study, escape extinction was combined with differential reinforcement, and the effects of the intervention on child bite acceptance was observed. The efficacy of caregiver implementation was modeled in the child's natural environment. The participant in the study was a five-year-old boy with pervasive developmental disorder. During baseline, the caregivers were instructed to feed the child as they typically would. No further instructions were provided. In the treatment phase, the caregivers were trained to conduct the

intervention (i.e., escape extinction and differential reinforcement of alternative behavior) via written instructions, task clarification (i.e., discussion over the written instructions), modeling, videotaped review, and feedback delivered weekly. For the video modeling, the caregivers were provided the opportunity to watch a video of the first author implementing the intervention with another child. During this, the caregivers were encouraged to role-play with one another, with one acting as the child, as they rehearsed the intervention without the child. The feedback was initially provided following the first three consecutive sessions of implementation. Following these sessions, the feedback schedule was reduced to one meal per week. Results of the study were mixed. Although not the primary dependent variable of the investigation, the first authors reported that the parents had difficulty implementing the procedure. Across various components of the study, the caregivers' treatment integrity was variable. For following the bite with a reinforcer, the caregivers implemented this step for 100% of bites for fruits but did not reinforce bite acceptance across all preferred foods. With the implementation of escape extinction, the caregivers implemented the procedure for 60% of fruits and only 22% of bites with preferred foods. This study suggests that the infrequent use of feedback may not be appropriate for training caregivers in a naturalistic setting. A more intensive training regime may be required to ensure high treatment integrity levels outside of a center-based setting. Regardless, the percentage of bites consumed increased across children during the treatment phase.

Mueller et al. (2003) conducted a study evaluating various training packages on the effects of treatment integrity across parents implementing pediatric feeding protocols. The researchers evaluated various components to train caregivers and examined treatment durability across settings with follow-up data within the clinic and in the home. The first

study utilized access to written protocols during baseline and combined verbal instructions, therapist modeling, and rehearsal training during the intervention phase. The participants in the first study included three parents of two children admitted into a day-treatment program. The primary dependent variables in this study were caregiver behaviors and consisted of correct prompts and correct consequences. In baseline, the caregivers were given access to the written protocol, but no further explanations were provided. In treatment, the therapists verbally explained the protocol to the caregiver followed by a model for each step. One therapist played the role of the child while the other played the therapist. The therapists used a script to ensure all components of the study were modeled. Additionally, the treatment package consisted of rehearsal in which the caregiver role-played the feeding with the therapist acting as a child confederate. For one caregiver, an additional component of post-session feedback was conducted. In this study, all caregiver's performance levels improved to high integrity levels. One month following the last intervention phase, a maintenance probe was conducted for one participant. The probe showed the trained behaviors maintained at high integrity levels.

In the second study, six caregivers participated. These were caregivers of three children in a day-treatment facility for the treatment of severe feeding concerns. Baseline was consistent with study 1 and the procedures for written instruction, modeling, and rehearsal remained the same. However, in the second study, participants were exposed to a unique combination of these three components. Two caregivers received verbal instructions and modeling, two caregivers received verbal instructions and rehearsal, and two caregivers received only verbal instructions. Each of the dyads saw an increase to mastery level across each of the various treatment packages. However, the dyad with only verbal instructions required two sets of verbal instructions to increase their levels to

mastery. This study suggests that both resource intensive (e.g., modeling, rehearsal) and resource light (e.g., verbal instruction only) methods for training caregivers may be sufficient to teach them to implement a feeding protocol at high integrity levels.

Phaneuf and McIntyre (2007) evaluated the effects of individualized video feedback combined with group parent training on inappropriate maternal behavior. Using a multiple baseline across four mother-child dyads, the authors added individualized video feedback to a group-based parent training program. The group-based parent training program was the Incredible Years™ (Webster-Stratton, 2005) program and is a curriculum originally developed for typically developing children with or at risk for behavior disorders to target inappropriate-child interactions and inappropriate child behaviors. In the Incredible Years™ program, group sessions were held every week for 2.5 hours. The primary areas targeted in this curriculum were: a) play and involvement, b) praise and rewards, c) limit setting, and d) handling misbehavior. The training consisted of group discussion, generic video vignettes, role playing, and feedback. Additionally, caregivers were assigned homework for practice, but this component was not measured or monitored throughout the investigation. The individualized feedback component was introduced across caregivers and consisted of videotape observations from the previous week's sessions. During the videotape observations, caregivers were provided a sheet to review while the author paused during an inappropriate caregiver behavior and asked the caregiver to identify appropriate alternative behaviors. Each successfully identified alternative was praised and practiced for three rounds. These practice opportunities consisted of modeling, rehearsal, praise, and corrective feedback. If the video did not show any inappropriate behaviors the author would pause the video every two minutes and provide the caregiver praise. Across all caregivers, the level of intervals with maternal inappropriate behavior

was reduced in the individualized video feedback phase when compared to the group training treatment phase. The researchers note that each participant received at least one to three individualized video feedback sessions during this phase, however, the focus of the investigation was not to analyze the individualized video feedback phase, but rather to analyze the comparison. Future research could look into which components of the video feedback had the largest impact on behavior change.

Najdowski et al. (2010) implemented a home-based parent training approach to treat food selectivity in children. The protocol taught was a combination of differential reinforcement of alternative behavior combined with nonremoval of the spoon and demand fading. The participants were three caregiver-child dyads. All participants were recruited from the Nevada Center for Severe Behavior Problems (NCSBP). The children in the dyads consumed 12 or less foods and emitted inappropriate mealtime behaviors in the presence of edible stimuli. The primary dependent variables were both caregiver behaviors (scored in 77.5% of sessions) and child behaviors. Measured caregiver behaviors varied across phases. During baseline and generalization probes, data were collected on: a) correct implementation of a three-step prompting procedure (i.e., vocal, gestural, and physical prompts), b) allowing 30-s of escape contingent on inappropriate mealtime behaviors, and c) highly preferred foods delivered within 5s of an acceptance and/or swallow of low preferred foods. During treatment sessions and follow-up, data were collected on: a) correct implementation of non-removal of the spoon, b) number of correctly represented bites, c) attention extinction for inappropriate mealtime behaviors, d) escape prevented until bite requirements were consumed, and e) highly preferred foods delivered within 5s of an acceptance and/or swallow of low preferred foods. Additionally, data were collected on the total number of sessions requiring supervision before the caregivers met 90% to

100% of the training criteria across phases. During the trainings, caregivers were provided data sheets to collect their own data along with written instructions and operational definitions. The researchers read the written descriptions of the procedures while simultaneously modeling the behaviors with another investigator. The caregivers were then provided the opportunity to role-play with the researcher acting as the child. In addition to these pre-session components of training, the researchers also provided in-vivo feedback to the caregivers as they implemented the protocol with their child. The mastery criteria for treatment integrity was two consecutive sessions for baseline, treatment, and generalization probes, with an accuracy of 90% or higher. Once caregivers met mastery, they continued to implement sessions without supervision with the researchers. However, they were required to video record one unsupervised meal per week. This video was then reviewed on a weekly basis with the caregiver while the researcher provided specific positive and corrective feedback. All caregiver participants demonstrated a mean of 99% treatment integrity across all experimental phases. The percentage of sessions that required supervision and training ranged from 14% to 22% of total sessions. This study utilized a consultative approach to training caregivers to implement a pediatric feeding protocol in a home setting. The data suggest that caregivers can maintain high levels of treatment integrity following a resource-heavy component to training including reviewing videotapes with caregivers and providing specific and corrective feedback. The researchers were able to successfully fade out the training once the mastery criteria was met.

Seiverling et al. (2012) evaluated the effectiveness of BST on caregiver treatment of their child's food selectivity using a multiple baseline design across caregiver-child dyads. Participants of the study were three mother-child dyads. The children in the dyads were diagnosed with ASD and had been evaluated for feeding concerns in a hospital-based

feeding clinic. The primary dependent variable was the percentage of steps performed accurately during both taste sessions and probe meals. Taste sessions were defined as the presentation of a single bite of food. The probe meals were 10-minute meal blocks consisting of novel foods in which there was no requirement for children to consume the bites of food. During baseline sessions, caregivers were provided a written task analysis for both taste and probe meal sessions and told to conduct the steps without further instructions. Following baseline sessions for both types of meal blocks, caregivers moved into the treatment phase. Treatment consisted of identical procedures for both taste sessions and probe meals. The caregivers were first exposed to treatment for the taste sessions followed by probe meals. The treatment started with the researcher reading the written task analysis out loud. Following this step, the researcher modeled two sessions for the caregiver. Once the modeling was complete, the researcher asked the caregiver to rehearse the session. Following the rehearsal, the researcher provided three comments regarding correct performance and two comments regarding incorrect performance. The BST process was repeated followed by a phase without feedback. Once the caregiver independently met an average level above 90% correct step implementation, the researcher repeated the training for probe meals. Following the treatment phase, a post-training phase identical to baseline was conducted. Finally, the researcher conducted weekly follow-up sessions for up to four weeks following the completion of the post training phases. During baseline, caregivers averaged less than 50% correct implementation during taste sessions and 70% for probe meals. The percentage of steps implemented correctly increased to an average of 97% following BST training. Caregivers in the study were asked to provide their opinions on the effectiveness of the BST package. All caregivers rated the BST training package as excellent and identified the modeling component as the most helpful for their skill

acquisition. All caregivers met mastery during the BST training phase without requiring any booster sessions across the duration of the study. These results suggest that BST is an efficient and effective training package for teaching caregivers to implement feeding protocols in the home setting.

Pangborn et al. (2013) evaluated the effectiveness of caregiver training practices to teach caregivers to implement a pediatric feeding protocol. The participants in this investigation were four caregiver-child dyads. The participants consisted of two children admitted into an intensive feeding program with both caregivers participating for each child. The researchers collected data on both the child and caregiver behaviors. The dependent variables for caregivers consisted of vocal prompts (e.g., "take a bite"), vocal praise (e.g., "good job taking that bite"), escape prevention, physical prompts (i.e., hand-over-hand prompts, jaw prompts, finger prompts, and side deposits), representations, and the duration of access to preferred items. Although similar, the feeding protocols for both children varied slightly. For the first participant, the protocol consisted of escape extinction, a finger prompt, representation, jaw prompt, and continuous access to a preferred item contingent on bite acceptance. The second participants' protocol consisted of escape extinction, a finger prompt, a side deposit, representation, hand-over-hand, a jaw prompt, and noncontingent reinforcement (NCR) in the form of access to a preferred DVD throughout the meal.

During baseline, caregivers were instructed to feed a meal as they would at home. These baseline sessions were 10 minutes in duration and the only additional instruction to caregivers was to feed for the entire 10 minutes. Using a multiple baseline design, the researchers implemented the caregiver training phase. During phase 1, caregivers were required to observe a minimum of 80% of the therapist-fed meals during their child's

admission. During these observation periods, caregivers were provided rationales for each component of the treatment protocol to ensure the caregivers were able to observe each component. No further procedural information was provided during this phase. In phase 2 of the training, caregivers were exposed to both written and verbal protocol review. Caregivers were provided the written protocol while each aspect of the intervention was described. Caregivers were provided the opportunity to ask clarification questions during this phase. Each question was answered with only verbal explanations. Following the written and verbal review, caregivers took a 10-question quiz in which the caregiver had to score at least 90% correct to pass to the next phase. In the next phase, researchers conducted video review with the caregivers. This review was on a previous caregiver-led probe meal. During the review, correct and incorrect components were analyzed with the researcher verbally describing the correct implementation. Following the review, caregivers were required to review a second portion of the video and identify correct and incorrect responses of their own behavior. A score of at least 90% was required to progress.

The next phase consisted of structured observations. In this phase, the caregivers observed a therapist-fed meal while collecting data on both child and therapist behavior. A second therapist collected data on interobserver agreement. Once the caregiver met 90% interobserver agreement (IOA), the caregiver transitioned to the next phase. The final training phase consisted of modeling. This phase introduced the caregivers to two therapists modeling the protocol; one therapist acted as the feeder while the other acted as the child. This was to ensure the caregivers were exposed to all aspects of the protocol. Following the observation, the caregiver was asked to prompt a novel feeder to demonstrate 10 procedures described in the protocol. Once they correctly prompted at least

90% of opportunities they transitioned to the last two phases that consisted of role-play and immediate feedback. However, these phases were not needed as caregivers met criterion after the modeling phase. The criterion was determined via probe sessions. Following each phase of training, caregivers conducted probe sessions with their child. If criterion was met during a probe session, caregivers were no longer required to continue through the remaining phases. For the caregivers of one child, an increasing trend in correct implementation can be observed as the researchers progressed across training phases. The participants progressed to the modeling phase before reaching mastery criteria, where high levels of correct implementation were observed throughout the phase. For the other child, caregivers met mastery in the video review phase and did not require any additional training. These data suggest that caregivers can be trained to implement pediatric feeding protocols to high integrities by training successive components. This allowed the researchers to avoid excessive training components that otherwise would not have been needed (e.g., role-play). Due to the sequential implementation of the protocol, the researchers suggested that a cumulative effect may have occurred, however, the usefulness of sequential training procedures allows for a more efficient training program for caregivers. Minimizing the required training components allows for more individualization of the training and increases the practicality of the training acquisition.

Murphy and Zlomke (2016) evaluated a behavioral feeding intervention while simultaneously training caregivers to implement the procedure. The participant was a six-year-old girl with a history of feeding comorbidities and a diagnosis of Avoidant/Restrictive Food Intake Disorder (ARFID). Although it consisted of several components, ranging from caregiver behaviors to treatment plans for the participant's behaviors, the relevant training components consisted of training for the parents on fear

and avoidance, training caregivers to utilize a reward system, modeling this system, identifying when to deliver attention, in-vivo feedback, and coaching of differential reinforcement and direct strategy procedures. During the initial training, the caregiver's mother was trained to differentially reinforce, through the delivery of attention, appropriate feeding-approaches and positive mealtime behaviors while simultaneously ignoring avoidant behaviors. During the coaching sessions, the researchers coached in-vivo through a bug-in-the-ear device as the caregiver fed their child. The coaching delivery utilized a fading procedure to fade out the frequency of precise guidance to only providing supportive feedback when appropriate. Each section of the study exposed the caregiver to systematic implementation and training of the various components. For example, when teaching differential reinforcement, the caregiver was first exposed to instruction and task clarification from the researchers, followed by sessions of coaching these behaviors. Following differential reinforcement, the caregivers were trained on direct strategies (i.e., "EATS") followed by coaching sessions on these procedures. Following treatment, the caregivers were successfully able to implement the procedures. There were no standardized measures used to track caregiver behaviors, but qualitative observations by the researchers suggest that the caregiver made substantial improvements while self-reporting that their confidence while feeding meal blocks improved. The child also saw decreases in feeding difficulties according to the Behavioral Pediatrics Feeding Assessment (BPFA; Crist and Napier-Phillips, 2001) scores.

Aclan and Taylor (2017) evaluated a caregiver training protocol on the generalization and maintenance of successful pediatric feeding interventions. The primary purpose of this study was to evaluate the effects of instructions and feedback on caregiver implementation of feeding protocols. The researchers identified that previous research has

relied on multicomponent treatment packages in the treatment of feeding. This has limited the ability to pinpoint the critical components required to increase caregiver treatment integrity. The study utilized a multiple baseline across dyads design with two caregiver-child dyads to assess the intervention. The children in the study had previously achieved success for food selectivity using a protocol implemented by a trained clinician. The primary caregiver behaviors measured consisted of both antecedent and consequent based components of the protocol. These behaviors were gaining the child's attention, placing the food in front of the child, presenting the initial instruction, providing or denying access to tangible or praise accurately, and blocking and redirecting inappropriate mealtime behavior. During baseline, caregivers had access to written instructions for protocol implementation and an additional 15 minutes for question asking. During treatment, performance feedback was provided via phone and/or email communication within 12 hours of the session recording. Feedback was contingent on praising accuracy, identifying inaccuracies, and suggesting targets for improvement. Across all participants, caregiver performance improved using only verbal feedback. Additionally, child behavior (i.e., bites consumed) also remained at moderate to high levels, ranging from 70% to 100% for mastered foods. The baseline consisting of only written instructions had no effect on integrity levels. This may suggest that the feedback functioned as either positive reinforcement (i.e., feedback was preferred) or punishment (i.e., corrective feedback was aversive). The authors proposed that feedback may be the most important component of any training package targeting caregiver behavior for pediatric feeding protocols.

Alaimo et al. (2018) conducted a study evaluating the effects of behavioral skills training and a general-care training package on caregiver implementation of a food selectivity intervention. Participants in this study were three caregiver-child dyads in which

the children were seen by an interdisciplinary team in a pediatric feeding clinic. Each child demonstrated food selectivity, and all had underlying medical issues ruled out prior to participation. The authors collected data on both caregiver and child behaviors. The primary caregiver dependent variable was the percentage of correct steps performed out of applicable steps for treatment sessions. Data were collected on the following steps: a) presentation of correct food, 2) bite presentation or nonremoval of the spoon, c) verbal praise, d) re-presentation, e) attention extinction for inappropriate mealtime behaviors, f) mouth clean checks, g) contingent breaks, and h) conducting a total of six bites. Highly preferred foods were delivered within 5s of an acceptance and/or swallow of a low preferred food. Experimental control was evaluated using a nonconcurrent multiple baseline design across caregiver-child dyads.

During baseline, caregivers were provided a written task analysis on how to conduct the treatment sessions. The protocol for baseline consisted of a repeated tasks exposure of single bites procedure. The treatment phases used both behavioral skills training with general-case training (GCT). GCT has been shown to result in generalized responding to untrained exemplars in several studies outside of the pediatric feeding literature (e.g., discrete-trail training, natural language paradigms). The authors developed several scripts using GST to train caregivers to respond correctly to a variety of commonly documented child mealtime responses. The training program consisted of four steps. The first step involved the experimenters reading the protocol aloud and answering any caregiver questions. The second step involved the researchers modeling one trial while simulating child behavior using one of the prewritten scripts. The next step involved rehearsal in which the caregiver rehearsed the procedure presented in the preceding trials with a researcher acting as a child. Each script was systematically developed to provide the

caregiver opportunities to practice all procedures in the task analysis. All scripts sampled a few steps in the task analysis, ensuring that when combined, all steps were included. In the final step of the training procedure, the researchers provided feedback based on the caregiver's performance. The feedback highlighted both correct and incorrect performance. All steps were repeated for each script (five scripts total). Finally, the caregivers were asked to implement a five-trial assessment without feedback to ensure acquisition. Once the caregivers implemented the assessment at a mastery level of 90% or higher, they began post training sessions with their child.

During baseline, steps implemented correctly ranged from 29% to 76%. All caregivers scored 100% steps implemented correctly during the five-trial assessment. During post-training sessions with the child, steps implemented correctly ranged from 96% to 100% across the three dyads. During follow-up sessions, steps implemented correctly remained at 100%. Two of the participants submitted the social validity questionnaire. Participants were asked about the acceptability of the training protocol. One participant rated the training as excellent and found rehearsal to be the most helpful component. The second participant rated the training as excellent and stated the instruction and feedback as the most helpful component. This study showed that preferences for training components may vary across participants, but that the use of GSL and BST may be beneficial in ensuring caregivers are contacting various components of the intervention prior to implementation with their child. The researchers note that due to simultaneous presentation of the training components, it is unclear which training components were necessary in the acquisition of caregiver implementation. The authors proposed that future research should conduct component analyses to determine necessary components of the training package.

Bloomsfield et al. (2019) evaluated the treatment of food selectivity in a child with a diagnosis of avoidant/restrictive food intake disorder through parent teleconsultation. In this investigation, the participant was an eight-year-old boy with a history of feeding problems. The initial training for the caregiver incorporated behavioral skills training which included didactic instruction, modeling the required behaviors, and performance feedback on the implementation of the procedure. During the first teleconsultation meeting, the researcher provided the caregiver with didactic instructions that described the procedures for the intervention as well as the data collection procedures. Following the description of the procedure and the instructions, the researcher modeled the protocol for the caregiver. The final step of training consisted of the caregiver role-playing the intervention, via teleconsultation, while the researcher provided performance feedback. During the intervention phase, the caregiver continued feedings during the week and met with the consultant on a weekly basis. During these consultations, the researcher provided performance feedback and continued to model portions of the intervention. Feedback was provided immediately following the observed behavior, as well as a summary at the end of the consultation meeting. When the caregiver engaged in correct behaviors according to the protocol, the researcher provided behavior-specific praise. Corrective feedback was provided and delivered to always outline an appropriate behavior change for the caregiver to engage in. Data were collected on the treatment integrity of the caregiver. A checklist was used that outlined the intervention steps. The caregiver treatment integrity checklist consisted of five steps. Caregiver integrity data were collected for 33% of sessions and had a $M = 94\%$. However, caregiver training was not the focus of this study, it is important to note that the feeding protocol in this study did not include an extinction component. The authors of the investigation called for treatment development on feeding concerns and mild

forms of avoidant/restrictive food intake disorder that do not require extinction to implement to increase caregiver compliance and maintenance of feeding protocols.

Bachmeyer-Lee et al. (2020) focused on training caregivers a pediatric feeding protocol utilizing in-vivo techniques. Previous researchers have shown positive effects when implementing BST to increase acquisition of correct treatment protocol implementation. The most frequently studied components of BST include written and verbal instructions, modeling, rehearsal, and feedback. In the current investigation, Bachmeyer-Lee et al. (2020) evaluated the utilization of fewer components to determine their effects on training. The authors included in-vivo feedback and written instructions using a multiple baseline design. The participants in this study were three caregiver dyads, each with a child diagnosed with a pediatric feeding disorder. During baseline, caregivers were exposed to their child's individualized written protocol and were allowed to ask questions to the therapists prior to sessions. However, once baseline sessions began, the authors referred the clients to the written protocol following further questions. Each dyad's protocol consisted of escape extinction, attention extinction, and continuous access to preferred stimuli with removal following inappropriate mealtime behaviors or the absence of acceptance. During intervention, caregivers were exposed to both positive and constructive feedback. Positive feedback consisted of pinpointing behaviors that were implemented correctly based on the steps within the written protocol. Constructive feedback pinpointed behaviors not consistent with the written protocol. Once caregivers were conducting sessions with stable levels of treatment integrity (i.e., at or above 80% with correct antecedent and consequence procedures) they transitioned to post training sessions. The post training phase continued until participants maintained 80% or greater treatment integrity in the absence of feedback during or after sessions. In-vivo feedback

was effective across all participants. An increase in percent correct of antecedent and consequence-based interventions was observed across each dyad. These high levels of treatment integrity maintained during the post training phase and for participants who implemented follow-up sessions. The authors noted that if participants did not meet a predetermined mastery criterion, then participants would have been exposed to further training components consisting of verbal instructions, modeling, and role play. These components were not needed during the duration of the study.

Clark et al. (2020) conducted an experiment evaluating the effects of written instructions and video modeling to train caregivers of children with pediatric feeding concerns. The participants were three parent-child dyads. The child in each dyads had a diagnosis of ASD. The children in the study met the criteria for a mild form of food selectivity, defined as consuming fewer than six proteins, six starches, six fruits, and six vegetables. In this study, the authors implemented two primary treatment phases with a third phase following, if deemed necessary. In baseline, caregivers were presented with foods and were asked to feed their child. No further instructions were provided. Authors collected data on the primary dependent variable, percentage of steps that parents performed accurately, based on a 37-step task analysis developed by the first author. The task analysis highlighted the essential components necessary for implementing the structured meal protocol used in the study. Following baseline, caregivers were provided a binder containing written instructions and links to all video models. The written instructions consisted of the formal protocol, a caregiver friendly version of the protocol that had removed behavioral jargon, and a cheat sheet of the written instructions that highlighted the main components of the protocol. The video models consisted of several videos, uploaded to Youtube™, that modeled the first author implementing each

component of the protocol with a role play partner. All potential outcomes for the protocol were modeled, ensuring that each component of the task analysis was covered in video modeling format. The caregivers had access to these videos and the written instructions for 72 hours. Once 72 hours elapsed, the caregivers conducted the intervention phase of the study. The authors did not provide any task clarification and instructed the caregivers to feed their child. If caregivers met the mastery criteria, the study was complete. If caregivers failed to meet the mastery criteria, they transitioned into the third phase consisting of in-vivo feedback and in-vivo prompting. This phase was outlined to replicate a typical, "resource-heavy" feeding training. Only one dyad met the mastery criteria in the second phase of the study, while the remaining dyads required exposure to the third phase to meet mastery. This study highlights the potential benefits of "resource-light" training modalities and outlines directions for further research.

Several studies evaluating various training components have been conducted with caregivers learning feeding protocols. In this literature, the most common components implemented were instructions (i.e., 13 of 13) followed by feedback (i.e., 11 of 13). These components are easily implemented and are commonly used. These require little resources and allow caregivers to learn the interventions in the absence of clinical staff. Modeling and rehearsal/role-play both were evaluated in eight of the 13 studies. These components require more resources to be implemented but allow caregivers to practice interventions to which they were exposed. These components are also commonly used in clinics, especially feeding clinics. It is important to further evaluate these components with behavioral staff to determine if new staff require intensive resources to train to high levels of treatment integrity.

Escape Extinction

Pediatric feeding disorders extend from picky eating to intensive feeding concerns that result in severe medical comorbidities. In cases presenting with severe behavioral challenges, escape extinction (EE) has been shown to be effective. Many studies have shown that EE is associated with an increase in bite acceptance (Kirkwood et al., 2021; Peterson et al., 2016). Although EE is considered the "gold standard" of pediatric feeding disorder treatment, research is limited in the training of this protocol. Clinicians have different approaches to training their staff. These trainings can consist of feedback, video modeling, in-vivo modeling, rehearsal, or some combination. Although EE has been studied, more research is needed on how to train both staff and caregivers to proficiency. Limited research has focused on training caregivers on EE, both as initial-interventionist and for generalization of initial therapy. In fact, there are no studies that evaluate the training of staff to implement this procedure. It is important to further our understanding of the training mechanisms necessary to train behavior therapists. As behavioral treatment becomes a more prescribed therapy for feeding disorders, behavior analysts will need to train more staff to meet this demand. A foundation of staff training procedures for feeding protocols will be necessary to assist the field in increasing its competency in this area.

Peterson et al. (2016) conducted a treatment comparison of a modified sequential oral sensory approach to a behavior analytic approach to feeding therapy. In this investigation, child participants were exposed to either nonremoval of the spoon (a form of EE) with continuous interaction (or an avoidance procedure for one participant) or the modified sequential oral sensory (M-SOS) approach to feeding, including but not limited to, components such as a sensory routine, sensory steps including touch, smell, taste, and systematic bite presentation. Three participants were randomly assigned to each condition

(i.e., ABA and M-SOS). Following exposure to their initial condition assignments, all participants in the ABA group demonstrated an increase in consumption of target foods. Comparatively, no participants in the M-SOS had an increase in consumption during therapy. Due to this, all participants initially in the M-SOS group were reassigned to the ABA group. In this phase, all participants engaged in higher levels of consumption.

Berth et al. (2019) extended the literature on reinforcement procedures in the treatment of pediatric feeding problems. In their study, Berth et al. compared the effects of differential reinforcement of alternative behavior (DRA) and NCR to treat five children with a feeding disorder. Following this comparison, the authors evaluated the relative effects of EE with and without NCR or DRA. The participants' ages ranged from four to five-years-old. The feeding problems presented across the participants ranged from inadequate solid and liquid intake to total refusal consisting of 100% of daily caloric needs being met through an external nutritional supplement (i.e., Pediasure^{TM}). The functions of participant's IMB were identified though a functional analysis prior to the treatment evaluation. Two of the participant's IMB was maintained by negative reinforcement alone while the remaining participant's IMB was maintained by both negative and positive reinforcement. A combined multielement and reversal design was used to demonstrate experimental control during the comparison of NCR and DRA, and when needed, in combination with EE. For all participants but one, EE was necessary to increase acceptance of bites. For the participant who did not need EE, DRA and NCR were equally effective in treating solid intake while DRA was the most effective reinforcement procedure to increase liquid consumption. Of the four participants who needed EE, three saw an enhancement to the EE procedure when it was combined with positive reinforcement. Two of these enhancements saw better results with DRA while the third participant saw better results in

combination with NCR. The authors showed that positive reinforcement was an effective component for the participants when treating IMB even when the IMB was maintained by positive reinforcement. The authors suggest that positive reinforcement procedures may be a logical addition to treatment consisting of EE. One interesting discussion from the study notes that the results for one participant (i.e., the participant who did not need EE) suggest that positive reinforcement was sufficient in decreasing IMB and aligns with previous research that suggests positive reinforcement may be effective at competing with negative reinforcement for some children (Riordan et al., 1985; Wilder et al., 2005). The authors note that the effects of DRA and NCR seem idiosyncratic across participants but note that if NCR can suppress IMB then acceptance may increase correspondingly. Additionally, the authors proposed that NCR may be an effective procedure to decrease aversive properties related to the mealtime due to continuous access to preferred stimuli during the meal block. NCR may serve as an abolishing operation when IMB is maintained by tangibles due to the decreasing value of tangibles during mealtime. Berth et al. (2019) suggested that future research should utilize large-scale clinical trials comparing the procedures using pretreatment functional analysis to compare when NCR and DRA are necessary for treatment across functions. Additionally, the authors suggest future research replicate the study using a reversal design and compare both caregiver attention and preferred tangibles separately during the reinforcement procedures.

Kirkwood et al. (2021) evaluated the implementation of escape extinction on inappropriate mealtime behaviors (IMB) during two conditions. In the first condition, the feeder implemented EE with attention contingent on any IMB. In the second condition, the feeder implemented EE with no attention provided. Participants' rate of IMB decreased

and acceptance increased across both conditions. This suggests that EE was effective in isolation regardless of whether attention was provided contingent on IMB.

Behavioral interventions are a viable and effective treatment for pediatric feeding concerns. Feeding challenges can cause high stress among caregivers and develop into larger medical concerns. Due to this, the field has a responsibility to understand and work towards a more feasible and accessible approach to providing these services. This includes research on the most efficient methods to train behavioral staff interested in helping this population. The options for accessing this intensive training are limited and the research has not yet addressed this problem. Therefore, the purpose of the current study was twofold: 1) to evaluate which components of validated training methods are necessary for behavioral staff; and 2) to determine the level of training required to implement a highly intensive feeding procedure, EE.

The focus of the current study was to analyze which training components have the largest impact on skill acquisition. The study did not aim to draw comparisons among treatments, but rather, to better understand how to train behavior analysts most efficiently to high levels of treatment integrity when implementing an intensive feeding protocol.

Chapter 2
Methods

Participants

Six behavior analytic staff participated in this study. Of the six participants, three were behavioral technicians working towards their certifications, two were registered behavior technicians (RBT®), and one was a board-certified behavior analyst at the doctoral level (BCBA-D®). Two participants were recruited through additional training at the Florida Autism Center and two participants were recruited via the onboarding process at the Florida Autism Center's specialty feeding clinic. This study was included in their new hire training course. Two participants were recruited via word of mouth.

Inclusion criteria included (a) a lack of prior experience implementing escape extinction in a feeding context; (b) currently working as a behavior therapist; (c) and a lack of prior observation of escape extinction being implemented in a feeding context in the past 6 months.

Setting and Materials

Training included typical meal block materials used in a feeding program. These included bowls, small maroon spoons, a tray, a baby spoon, two timers, paper, pens, a scale, a camera, a computer, gloves, and paper towels. The role play partner used randomized behaviors predetermined from a worksheet to determine when to engage in certain IMB during each bite trial across each session. All materials were prepared in the feeding room prior to the participant entering the room. All materials required to engage in 100% of steps implemented correctly were present on the table from the start of each baseline and training session prior to the participant entering the session room. Meal blocks took place at a table with two chairs: one for the feeder and one for the role play partner.

Sessions were recorded with a video camera to assist in scoring interobserver agreement and treatment integrity data.

Role Play Partner

The first author acted as the "child" during the duration of the training. All "child" behaviors were pre-determined and randomized across participants. Randomization occurred across sessions, but not within session (i.e., bite trials remained consistent within each predetermined session). This method was used to ensure that all participants were exposed to the same frequency, duration, and magnitude of inappropriate mealtime behaviors. This is a variable for which no prior studies have controlled. This helped to ensure that no participants were exposed to more behaviors than others, thus eliminating additional learning opportunities during each training phase.

The various topographies of role play behaviors were based on the most common behaviors seen in intensive feeding programs. These included head turns, contact of the client's hand to the feeder's arm and feeding utensil, verbal refusal, blocking deposits with the hand, packing, and expels. The behaviors were emitted in various rates across bite trials and remained consistent in intensity and magnitude across participants. It is worth noting that not all topographies of escape-maintained behaviors were included in this training (e.g., operant vomiting, throwing utensils). The primary purpose of this training was to evaluate the effects of training methods on the training of an intensive feeding protocol. The purpose was not to train highly competent feeding therapists, capable of conducting the procedure without further supervision and training. Due to this, only the most common topographies of maladaptive feeding behaviors were included at lower intensities than exhibited by a typical feeding client admitted into a day treatment program.

Response measurement

A task analysis was developed (see appendix A) that included all appropriate behaviors and components of the protocol. The task analysis consisted of presession, intra-session, and post session components and included all elements necessary to train novel feeding staff to feed and implement the target intervention. The participants were evaluated on all the relevant components. Each participant was exposed to a range of applicable components that were scored across sessions (e.g., if the role play partner packed a bite, there were three behaviors the feeder needed to engage in rather than a single behavior for an incompatible mouth clean). The task analysis consisted of 19 steps with 13 steps being replicated across the five trials per session. The remaining 6 steps of the task analysis included pre- and post-meal behaviors that occurred once per meal block and were thus scored once per session. Sessions were either scored during the training session or via the recorded sessions. The task analysis steps were scored across each bite trial. If the role play partner behaviors promoted incompatible target behaviors according to the task analysis (e.g., active acceptance praise and non-active acceptance attention extinction), a NA was scored for the behavior that could not occur. This prevented the participant from receiving a lower score on total percent correct due to the role play partner behavior arrangements.

Interobserver agreement

Two independent observers collected data with the use of the task analysis on all participants across all phases of the study. The primary data collector recorded each participant's performance either by reviewing video-recorded sessions or during live sessions, and an independent observer scored interobserver agreement (IOA) data by reviewing video-recorded sessions. Agreements occurred when both observers scored a step as correct or incorrect. Disagreements were scored when only one observer scored a

step as correct or incorrect. The total number of agreements per sessions were divided by the total number of disagreements plus agreements and then multiplied by 100. IOA data were collected for 33% of all sessions in the study. The IOA ranged from 81% to 100% across all participants with an average of 94%.

Mean IOA for Behavior Technician 1 was 96% in baseline, 90% in training phase 1, 100% in training phase 2, and 96% in training phase 3. The mean IOA for Behavior Technician 1 across all phases was 96%. Mean IOA scores for Behavior Technician 2 was 93% in baseline, 93% in training phase 1, 91% in training phase 2, and 98% in training phase 3. The mean IOA for Behavior Technician 2 across all phases was 94%. The mean IOA across all phases for Behavior Technician 3 was 95%. Behavior Technician 3's mean IOA was 96%, 95%, 92%, and 98% across baseline, training phase 1, training phase 2, and training phase 3, respectively. Mean IOA for RBT® 1 was 91% in baseline, 89% in training phase 2, and 96% in training phase 2. The mean IOA for RBT® 1 across all phases was 92%. Mean IOA for RBT® 2 was 90% in baseline, 86% in training phase 1, 91% in training phase 2, and 90% in training phase 3. The mean IOA for RBT® 2 across all phases was 89%. Finally, the mean IOA for BCBA-D® 1 was 95% in baseline and 97% in training phase 1. The mean IOA for BCBA-D® 1 was 96% across all phases.

Procedural integrity

Research assistants scored procedural integrity of the role play partner behaviors for 30% of all sessions across all phases of the study. The observers reviewed the recorded sessions and scored the role play partner on correct or incorrect responses when engaging in the pre-determined "child" behaviors across all bite trials. These data were collected to ensure that the participants were exposed to the same role play partner behaviors across the training to control for variations of responses and increased learning opportunities.

Procedural integrity remained high across participants with a range of 85% to 88%, with an average of 86% across participants.

Experimental design

A nonconcurrent multiple baseline across participants design was used to demonstrate experimental control. The six participants were split across two separate multiple baseline designs to emphasize the effects of the interventions absent of extended time delays between baseline to intervention. With staff being the population for this study, prolonged baseline measures are unnecessary and may hinder outcomes when evaluating complex procedures, such as those that occur in an intensive pediatric feeding clinic (Harvey et al., 2004). A nonconcurrent multiple baseline provided the flexibility to study a wide range of behavioral training interventions in a short period of time.

Target intervention

All participants were taught an EE and attention extinction (AE) procedure with a DRA component for the delivery of attention in the form of praise. This procedure is a foundational intervention in pediatric feeding and is often one of the first interventions to which new staff and caregivers are exposed. This is because EE is considered the "gold standard" of pediatric feeding programs. This protocol is essential when training new staff.

During the EE + AE + DRA protocol, the feeder should keep the bite of food in contact with the participant's lips while simultaneously blocking instances of IMB. Additionally, the feeder should withhold any attention contingent on IMB. This procedure eliminates the negative (e.g., escape) and positive (i.e., attention) reinforcement that IMB has produced in the past. If the child begins to expel bites of food following acceptance, the feeder should gather the expelled bite and represent the bite into the child's mouth to decrease the escape that expulsion provides. Operational definitions were identified for

components of the protocol that included latencies outlining a correct or incorrect response (e.g., expelled bites should be re-presented within three seconds following the expulsion). The protocol included additional criteria for a blocker; however, this criterion was not incorporated into the training of this study.

General procedure

Baseline

During baseline, the participant entered the training room with full access to all materials necessary to implement the procedure at 100% integrity. The role play partner sat next to the feeder based on the feeder's dominate hand. Once the seating was arranged, the researcher instructed the participant to "implement an escape extinction, attention extinction, and DRA procedure". Following the delivery of this instruction, the researcher did not provide any further instructions. The researcher began the video recording to label the session and then prompted the feeder, "you can start whenever you are ready." Following this instruction, the participant began to feed while the role play partner engaged in the predetermined "child" behaviors. The session ended if one of three requirements were met: (a) the feeder stated the session was over; (b) the feeder fed more than five bites; or (c) the 10-minute meal block cap was met. Once one of these criteria was met, the researcher ended the video with a countdown and began the next session. No explanation was provided.

Treatment Phase 1 – Written instructions and video modeling

Following baseline, the participant completed a five-question contact quiz prior to receiving the training materials. The purpose of this quiz was to show that the participant had not previously been exposed to the training materials. All participants in the study scored below a 60% in the pre-contact quiz allowing them to continue their participation.

Following this quiz, the participant and researcher set the first treatment session start date. Seventy-two hours prior to the start of the treatment phase, the participant was provided the formal written protocol as well as a link to three video models of the protocol. These video models consisted of the author modeling three complete sessions of the protocol from beginning to end. In the videos, a research assistant acted as the child according to a set script. Following complete observation of all three videos, participants were exposed to all potential outcomes and child behaviors of which the participant could be evaluated and scored. Once the 72 hours elapsed, the protocol was removed from the participants access, the link to the videos was removed, and the participant completed the same contact quiz. The purpose of the post-contact quiz was to show that the participant had contacted the materials in enough detail to move forward with the training. All participants scored 60% or higher and were allowed to continue the training.

During this phase, the meal block was identical to the baseline sessions. The researcher did not answer any questions and conducted the video recordings in the same manner as described above. This phase was conceptualized as being similar to a situation in which a behavioral staff member acquires materials online or contacts the information following a conference presentation.

Treatment Phase 2 – Procedural clarification

During the brief second phase, participants were allowed five minutes of clarifying questions. The researcher set a five-minute timer and allowed the participant to ask questions regarding the protocol. The researcher did not provide information beyond the questions asked. This phase ended when the participant stated they had no more questions, or the five-minute timer elapsed. Once the timer elapsed, no more questions were answered, and the researcher conducted sessions identical to the previous phases. All

sessions in this phase were conducted in a single meal block to control for time variations between phase 1 and phase 2 across each participant. On average, all participants asked four questions with a range of 2 to 6 questions. No participants used the entire five minutes allotted for procedural clarification. This phase was conceptualized as being equivalent to a situation in which a staff member has access to a feeding expert and a limited opportunity to ask questions.

Treatment Phase 3 – In-vivo feedback and modeling

In the final phase of training, the participants were exposed to in-vivo feedback and modeling. Prior to and following each session, the researcher provided feedback on the participants' behaviors according to each step in the task analysis. Additionally, the researcher modeled each step performed incorrectly and provided feedback on participant performance and the correct implementation for each step. Following the feedback and modeling, the participant immediately conducted the next session. This phase continued until the participant met mastery criteria.

Mastery criteria was set at correct implementation of the protocol at or above 85 percent treatment integrity for three consecutive sessions. This mastery criteria is commonly used in pediatric feeding programs when identifying whether intensive pediatric feeding protocols are being implemented effectively. Additionally, this criterion is also generally used to identify when to introduce a blocker (i.e., additional behavioral staff focused on the blocking of high intensity inappropriate mealtime behavior) into the meal. Once the procedural clarification increases to 85% or greater integrity for three consecutive sessions, the blocker is typically removed. This phase was most like typical pediatric feeding program training and is considered a "resource-heavy" training method. This was

conceptualized as being equivalent to a situation in which a staff member has been trained in a feeding program by a feeding expert.

Social validity

All participants were asked to complete a brief social validity questionnaire (see Appendix B) consisting of questions using a Likert Scale. The goal of the survey was to determine the potential effectiveness of these training methods, level of comfort, and preparedness participants had in implementing the protocol.

Chapter 3
Results

Baseline

In baseline, all participants scored low in percentage of steps implemented correctly (*M* = 19.4%) with a range of 2% to 52%. Behavior Technician 1's baseline scores ranged from 8% to 22% (*M* = 13.67%), Behavior Technician 2 scored between 15% and 21% (*M* = 17.8%), and Behavior Technician 3's baseline ranged from 2% to 9% (*M* = 4.43%). The mean of the behavior technicians' baseline levels was 10.73% steps implemented correctly (See Figure 1).

RBT® 1's average baseline correct steps was 25.33% with a range of 16% to 34%. RBT® 2 scored between 6% and 15% in baseline (*M* = 10.8%). The BCBA-D® scored the highest in baseline, with a maximum of 52% correct steps and a low of 34% correct steps (*M* = 41.43%).

The pre-test quizzes ranged from 20% to 40% with an average of 33.33%. After 72 hours of exposure to the materials, the posttest quizzes ranged from 60% to 100%, with an average of 86.66%. No participants scored below 60%, thus no participants were removed due to failing the post-test pass criteria. Three participants scored 100% on the posttest. This included the BCBA-D® and the two RBTs®.

Treatment Phase 1 – Written instructions and video modeling

During the first treatment phase, all participants' percent of steps implemented correctly increased. Behavior Technician 1's correct steps ranged from 60% to 66% (*M* = 68%). Behavior Technician 2 scored similarly with a range of 63% to 72% (*M* = 69%). The final behavior Technician, Behavior Technician 3, scored between 29% to 39% (*M* = 32.96%). RBT® 1 scored a high of 79% and low of 74% (*M* = 76.33%). RBT® 2's scores

ranged from 42% to 76% (*M* = 61.8%). Finally, the BCBA-D's® correct steps ranged from 77% to 97% (*M* = 87.5%).

The largest shifts in percent of steps implemented correctly were seen between baseline and the written instruction and video model phase. Only the BCBA-D® met mastery criteria in this phase. The BCBA-D® mastered out of subsequent training phases.

Treatment Phase 2 – Procedural clarification

Once participants contacted five minutes of questions via procedural clarification, all performances increased compared to the previous phases, with an average 20.6% increase from the last written instructions and video model phase to the first phase in procedural clarification. Only one participant, RBT® 1, met the mastery criteria in this phase, mastering out of all subsequent training phases.

Behavior technicians 1, 2, and 3's treatment phase 2 correct steps ranged from 71% to 78% (*M* = 74%), 67% to 79% (*M* = 76%), and 77% to 90% (*M* = 82.29%) respectively. RBT® 1's correct steps ranged between 87% and 94% (*M* = 90.33%) and RBT® 2's scores ranged between 72% to 85% (*M* = 77.83%).

Treatment Phase 3 – In-vivo feedback and modeling

Finally, all remaining participants met the mastery criteria following exposure to the in-vivo feedback and modeling phase. The average increase from the last procedural clarification phase and the first in-vivo feedback and modeling phase was 11.5%. The mastery criteria was met within four sessions of the final training phase, with all participants but Behavior Technician 1 meeting the mastery criteria within the first three sessions.

Behavior Technician 1 scored between 73% to 100% correct steps (*M* = 92.5%). Behavior Technician 2's correct steps ranged from 89% to 94%, with an average of

91.33%. Behavior Technician 3's correct steps ranged from 93% to 96% (M = 94.67%). Lastly, RBT® 2's correct steps in phase 3 ranged from 94% to 98% (M = 96.67%).

Within-Session Data

Within session data were analyzed across sessions to determine how each training modality affected pre- and post-bite steps combined and intra-bite steps within the task analysis. Thirty percent of sessions across each phase were averaged to determine the within-session data across each participant. Pre- and post-session data included steps such as stating the rules prior to the delivery of the first bite and rotating across foods. Intra-session steps included behavior specific praise and leveling the bolus for each bite.

For outside of bite steps implemented correctly, Behavior Technician 1 scored 0%, 33%, 50%, and 100% across subsequent phases. Behavior Technician 2 scored 0%, 8.33%, 25%, and 100% across phases. Behavior Technician 3 scored 3.54%, 35.87%, 77.42%, and 97.56% across all phases. RBT® 1 scored 16.67%, 100%, and 100% across phases. RBT® 2 scored 0%, 75%, 91.67%, and 100% across all phases of the study. BCBA-D® scored 27.78% and 72.22% for the two phases to which they were exposed.

For within steps implemented correctly, Behavior Technician 1 scored 13.66%, 75.45%, 80.96%, and 90.82%. Behavior Technician 2 scored 26.61%, 77.12%, 73.86%, and 99.8% across all phases. Behavior Technician 3 scored 3.54%, 35.87%, 77.42%, and 97.56% across phases. RBT® 1 scored 27.5%, 75.61%, and 88.09% and RBT® 2 scored 8.42%, 56.41%, 80%, and 93.41% across phases. Finally, BCBA-D® scored 43%, 54%, and 90.16% across phases.

Social validity

Social validity was measured with a post-participation social validity survey. This survey was submitted anonymously and was completed by four of the six participants.

When asked if the participants felt that the written instructions and video modeling were sufficient to learn the protocol, the mean score was 3.75 (i.e., agree) for all participants. When asked if the protocol clarification was sufficient to ask all the questions they had regarding learning the protocol, the mean score across participants was 3.66 (i.e., agree). The mean score was 3.25 (i.e., neutral) across participants when participants were asked if they would be able to correctly conduct the procedure without further guidance. For the question regarding whether in-vivo feedback and modeling were necessary to learn the protocol, the mean score was 4.33 (i.e., agree) across participants who contacted this phase. For question five, which asked if learning the protocol without a client was helpful, participants' mean score was 4.0 (i.e., agree). Participants identified video modeling and in-vivo feedback (50% of participants) as the most effective component in teaching the protocol, followed by written instructions (25% of participants). Participants' mean score was 2.75 (i.e., neutral) when asked if they would prefer to practice on a child rather than a role play partner while learning the protocol. Finally, when asked if the participants would have liked more time to review the video models prior to rehearsing, the mean score across participants was 2.0 (i.e., disagree).

Chapter 4
Discussion

In the current study, increasing training modalities were systematically introduced to determine their effects on learning an intensive pediatric feeding intervention (i.e., escape extinction). Participants were exposed to written instructions and video modeling, procedural clarification, and in-vivo feedback and modeling across subsequent phases. Participants were scored using a task analysis that highlighted the critical steps necessary to meet high treatment integrity levels for the intensive feeding protocol. The results indicate each training modality increased steps implemented correctly across all participants. The largest increase in steps implemented correctly was observed during the initial training phase, consisting of written instructions and video modeling. However, although the largest shift in correct steps occurred in the initial, resource-light phase, only one participant met the mastery criteria in that phase. Most participants required exposure to all training modalities to increase correct steps to clinically significant levels (i.e., three consecutive sessions of steps implemented correctly at or above 85%).

Of the six participants in the current study, one participant required only written instructions and video modeling, one participant required the additional procedural clarification, and four of the participants required the in-vivo modeling and feedback component. Although increases in percentage of steps implemented correctly were observed across each training phase of the study, 67% of the participants required the full resource-intensive training, typically experienced in an intensive day treatment program. The largest increase in the percentage of steps implemented correctly was observed between baseline and the written instructions and video modeling phase. The smallest increase occurred between procedural clarification and the in-vivo feedback and modeling

phases. Although the largest acquisition of the protocol occurred in the initial training phase, only one participant met mastery criteria in this phase.

The first training phase consisting of written instructions and video modeling increased the percent of steps implemented correctly for all participants when analyzing the within-bite protocol steps. However, for outside of bite steps, training phases had various effects across participants. Three of the participants (i.e., 50%) had the largest increase in steps implemented correctly following written instructions and video modeling, two participants (i.e., 33%) had the largest increase in in-vivo feedback and modeling, while only one participant (i.e., 17%) had the largest increase in outside of bites steps implemented correctly following procedural clarification. These results suggest that procedural steps that occur outside of the formal protocol may be more idiosyncratic than the effects of training on within-bite steps.

In Ibañez et al. (2023), the authors utilized behavioral skills training to train caregivers to implement a structured meal protocol. Using similar training components as the current investigation, the authors combined these training components into a single training package, including written instructions, modeling, and rehearsal plus feedback. The results of the current investigation replicate Ibañez et al. (2023). In their study, the training was successful at teaching behavioral staff a less intensive procedure. The current study demonstrated that these training components can also be used to teach staff more intensive feeding procedures. In Ibañez et al., the effects of individual training components could not be evaluated, making it impossible to determine which components had the largest effect on staff performance. By separating these training components, the current investigation attempted to provide a broader understanding of how certain training mechanisms can contribute to learning and successfully implementing a feeding procedure.

The results suggest that for most behavioral staff, the in-vivo feedback and modeling by feeding experts may be necessary to increase treatment integrity to high levels of implementation.

Previous studies focusing on caregiver training of pediatric feeding protocols have used several different training modalities to increase caregiver implementation across various feeding protocols. The two most common training components seen in these studies were written instructions (used in 100% of previous studies) followed by feedback (used in 85% of previous studies). As observed in the current study, written instructions, combined with video modeling, provided the highest level of acquisition compared to the other components. According to the previous research, written instructions are a common first step in training caregivers during clinical admissions. Unlike Najdowski et al. (2010), the current study provided participants access to written instructions without additional opportunities to model behaviors with the researcher. This approach simulates the likely approach most behavior analysts will take when acquiring these materials. Replicating Clark et al. (2020), the current study's written instructions phase duration was held consistent (i.e., 72 hours). Similar to Clark et al. (2020), only one participant in the current study met mastery with the "resource-light" materials, but all participants saw an increase in performance following access to written instructions and video models. Future research should consider analyzing direct manipulations of the levels and intensity of written instructions on integrity during feeding training.

Procedural clarification produced a relatively small change in performance, replicating Pangborn et al. (2013). However, participants identified the procedural clarification phase as an appropriate amount of time for clarifying questions. In-vivo feedback and modeling were necessary for 66% of the participants to obtain mastery.

These results align with the commonality of these two training methods. Similar to Bachmeyer-Lee et al. (2020), written instructions were effective at achieving mastery criteria only following exposure to in-vivo feedback. Additional prior research has systematically exposed participants to written instructions followed by feedback (i.e., Aclan and Taylor, 2017; Clark et al., 2020; Pangborn et al., 2013) once a failure to reach mastery criteria was observed. A clinical rollout of training methods have repeatedly shown that feedback following previous training components is extremely effective at increasing treatment integrity. Previous research, combined with the current study results, have demonstrated that feedback is a crucial component in the training of feeding protocols.

Training behavioral staff in pediatric feeding procedures is an important step in helping serve a larger population of children suffering from feeding issues. Although there has been little research focused on the training of behavioral staff to implement pediatric feeding protocols, researchers such as Sharp et al. (2013) have identified the growing demand to expand feeding training opportunities to providers in the community. To date, most prior feeding training research has focused on the generalization of clinical outcomes to caregivers. The limited existing research on training staff used a behavioral skills training package to train eight staff to implement a simplified behavioral assessment (i.e., standard outcome baseline; Ibañez et al., 2023). Most feeding training research studies have focused on training caregivers to serve as feeders in their own child's clinical care. The current study is the first aimed at evaluating various levels of training approaches to train behavioral therapists to implement an intensive pediatric feeding protocol.

The prior education of the participants may have contributed to the outcomes of the current investigation. The four participants that required in-vivo feedback and modeling

had limited experience in the field and a limited educational background in behavior analysis. Two of these participants were new hires in the pediatric feeding program and were working toward their RBT® credentialling. These participants had little to no experience with applied behavior analysis prior to their hire and participation in this study. This lack of understanding of behavioral terminology may have contributed to their ineffectiveness on acquisition via the formal written protocol and video models. Future research may want to look at the level of jargon within pediatric feeding trainings, across various background levels of education, on sessions to mastery. It is possible that the formally written protocol contained vocabulary unfamiliar to the participants (e.g., escape extinction, differential reinforcement of alternative behavior). Although video models were paired with the written protocol, it is reasonable to suggest that if a participant does not understand differential reinforcement, for example, they will not be able to identify this component in a video model.

One RBT® also required all training components. This participant has held their credential for approximately two years, primarily working with clientele presenting with challenging behaviors. Although they may have been more familiar with the scientific jargon in the written instructions, the behavioral processes and clinical protocols experienced in non-feeding programs (e.g., problem behavior, transitions to adulthood) may not generalize to feeding cases. The final participant that required contact with all training components was a first-year graduate student working towards their doctorate degree with less than one year of experience in the field.

RBT® 2 required two levels of training and met mastery in the procedural clarification phase. This participant saw a large increase from baseline in the percentage of steps implemented correctly during the written instructions and video modeling phase.

RBT® 2 required several questions regarding the protocol to shift performance on certain variables regarding leveling the spoon and physically holding the bite against the role play partner's lips during presentation. They did not require the entire five minutes of procedural clarification to meet mastery criteria. Following the procedural clarification, the RBT® was able to identify their mistakes and quickly met mastery criteria.

The participant possessing a BCBA-D® required the least amount of training components to meet mastery criteria. This participant was the only participant with a graduate level education. It is possible that their education assisted with their acquisition of the protocol and the behavioral terminology within. Additionally, the BCBA-D® had the longest experience in the field of behavior analysis serving children in both early learner and severe problem behavior programs. Their learning history for learning novel protocols and modeling these skills was richer in opportunities when compared to the other participants in the study, suggesting easier generalization into feeding programs.

These results indicate that training modalities for intensive feeding protocols may vary based on the staff's level of education and prior behavioral experiences. It may be the case that staff holding a doctoral level board certification require less resource-intensive training materials, while newer technicians in the field require more training opportunities to be able to implement feeding protocols at high integrity levels. Behavior analysts holding a doctorate level degree may be able to contact written instructions (e.g., a protocol) with limited video models to implement intensive protocols overall. Based on their clinical competence with the additional medical variables, level of the client's feeding severity, and medical fragility, it may be possible for BCBA-Ds® to intervene in the absence of direct, continuous feeding oversight. However, for RBTs® and behavior technicians, the results show that individuals at these clinical levels require direct

supervision and oversight when implementing feeding therapy. Contacting symposium, research articles, or finding models or instructions online is not sufficient to implement intensive feeding interventions regardless of clinical background as client medical or feeding severity can vary significantly. These results suggest that it is still inappropriate, in almost all cases, for lower-level behavior analysts to implement feeding following limited consultation services. More long-term oversight may be required. Future research should examine whether prolonged contact and supervision results in quicker skill acquisition within feeding protocols.

Although the purpose of this study was not to draw direct comparisons between the training modalities, it is important to discuss the practicality of each modality when considering their clinical implementation. As Clark et al. (2020) pointed out, there is need for research to evaluate the efficacy of resource-light training methods (e.g., written instructions) compared to resource-heavy (e.g., rehearsal). Written instructions and video modeling require the least number of resources when compared to procedural clarification and in-vivo feedback and modeling. The implementation of the written instruction and video modeling phase required minimal up-front preparation and no additional time allocation by the researcher during the time the participants had access to the training materials (i.e., the duration of time in which skills acquisition was occurring). The results showed favorable outcomes following the utilization of resource-light materials, as the largest skill acquisition occurred across all participants moving from baseline to training phase 1. Researchers may want to look at analyzing resource-light materials on their training parameters, such as duration of access to these materials, the components within them, or the various ways of implementation (e.g., online modules, continuous access) to

determine if these materials can increase performance in the absence of additional resources.

The level of resource requirements increased systematically as the layers of training modalities were applied across phases in this study. During procedural clarification, access to the researcher was required. While the opportunity for questions was controlled, general procedural clarification can vary in the level of resources required by the "feeding expert." Some degree of expert availability is mandatory for the learner to acquire the skills necessary to implement the protocol at high integrity. The feasibility of consistent monitoring and clarification dramatically increases the resources required to train future feeding therapists when compared to written instructions and video modeling.

The final training (i.e., in-vivo feedback and modeling) phase requires the largest degree of resources to clinically maintain. Since in-vivo feedback and modeling by behavior analysts competent in feeding are only accessible through opportunities in established feeding programs, the chance to access these training opportunities is low. Pediatric feeding programs are limited in the United States and with most feeding experts practicing in these programs, opportunities for in-vivo training remain limited in our field. Thus, the practicality of this type of training is low. However, in order for applied behavioral feeding therapy to grow in popularity, feeding experts should pursue developing paths for increasing this accessibility. Furthermore, sessions to mastery should be an important consideration. Delays to high levels of treatment integrity could have damaging effects on service delivery. Populations served in intensive feeding programs often require rapid improvement in nutrition, requiring immediate intervention. Staff training studies should evaluate what training parameters produce the shortest latency to high levels of treatment integrity.

Researchers may want to consider further evaluating training programs that promote quick acquisition while minimizing the level of resources necessary to maintain continuous training. Modalities such as pyramidal trainings have shown to be effective in several areas of investigation and can often be maintained with reduced efforts (Haberlin et al., 2012; Kuhn et al., 2003). Pyramidal training involves training an individual or group of individuals to implement a behavioral intervention and then teaching the trained individuals to train others. These methods may produce a system of training for behavioral staff that promote easier accessibility and maintenance (e.g., Parsons et al., 2013; Pence et al., 2014). Pediatric feeding training may benefit from researchers analyzing this process while emphasizing high levels of quality of care.

Ethical considerations should be discussed. The development of each training modality was conceptualized as various avenues of "learning" experienced by a non-feeding behavioral provider attempting to learn a feeding protocol. The written instructions and video modeling were conceptualized as a behavior analyst contacting materials online or attending a presentation at a conference. This form of training is minimal and should not be considered ethical nor adequate in implementing a feeding treatment. The results showed that it may be effective at increasing the understanding of the protocol, but in most cases, does not result in clinically significant levels of integrity. Low levels of integrity during extinction may produce detrimental effects on the long-term success of the procedure and could do more harm than good.

Procedural clarification was conceptualized as a behavior analyst being supervised by a feeding expert. The level of clarification in this study was not sufficient at increasing performance for most participants. In many cases, consultative services can be an expedited way to train staff. However, in pediatric feeding, it may be the case that more

intensive training is necessary. More research should analyze the magnitude, frequency, and modality of consultative feeding services as this training avenue could be beneficial for the growth of behavioral feeding therapy. This future research may demonstrate the case that feeding should only be conducted by those trained via in-vivo training (i.e., trained at an intensive feeding program).

This study extends the literature, as it is the only study to analyze the training requirements for feeders to implement the "gold standard" of behavioral feeding therapy at high integrity levels. Minimal research has focused beyond caregiver training of feeding interventions. As the field grows and behavior analytic feeding therapy becomes more widely recommended, the field will need to ensure that behavior therapists have the resources and understanding to train a larger work force in this specialized area of practice. The intensity of escape extinction in feeding may be one reason for the limited research in this area. There are many factors to consider when planning an intervention with a feeding client. The level of feeding severity, the medical urgency of increased volume and variety, medical concerns (e.g., allergies, slow digestion, aspiration), and coordination of care are only some of the factors that need to be considered. However, separating the training of behavioral staff from the determination of clinical competence and resource readiness is crucial for the growth of feeding in the field. Researchers should be able to continue studying these training methods while simultaneously outlining how and when an individual is considered competent. Withholding studies on staff training will only serve to slow the growth of a very successful intervention for children with feeding concerns.

Although there was clear skill acquisition across participants, some limitations in this study should be noted. Although the participants' access to the written instructions and video models were controlled (i.e., materials were removed at the 72-hour mark and the

first intervention session began at that time), exposure to the materials during the 72-hour access period were not controlled. That is, some participants may have reviewed the materials several times while those who failed to acquire the protocol may have read through the materials only once. Participants who exposed themselves to the materials multiple times may have been able to recall the various components better than those who did not. Another limitation of the current study was the absence of qualitative data recording of the in-vivo feedback and procedural clarification questions. Although the first researcher provided feedback in a structured manner, the addition of qualitative data on these components of the study would have provided additional insights into the level of learning opportunities the participants had access to during the various training sessions. Future research should consider recording the training components of the study to identify what type of questions occurred most frequently across participants and to analyze what aspects of the protocol required the highest level of feedback.

This study is an introduction into the area of staff training for pediatric feeding research. Future research should compare further differences in training modalities required across differing levels of behavioral staff. The current study showed that training requirements may differ as a function of the behavior analyst's education level. Identifying these differences may assist in the development of educational materials and more resource-heavy materials needed for the field. Researchers should also look at the resources needed to train staff to generalize these intensive feeding skills to children with feeding disorders. Understanding the level of generalizability of these trainings is crucial in fully understanding if staff are able to serve the populations for whom these protocols are intended. Finally, future research should look at conducting a large-scale training project to provide an understanding of how various training components are feasible when addressing

a large-scale training study for behavior analysts. This study is the first step in understanding what is required for staff to learn an intensive feeding protocol. It is crucial for the field to begin to understand how to develop educational materials and feeding training opportunities on a larger scale to allow the field to grow while maintaining high levels of integrity and competency.

It is worth noting that although all staff met a predetermined mastery criterion, each staff was debriefed at the end of their participation. This debrief emphasized that meeting the mastery criteria in this study did not suggest they were competent to conduct intensive feeding protocols absent of supervision. This debrief occurred after the social validity survey. Participants responded to the survey, identifying that they did not feel they could independently implement the procedure without additional guidance and support. The purpose of this study was to begin to understand how different training modalities can support the skill of implementing a single feeding protocol at a foundational level. It is not a study that aimed to create competent feeding staff who were ready to conduct feeding therapy. Rather, it should be used as a guide for future researchers to continue to pursue next steps in feeding staff training. Additional training, supervision, and experience is crucial in the development of feeding expertise.

References

Aclan, M. D. and Taylor, R. S. (2017). An evaluation of a caregiver training protocol on the generalization and maintenance of successful pediatric feeding interventions. *Behavioral Interventions, 32, 182-189.* https://doi: 10.1002/bin.1468

Alaimo, C., Seiverling, L., Sarubbi, J., & Sturmey, P. (2018). The effects of behavioral skills training and general-case training package on caregiver implementation of a food selectivity intervention. *Behavioral Intervention, 33, 26-40.* https://doi: 10.1002/bin-1502

Alligood, C. A. and Gravina, N. E. (2021). Branching out: Finding success in new areas of practice. *Behavior Analysis in Practice, 14, 283-289.* https://doi: 10.1007/s40617-020-00483-2

Anderson, C. M. and McMillan, K. (2001). Parental use of escape extinction and differential reinforcement to treat food selectivity. *Journal of Applied Behavior Analysis, 34 (4), 511-515.* https://doi: 10.1901/jaba.2001.34-511

Bachmeyer-Lee, M. H., Kirkwood, C. A., Sheehan, C. M., Gibson, A. L., Shuler, N. J., & Keane, J. A. (2020). Utilizing in-vivo feedback for caregiver training for pediatric feeding protocols. *Journal of Applied Behavior Analysis, 53(3), 1622-1637.* https://doi: 10.1002/jaba.693

Baer, D. M., Wolf M. M., & Risley, T. R (1968). Some current dimensions of applied behavior analysis. *Journal Applied Behavior Analysis, 1(1), 91-7.* https://doi: 10.1901/jaba.1968.1-91

Berth, D. P., Bachmeyer, M. H., Kirkwood, C. A., Mauzy IV, C. R., Retzlaff, B. J., & Gibson, A. L. (2019). Noncontingent and differential reinforcement in the treatment of pediatric feeding problems. *Journal Applied Behavior Analysis, 52(3), 622-641.* https://doi: 10.1002/jaba.562

Bloomsfield, B. S., Fisher, A. J., Clark, R. R., & Dove, M. B. (2019). Treatment of food selectivity in a child with avoidant/restrictive food intake disorder through parent teleconsultation. *Behavior Analysis in Practice, 12, 33-43.* https://doi: 10.1007/s40617-018-0251-y

Clark, R.J., Wilder, D. A., Kelley, M. E., & Ryan, V. (2020). Evaluation of instructions and video modeling to train parents to implement a structured meal protocol for food selectivity among children with autism. *Behavior Analysis in Practice, 13, 674-678.* https://doi: 10.1007/s40617-020-00419-w

Clark, R. J., Wilder, D. A., & Lesser, D. E. (2023). A preliminary survey of pediatric feeding experiences and practices among behavior analysts. *Austin Journal of Autism and Related Disabilities, 9(1), 1060.* https://doi: 10.26420/austinjautismrelatdisabil.2022.1060

Crist, W. and Napier-Phillips, A. (2001). Mealtime behaviors of young children: A comparison of normative and clinical data. *Journal of Developmental and Behavioral Pediatrics, 22, 279-286.* https://doi: 10.1097/00004703-200110000-00001

Green, C. W., Rollyson, J. H., Passante, S. C., & Reid, D. H. (2002). Maintaining proficient supervisor performance with direct support personnel: An analysis of two management approaches. *Journal of Applied Behavior Analysis, 35(2), 205-208.* https://doi: 10.1901/jaba.2002.35-205

Groff, R. A., Piazza, C. C., Volkert, V. M., and Jostad, C. M. (2014). Syringe fading as treatment for feeding refusal. *Journal of Applied Behavior Analysis, 47(4), 834-839.* https://doi: 10.1002/jaba.162

Haberlin, A. T., Beauchamp, K., Agnew, J, & O'Brien, F (2012). A comparison of pyramidal staff training and direct staff training in community-based day programs. *Journal of Organizational Behavior Management, 32, 65-74.* https/doi: 10.1080/01608061.2012.646848

Harvey, M .T., May, M. E., & Kennedy, C. H. (2004). Nonconcurrent multiple baseline designs and the evaluation of educational systems. *Journal of Behavioral Education, 13(4), 267-276.* https://doi: 1053-0819/04/1200-0267/0

Ibañez, V. F., Peters, K. P., Bacotti, J. K., Llovera, L. A., Arsdale, A. V., & Vollmer, T. R. (2023). Teaching behavior analysts in an early intensive behavioral intervention setting to conduct a structured mealtime protocol. *Behavioral Interventions, 38, 159-177.* https://doi: 10.1002/bin.1915

Kadey, H., Piazza, C. C., & Zeleny, J. R. (2013). An evaluation of texture manipulations to increase swallowing. *Journal of Applied Behavior Analysis, 46(2), 539-543.* https://doi: 10.1002/jaba.33

Kelley, M. E., Clark, R. J., McGarry, M. M., Henry, J. E., Morgan, A. C., Gadaire, D. M., & Sloman, K. N. (2022). Multiple schedules to facilitate rapid noncontingent reinforcement schedule thinning. *Behavior Analysis in Practice.* https://doi: 10.1007/s40617-022-00709-5

Kuhn, S. A. C., Lerman, D C., & Vorndran, C. M. (2003). Pyramidal training for families of children with problem behavior. *Journal of Applied Behavior Analysis, 36(*1*), 77-88.* https://doi: 10.1901/jaba.2003.36-77

Mitteer, D. R., Greer, B. D., Randall, K. R., Kimball, R. T., and Smith, S. W. (2022). Empirically deriving omission and commission errors for relapse tests: A demonstration of reverse translation. *Behavior Analysis: Research and Practice, 21(4), 351-363.* https://doi: 10.1037/bar0000218

Mueller, M. M., Piazza, C. C., Moore, J. M., & Kelley, M. E. (2003). Training parents to implement pediatric feeding protocols. *Journal of Applied Behavior Analysis, 36(*4*), 545-562.* https://doi: 10.1901/jaba.2003.36-545

Murphy, J. and Zlomke, K. R. (2016). A behavioral parent-training intervention for a child with avoidant/restrictive food intake disorder. *Clinical Practice in Pediatric Psychology, 4(*1*), 23-34.* https://doi: 10.1037/cpp0000128

Najdowski, A. C., Wallace, M. D., Reagon, K., Penrod, B., Higbee, T. S., & Tarbox, J. (2010). Utilizing a home-based parent training approach in the treatment of food selectivity. *Behavioral Interventions, 25, 89-107.* https://doi: 10.1002/bin.298

Parsons, M. B., Rollyson, J. H., & Reid, D. H. (2013). Teaching practitioners to conduct behavioral skills training: A pyramidal approach for training multiple human service staff. *Behavior Analysis in Practice, 6(2), 4-16.* https://doi: 10.1007/BF03391798

Pangborn, M. M., Borrero, C. S. W., & Borrero, J. C. (2013). Sequential application of caregiver training to implement pediatric feeding protocols. *Behavioral Interventions, 28, 107-130.* https://doi: 10.1002/bin.1356

Pence, S.T., St. Peter, C. C., & Giles, A. F. (2014). Teacher acquisition of functional analysis methods using pyramidal training. *Journal of Behavioral Education, 23(1), 132-149.* https://doi: 1-.1007/s10864-013-9182-4

Peterson, K. M., Piazza, C. C., Ibañez, V. F., & Fisher, W. W. (2019). Randomized controlled trial of an applied behavior analytic intervention for food selectivity in children with autism spectrum disorder. *Journal of Applied Behavior Analysis, 52(4), 895-917.* https://doi: 10.1002/jaba.650

Peterson, K. M., Piazza, C. C., & Volkert, V. M. (2016). A comparison of a modified sequential oral sensory approach to an applied behavior-analytic approach in the treatment of food selectivity in children with autism spectrum disorder. *Journal of Applied Behavior Analysis, 49(3), 485-511.* https://doi: 10.1002/jaba.332

Peterson, K. M., Volkert, V. M., & Zeleny, J. R. (2015). Increasing self-drinking for children with feeding disorders. *Journal of Applied Behavior Analysis, 48(2), 436-441.* https://doi: 10.1002/jaba.210

Phaneuf, L. and McIntyre, L. L. (2007). Effects of individualized video feedback combined with group parent training on inappropriate maternal behavior. *Journal of Applied Behavior Analysis, 40(4), 737-741.* https://doi: 10.1901/jaba.2007.737-741

Piazza, C. C., Patel, M. R., Gulotta, C. S., Sevin, B. M., & Layer, S. A. (2003). On the relative contributions of positive reinforcement and escape extinction in the treatment of food refusal. *Journal of Applied Behavior Analysis, 36(3), 309-324.* https://doi: 10.1901/jaba.2003.36.309

Saini, V., Greer, B. D., & Fisher, W. W. (2015). Clarifying inconclusive functional analysis results: Assessment and treatment of automatically reinforced aggression. *Journal of Applied Behavior Analysis, 48(2), 315-330.* https://doi: 10.1002/jaba.203

Schulz, A. and Wilder, D. A. (2022). The use of task clarification and self-monitoring to increase affirmative to constructive feedback ratios in supervisory relationships. *Journal of Organizational Behavior Management, 42(3), 1-11.* https://doi: 10.1080/01608061.2021.2019168

Seiverling, L., Williams, K., Sturmey, P., & Hart, S. (2012). Effects of behavioral skills training on parental treatment of children's food selectivity. *Journal of Applied Behavior Analysis, 45(1), 197-203.* https://doi: 10.1901/jaba.2012.45-197

Sharp, W. G., Berry R. C., McCracken, C., Nuhu, N. N., Marvel, E., Saulnier, C. A., Klin, A. Jones, W., & Jaquess, D. L. (2013). Feeding problems and nutirnet intake in children with autism spectrum disorders: A meta-analysis and comprehensive review of the literature. *Journal of Autism and Developmental Disorders, 43(9), 2159-2173*. https://doi: 10.1007/s10803-013-1771-5

Sharp, W. G., Volkert, V. M., Scahill, L., McCracken, C. E., & McElhanon, B. (2017). A systematic review and meta-analysis of intensive multidisciplinary intervention for pediatric feeding disorders: How standard is the standard of care? *Journal of Pediatrics, 181, 116-124.* https://doi: 10.1016/j.jpeds.2016.10.002

Twachtman-Reilly, J., Amaral, S. C., & Zebrowski, P. P. (2008). Addressing feeding disorders in children on the autism spectrum in school-based settings: physiological and behavioral issues. *Language, Speech, and Hearing Services in Schools, 39(2), 261-272.* https://doi: 10.1044/0161-1461(2008/025)

Volkert, V. M. and Vaz, P. C. (2010). Recent studies on feeding problems in children with autism. *Journal of Applied Behavior Analysis, 43(), 155-159.* https://doi: 10.1901/jaba.2010.43-155

Volkert, V. M., Vaz, P. M., Piazza, C. C., Frese, J., & Barnett, L. (2011). Using a flipped spoon to decrease packing in children with feeding disorders. *Journal of Applied Behavior Analysis, 44, 617-621*. https://doi: 10.1901/jaba.2011.44-617

Webster-Statton, C. (2005). The incredible years: A training series for the prevention and treatment of conduct problems in young children. In E. D. Hibbs & P.S. Jensen (Eds.) *Psychosocial treatment for children and adolescent disorders: Empirically based strategies for clinical practice, 507- 555.* American Psychological Association.

Werle, M. A., Murphy, T. B., & Budd, K. S. (1993). Treating chronic food refusal in young children: home-based parent training. *Journal of Applied Behavior Analysis, 26(4), 421 – 422.* https://doi: 10.1901/jaba.1993.26-421

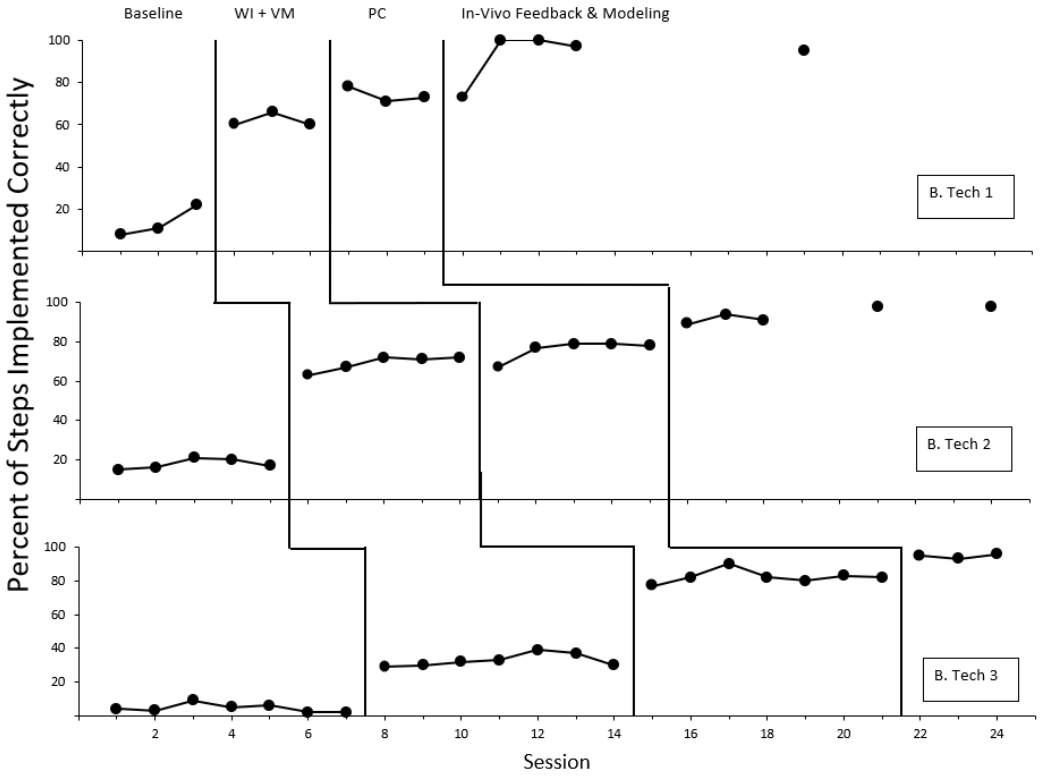

Figure 1: Percent of steps implemented correctly across participants. Baseline consists of no prior instructions. Phase 1 consists of access to written instructions and video modeling. Phase 2 consists of procedure clarification. Phase 3 consists of in-vivo modeling and feedback on performance. BL = Baseline, WI = Written instructions, VM = Video models, PC = Procedural clarification

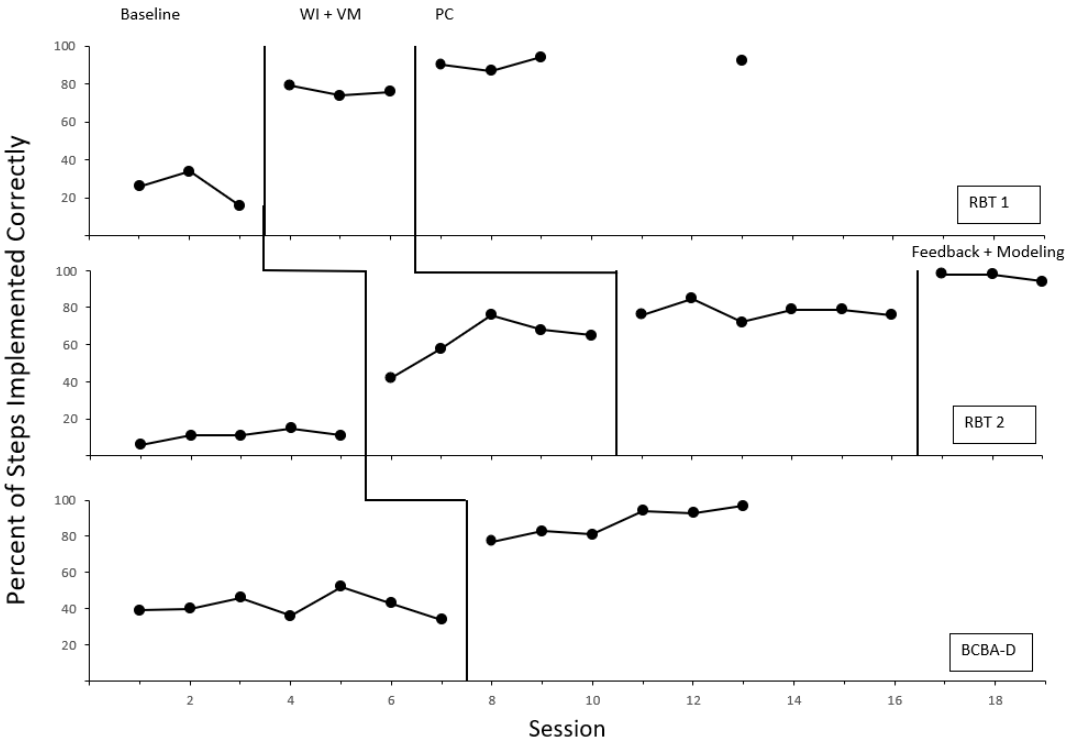

Figure 2: Percent of steps implemented correctly across participants. Baseline consists of no prior instructions. Phase 1 consists of access to written instructions and video modeling. Phase 2 consists of procedure clarification. Phase 3 consists of in-vivo feedback on performance. BL = Baseline, WI = Written instructions, VM = Video models, PC = Procedural clarification.

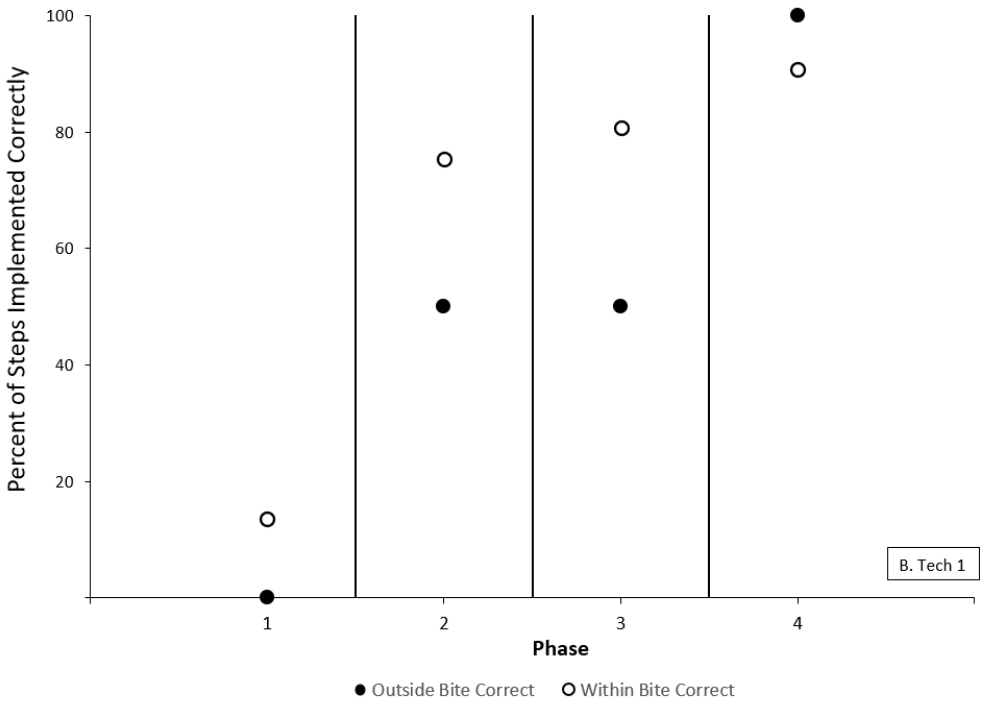

Figure 3: Behavior Technician 1's percent of steps implemented correctly across phases for within-bite and outside of bite tasks analysis steps.

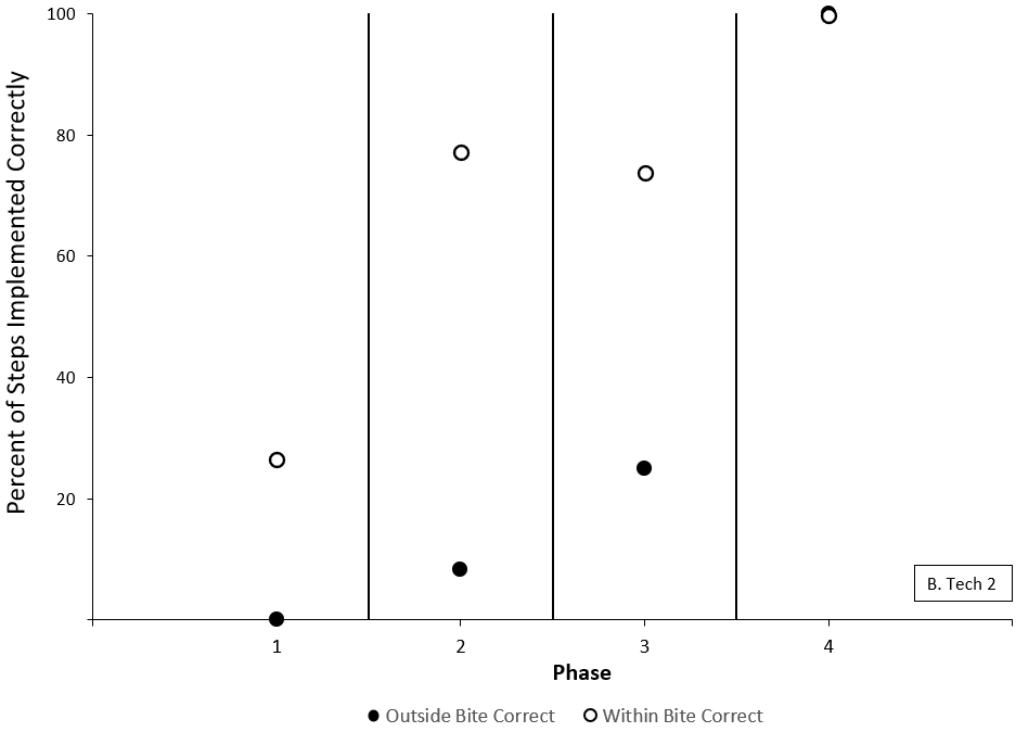

Figure 4: Behavior Technician 2's percent of steps implemented correctly across phases for within-bite and outside of bite tasks analysis steps.

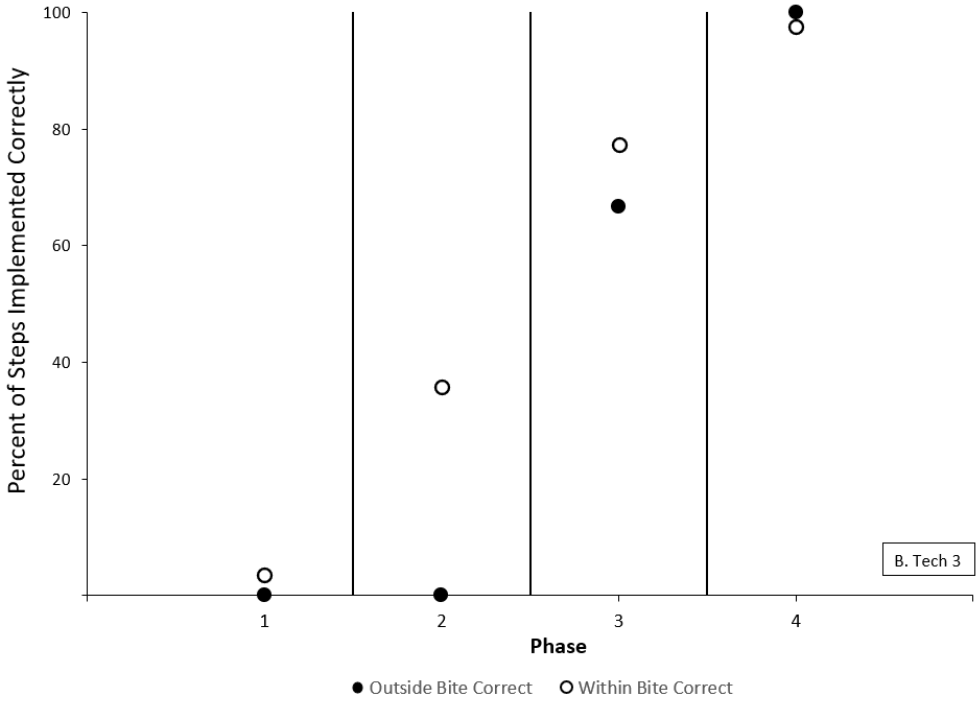

Figure 5: Behavior Technician 3's percent of steps implemented correctly across phases for within-bite and outside of bite tasks analysis steps.

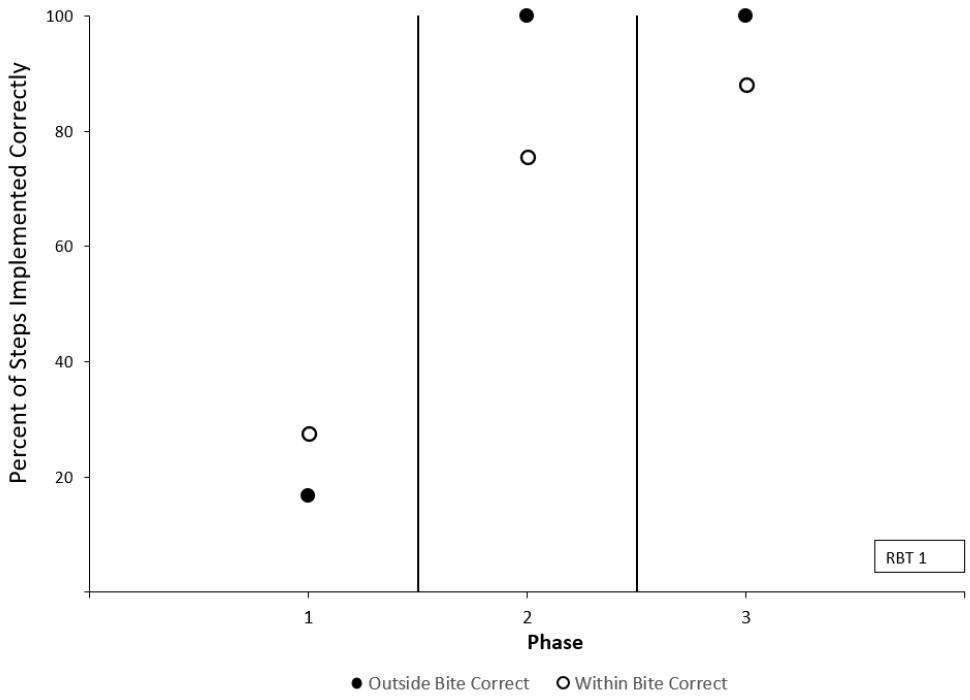

Figure 6: Registered Behavior Technician 1's® percent of steps implemented correctly across phases for within-bite and outside of bite tasks analysis steps.

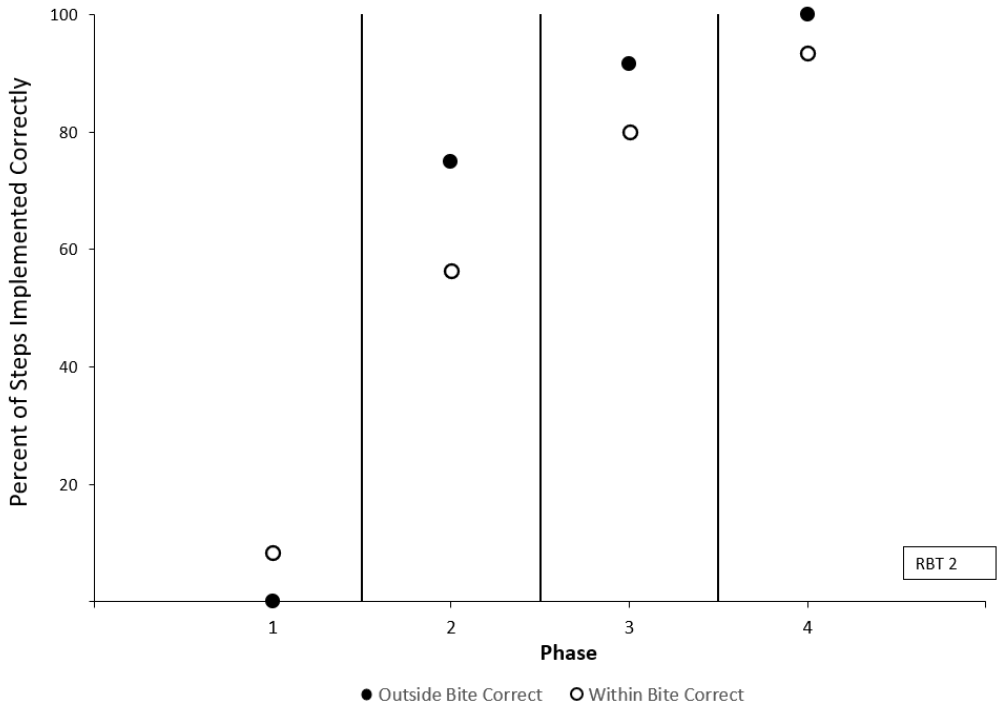

Figure 7: Registered Behavior Technician 2's ® percent of steps implemented correctly across phases for within-bite and outside of bite tasks analysis steps.

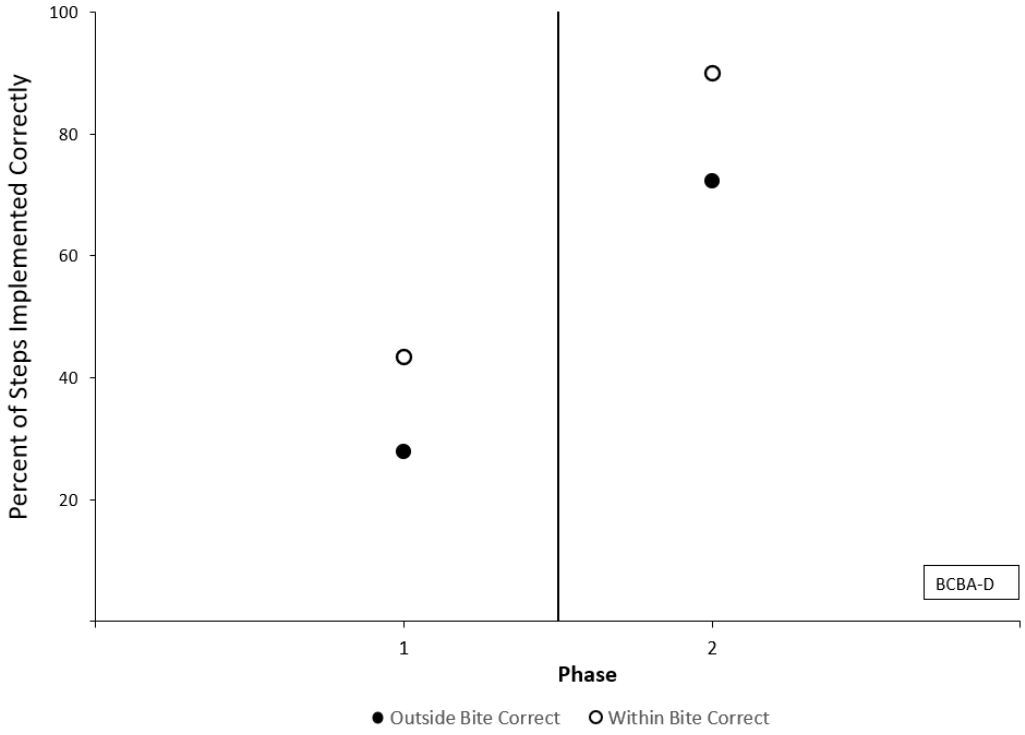

Figure 8: Board Certified Behavior Analyst Doctorate's ® percent of steps implemented correctly across phases for within-bite and outside of bite tasks analysis steps.

Appendix

Feeding Task Analysis

Date	
Session	
Data Collector	
loa/Pri	
Confederate	
Participant	

10 Min Timer	
Pre-weight	
Post-weight	
5 Bites presented	
Provided Rules	
Rotated through foods	

Level Bolus		Begins 30s timer following acceptance	
Provided specific instructions once utensil touches lips		Conducts mouth check at 30s Mark	
Provided specific verbal praise "____ taking bite" if bite taken within 5s w/o IMB		Provides specific praise if less than pea in mouth at MC check	
Keeps bite physically at child's lips until bite is deposited into child's mouth (no periods longer than 8s)		Provide statement to "finish swallowing" if more than pea in mouth at MC	
Does not provide praise once bite deposited if not taken within 5s without IMB or followingIMB		Presents next bite if folllowing pack (if not at 3 consistent packs)	
Gathers and represents expelled bite to lips within 3s of expel		Restarts MC timer if 3 packs or pack on last bite	
Does note provide extra attention to child			

Social Validity Questionnaire

"1" = Strongly disagree "5" = Strongly agree

1. I felt the written instructions and video modeling were sufficient to learn the protocol.

   1 2 3 4 5

2. The protocol clarification was sufficient to ask all the questions I had regarding learning the protocol.

   1 2 3 4 5

3. I will be able to correctly conduct the procedure without further guidance.

   1 2 3 4 5

4. The in-vivo feedback and modeling were necessary to learn the protocol.

   1 2 3 4 5

5. Learning the protocol without a client was helpful.

   1 2 3 4 5

6. I believe I am ready to feed a child after learning the protocol.

   1 2 3 4 5

7. Which component of training was the most effective in teaching the protocol?

   a. Written instructions b. Video models

c. Protocol clarification d. In-vivo feedback

e. In-vivo modeling

8. I would prefer to practice on a child than a “confederate” while learning a procedure.

   1 2 3 4 5

9. I would have liked more time to review video models prior to rehearsing.

   1 2 3 4 5