A LITERATURE REVIEW OF ALTERNATIVE APPROACHES TO ESCAPE EXTINCTION IN FEEDING PROTOCOLS

Honors Thesis

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Abstract

This literature review investigated different treatment packages for feeding protocols in children with autism spectrum disorder (ASD). A literature review was conducted on case studies with participants under the age of eighteen with at least one problem behavior related to feeding. The case studies included were peer-reviewed and published in a journal article in the past twelve years. The review considered a set of variables for each study that included: the number of children who were treated, the effectiveness of the treatment, consistency of results between participants, consistency of results across studies, and follow up treatment effectiveness. Based on the literature reviewed, the results indicated there was no single treatment package that consistently demonstrates a decrease in inappropriate mealtime behavior and an increase in acceptable mealtime behavior. High probability sequences, noncontingent reinforcement, behavioral skills training, least-to-most prompting, and lag schedules of reinforcement were at least moderately effective at decreasing inappropriate mealtime behavior and increasing appropriate mealtime behavior without using escape extinction.

Key terms: escape extinction, feeding protocols, ethical ABA

Introduction

After almost four years of working as a behavior technician providing behavior analytic

services, I have had multiple clients who have had feeding programs that I had to conduct with

them. I had one case, in particular, that changed the entire trajectory of my career in applied

behavior analysis (ABA) and exposed me to advocates against ABA for the first time.

I had been working in the field for about a year when I was assigned to a four-year-old

girl who had been diagnosed with autism spectrum disorder (ASD) and food selectivity. She

would only eat chicken nuggets, pizza, macaroni and cheese, and pop tarts. Her challenging

behaviors in her behavior support plan were elopement, aggression, and tantrums. Her parents

and doctor identified that she needed to expand what she was eating to ensure she is getting

essential nutrients in her diet. The behavior analyst assigned to the case decided that it was best

to present her with a different type of food at each meal and snack. She had 30 minutes to eat

five bites, then she could have the rest of her meal with the foods she liked. If the 30 minutes

elapsed before she took five bites, then she would not get an opportunity to eat her meal. If she

eloped from the table, we would follow her with her plate of food. If she got hungry in between

meals, the same process would occur for snacks. For foods that were extremely aversive to her,

she would go hungry. There were days where she would only eat a few bites of food. On this

treatment protocol, she lost weight, her aggressive behaviors increased, and her tantrums

increased, but her elopement was extinguished. I was removed from the case before a new

treatment protocol was introduced.

While I was on this case, I felt the treatment I was providing was causing more harm than

good, but I had not had exposure to conversations about ethical ABA so I did not know how to

voice my concerns. Once I was removed, I began looking into networks of ABA providers to see if other people were having moral dilemmas in the care they were providing. As it turns out, there is an active community of people, including past and present ABA providers, parents of children with autism[1], and autistic individuals, talking about the ethicality of ABA. It was in this online community where I encountered discussions about the potential negative side effects of escape extinction in feeding treatment packages. Some of the adults with autism that I spoke to suggested that the use of escape extinction in feeding protocols they received as children had contributed to the development of eating disorders as teenagers. Personal anecdotes from autistic people who have received ABA services are critical to ensure that ABA providers are helping their clients instead of causing more harm in the future and for identifying new areas of research within the field.

These conversations regarding the ethicality of ABA were still in my mind three years later when it came time to choose a topic for my Honors thesis. I looked to see if there was any research conducted to see if there was any correlation between escape extinction in feeding treatment packages and the development of eating disorders, but my search yielded no results. Because of the limitations of completing an undergraduate-level thesis and only one semester to complete my research, I took my research in a different direction. Since I did not have any evidence to support the claims made by the people I spoke with but I did not have any evidence to disprove their claims, I took their concerns at face-value and decided to look into the alternatives to escape extinction in feeding treatment protocols. This literature review will examine escape extinction along with other ABA procedures to interrogate the effectiveness of different treatment packages.

In the field of ABA, a behavior is anything that a person says or does that is observable and measurable (Cooper, Heron, & Heward, 2020). For example, scratching an itch is an example of a behavior because another person is able to observe and measure this behavior. The feeling of having an itch on the skin is not a behavior because another person is not able to observe nor measure the sensation; however, the twitches that the itch may cause would be considered a behavior because twitching is observable and measurable.

Consequences of behavior are generally one of two things: reinforcing or punishing. When a consequence is reinforcing, the likelihood of the behavior that just occurred will increase. For example, if a child makes their bed and earns $1.00 for their allowance, the money the child receives acts as reinforcement to the behavior of making their bed. The child will likely make their bed in the future to earn more money. When a consequence is punishing, the likelihood of the behavior that just occurred will decrease. If a driver is going 30 mph over the speed limit, receiving a hefty speeding ticket is punishing for the behavior of speeding. The driver will likely drive slower, at least through that neighborhood, in the future.

Human behavior has four basic functions, sensory, escape, attention, or tangible (Cooper et al., 2020). This literature review is going to focus specifically on escape-motivated behaviors. When an aversive stimulus is presented, many people will try to avoid or stop interactions with that stimulus – known as negative reinforcement. To stop or decrease the escape behavior, practitioners of ABA will present the aversive stimulus while the person is engaging in escape motivated behaviors. No longer reinforcing the behavior is known as extinction. When this is applied to escape-motivated behaviors, it is known as escape extinction (EE).

The current study is a literature review of existing literature on feeding treatment packages for children with ASD and is structured around the different levels of effectiveness of

those packages. This will include examining the effectiveness between participants, the

effectiveness across studies, and the effectiveness at study follow ups.

Due to the technical and complex nature of ABA treatment packages, a list of key terms and

examples are in Table 1 below.

Table 1

Key Definitions

Term	Definition	Example
Escape Extinction (EE)	No longer allowing escape-motivated behaviors to be reinforced (Cooper et al., 2020)	Instead of letting a child run away from the broccoli they hate, a parent will follow them with the broccoli until they eat it.
Noncontingent Reinforcement (NCR)	Allowing for reinforcement without needing to perform the behavior (Cooper et al., 2020)	Instead of chasing the child with broccoli, a parent will randomly allow the child to leave the table during dinner time.
Differential Reinforcement of Alternative Behavior (DRA)	Reinforcement is given for desirable alternative behaviors and reinforcement is withheld following problem behaviors (Cooper et al., 2020)	Even if a child is running away from the broccoli, the parent will praise them for slowing down or using their words to communicate.
Attention Extinction (AE)	No longer allowing attention-motivated behaviors to be reinforced (Cooper et al., 2020)	Instead of yelling at a child for running away from their broccoli, a parent will simply not say anything and not look at the child when they engage in the target behavior.
Response Cost (RC)	Conditioned reinforcers are removed to decrease the likelihood of the target behavior happening in the future (Cooper et al., 2020)	If a child earns a gold star for each bite of broccoli they swallow, when the child runs away, they lose a gold star.

Term	Definition	Example
Least-to-Most (LTM) Prompting	Providing any opportunity to perform the response with the least amount of assistance on each trial (Cooper et al., 2020). The learner receives greater degrees of assistance with each successive trial without a correct response (Cooper et al., 2020).	When a child refuses to eat broccoli, a parent will first point to the broccoli. If that doesn't work, the parent may guide the child's hand to their fork. If that doesn't work, the parent will physically guide the child at the elbow to bring the fork to the child's mouth. This continues until the child follows through with the desired behavior.
Most-to-Least (MTL) Prompting	Physically guiding a learner to teach a behavior, then fading the prompt levels back as the learner masters the behavior (Cooper et al., 2020)	When a child refuses to eat broccoli, a parent will use hand-over-hand to put the broccoli on the fork and bring it to the child's mouth. Once the child is reliably eating their broccoli with hand-over-hand, the prompt level will fade to just guiding them at the elbow. This fading will continue until the child is feeding themselves broccoli independently.
High Probability (High-p) sequence	Also known as behavior momentum. Before placing a difficult demand, 2-5 easy or mastered demands will be placed first. This will increase the likelihood that a difficult demand will be followed through with (Cooper et al., 2020)	If a child refuses to eat broccoli, but they love peas, cucumbers, and carrots, the parent will put all of the vegetables on the same plate. The parents will first instruct the child to eat a bite of peas followed by praise when the behavior is completed, then a bite of carrots followed by praise, then the parents will instruct the child to take a bite of broccoli.
Behavioral Skills Training (BST)	A method of teaching parents/caregivers/staff how to teach a skill to a learner (Cooper et al., 2007). BST includes four steps, instructions, modeling, rehearsal, feedback (Cooper et al., 2020).	Instruction: A behavior analyst will provide parents with written instructions of how to get their child to eat broccoli. Modeling: A behavior analyst will act out the instructions given to the parents. Rehearsal: The parents will practice the instructions while the behavior analyst observes. Feedback: The behavior analyst will provide feedback on how the parents did at implementing the treatment.
Lag Schedule of Reinforcement	A response of a behavior is reinforced if it differs from a predetermined number of previous responses (Cooper et al., 2020)	The parents want their child to eat more vegetables, so they will put 6 different vegetables on their plate. If the child is on a Lag 1 schedule, the child will get reinforced after they eat a bite of food that is different from the one that they just took a bite of. If a

		child is on a Lag 3 schedule, the child will get reinforced after they eat a bite of food that is different from the previous three bites they took.

Scope of Literature Review

PsychINFO was the online database used to find studies. Keywords used included "escape extinction," "feeding programs," "feeding protocols," and "food selectivity." Case studies were included if they were conducted on people under the age of 18 with at least one problem behavior, were peer-reviewed, and were published in the past 12 years in a journal article. Based on these search results and time constraints, 16 studies were included in the review. In the 16 studies, 17 different treatment packages were used on 32 children with varying diagnoses.

While reading the studies information regarding the treatment package, information was systematically compiled about the participants' diagnoses, the inappropriate mealtime behaviors (IMB) being targeted for decrease, the topography of target behavior, appropriate mealtime behaviors that were identified for increase, the participants' age, treatment details, whether or not a follow up was conducted, and the results. Also noted was the reported treatment effectiveness, consistency of results between participants when applicable, consistency of results across studies when applicable, and follow up treatment effectiveness when applicable. See Table 2, which lists the studies and the details of the variables under consideration.

Table 2

Details of Study Included in the Review

Author Names	Year	Diagnosis	Age of Children	Treatment Details & Duration
Alaimo, Seiverling, Anderson, Sturmey	2017	Developmental delays, chromosomal deletion, failure to thrive, gastroesophageal reflux disease, history of constipation and food refusal	2 y	Had target foods, utensils, reinforcers, and a scale; intake was measured by using pre and postweights of the food; child had to swallow all the food/drink within 10 s of presentation and a clean mouth within 30s of the initial acceptance of food; 4-6 sessions were held daily with 30-45 min in between for 11 days
Allison, Wilder, Chong, Lugo, Pike, Rudy	2012	ASD	3 y	Acceptance, latency, problem behavior, and negative vocalizations were scored, client must accept food within 3 cm of the child's mouth; 5-10 sessions per day, 2-3 days per week, carried out for 20 minutes
Bachmeyer, Piazza, Fredrick, Reed, Rivas, Kadey	2009	History of hernias; developmental delays; developmental delays and GERD; developmental delays, mild vision impairment	5 y, 3 y, 4 y, 4 y	Measured acceptance and instances of target behavior; Meals were 30-45 min and were conducted every 30 min-2.5 hr; sessions had 5 bite/drink presentations but were terminated if the feeder did not present all 5 bites after 30 min
Berth, Bachmeyer, Kirkwood, Mauzy, Retzlaff, Gibson	2019	Feeding disorders	4 y, 4 y, 20 mon, 4 y, 5y	Measured presentation and acceptance of food with and without physical prompting; 2-3 session blocks during 3-hour visits, 2-4 days per week, session blocks had 2-6 sessions that were no more than 30 minutes with 30 minutes in between blocks, sessions were terminated after 5 bites or if 30 min elapsed
Borrero, Schlereth, Rubio, Taylor	2013	Feeding disorders	2 y, 4 y, 14 mon, 5 y	Observed latency to bite acceptance and IMB, measured bite acceptance; 10-bite presentations every 20-30s, one hour sessions, if the child did not bite within 5 s, the food was left there for 5 more s (nonremoval), then physical guidance (jaw or finger prompt) was used in addition to nonremoval of spoon
Author Names	Year	Diagnosis	Age of Children	Treatment Details & Duration

De los Santos, Silbaugh	2020	Developmental delays and food selectivity	4 y	Measured acceptance, gagging, and expulsion; ABCB design, A=Baseline, B=DR w/ highly preferred food, C=DR w/highly preferred food; client did not have food 2 hours prior to session; a plate was set up with 2 bites of 3 different foods (6 total); 4 sessions were held per day; least-to-most prompting; 82 sessions over 2 months
Groff, Piazza, Volkert, Jostad	2014	Total food refusal and 100% gastronomy tube dependence	4 y	Measured acceptance, mouth clean, and inappropriate behavior; A=baseline with cup, b=extinction nonremoval of cup, C=fading with extinction using nonremoval of syringe; five 30-45 min meal blocks held daily with each block having 5-7 sessions; syringe was used if client did not accept liquid within 5 s of presentation; visual inspection was used to determine fading; stable levels of acceptance and clean mouth above 80% advanced the fading procedure and below 80% resulted in going back a step; a special cup was used to allow for fading with the syringe
Levin, Volkert, Piazza	2014	ASD; Nick relied on 90% of their calories from a gastronomy tube; Cara had dysphagia	4 y	Measured clean mouth and packing after nonremoval procedures; Nick: 1 meal per week for 1 hr; Cara: 2-5 meals per day for 30-45 min per meal w/ at least 1 hr between the start of each meal; Presented bites every 30-45 s w/ verbal prompt
Najdowski, Tarbox, Wilke	2012	ASD	3 y	Verbal prompts were used simultaneously with a level spoonful of food, acceptance was scored if client accepted food within 5 s of presentation, clean mouth checks were one 25s after acceptance, client given access to highly preferred videos for 15 s for clean mouth; 20 bites were presented every 30-45 s during one session;
Penrod, Wallace, Reagon, Betz, Higbee	2010	Pervasive Developmental Disorder, ASD	3 y, 4 y, 4 y	Measured bite fading, manipulation of reinforcer magnitude, and EE; Meals were ended after bite requirements were met or if 30 min elapsed

Author Names	Year	Diagnosis	Age of Children	Treatment Details & Duration
Penrod, Gardella,	2012	ASD	9 y, 10 y	Intervention included demand fading; Measured bite consumption as clean mouth after 5 s of

Author Names	Year	Diagnosis	Age of Children	Treatment Details & Duration
Fernand				food presentation and compliance as following an instruction after the first or second prompt, 12 trials, if a client did not accept food within 5 s, the therapist would prompt them to take a bite, if they did not take a bite within another 5 s, the therapist would reprompt; if they did not take a bite after that, the food was removed and the therapist waited 20s before presenting a new bite, therapist ignored food refusal; after baseline, the prompts were changed to low-p behaviors, clients were given 10s access noncontingently to highly preferred foods at start of session; following a high-p demand earned praise and following a low-p demand earned praise and 2-3 bites of high-p food; 2-4 consecutive sessions with 5-min break in between 2-3 days per week, Sessions were trial based instead of time based, but they were approximately 10 min on average, 4-6 sessions were completed in 60 min
Rivas, Piazza, Patel, Bachmeyer	2010	gastroesophageal reflux disease (GERD), failure to thrive, status post Nissen fundoplication, hypothyroidism, and bronchopulmonary dysplasia; failure to thrive; failure to thrive and GERD	4.5 y, 5 mon, 10 mon	Measured inappropriate mealtime behavior (turning head 45 degrees), acceptance (opening mouth to allow bite to pass within 5 s of presentation), and negative vocalizations (crying or whining for more than 3 s), therapist presented bites to the child for 5 min during all sessions except during EE, when the session continued until the child swallowed the last bite that entered his or her mouth within the initial 5-min session; therapists vocally prompted to "take a bite" every 20-30 s; therapist checked for food in mouth after 30 s: added a fading+EE section to mitigate the negative side effects of EE; 5 meals per day with 1-3 h in between each; each meal lasted 30-45 min and had several sessions with 1-2 min in between sessions
Seiverling, Williams, Sturmey, Hart	2012	ASD and food selectivity	4 y, 8 y, 5 y	Parents were given a task analysis on how to complete sessions; Experimenters did parent training and modeled two taste sessions with child and mother rehearsed a taste session; experimenter gave 3 comments of things done well and 2 ways to improve; parents did 3 feeding sessions without feedback; Several weeks, but parents kept up intervention for 3 months

Author Names	Year	Diagnosis	Age of Children	Treatment Details & Duration

Silbaugh, Wingate, Falcomata	2016	ASD	3 y	Had a Lag 1/Response blocking (RB) and Lag 2/RB; an array of 5 foods as big as a small marshmallow was arranged horizontally on the plate; no utensils were used and the participant self-fed; Lag 1 used EE; Up to 4 sessions a day; baseline and Lag 1 sessions had 11 trials and Lag 2 had 12 trials; between consecutive sessions, a 1-3 minute break in a new room was provided
Silbaugh, Swinnea, Falcomata	2018	ASD	4 y	Responses of mealtime challenging behavior were ignored and blocked; the child was told "Open your mouth or I will have to help you" if child did not accept within 5 s, the feeder used thumb and forefinger to apply gentle pressure on the mandibular joint; another way was the feeder sticking his finger gently in the client's mouth; 2-6 sessions per day for 2-3 days per week; 1-3 min break in between sessions
Volkert, Piazza, Vaz, Frese	2013	Failure to thrive, reflux, vomiting; developmental delays, prematurity, bronchopulmonary dysplasia, tracheostomy, failure to thrive, reflux, fundoplication, and gastrostomy tube dependence	4 y, 14 y	Sessions were 5 bite presentations and prompted "take a bite"; verbal praise was delivered; if the child did not self-feed within 5 s, the feeder used nonremoval of spoon until the child opened their mouth; no differential consequences for inappropriate behavior; used least-to-most prompting (verbal, gestural, physical) to prompt chewing

Effectiveness of Treatment Packages

The case studies that were reviewed were conducted over the course of several weeks, some of which spanning over several months including study follow ups. To synthesize the findings, the studies reviewed here are organized according to their reported treatment effectiveness, from high to moderate to low. Interventions that decreased inappropriate mealtime behaviors (IMB) by 75-100% after baseline and increased appropriate mealtime behaviors to 85-100% are grouped for the purpose of this review as "highly effective." Interventions that

decreased inappropriate mealtime behaviors (IMB) by 50-75% after baseline and/or increased appropriate mealtime behaviors to 50-85% are grouped as "moderately effective." Interventions that decreased behaviors by less than 50% after baseline and/or appropriate mealtime behavior is still occurring less than 50% of the time are considered "lowly effective." Some interventions are described as "moderate-highly effective" or "low-moderately effective" if there were more than one participant, and one or more participants fit in different effectiveness rating qualifications. For example, if the treatment was highly effective for one participant but was moderately effective for another, the treatment was rated as "moderate-highly effective."

Consistency is defined within this literature review if the treatment package had the same effectiveness rating when applicable between participants, across studies, and during follow ups. If the treatment effectiveness rating was different between participants, across studies, or during follow ups, the treatment is described as "inconsistent" for the corresponding category. If the treatment was only used on one participant, did not have a follow up, or was only used in one study, the consistency was not rated and "N/A" was filled in Table 3.

The current literature review determined if specific components of treatment options are variable. For example, DRA was used for six different treatment options. In some instances, treatment with DRA was given a treatment effectiveness rating of highly effective while in other instances, treatment packages that incorporated DRA were given a rating of lowly effective. DRA was considered highly variable due to the inconsistency of different treatment packages that use DRA as a component. Treatment package components, such as DRA, EE, and NCR are discussed below in terms of variability.

Based on this categorization scheme, five treatment packages appeared to be highly effective, three treatment packages were moderately-to-highly effective, three treatment

packages were moderately effective, one treatment package was lowly-to-moderately effective, and five treatment packages were lowly effective.

Based on the findings of the studies within the literature review, including escape extinction in the treatment package does not necessarily mean that the intervention will work. When EE was paired with DRA and a response cost for one child, the treatment package was halted before the study concluded because of it was not as effective as another treatment package (Alaimo, Seiverling, Anderson, & Sturmey, 2017); however, when EE is packaged with just DRA, the same study and multiple others found that this treatment package can work well, but it may vary depending on the child treated (Alaimo et al., 2017; Allison, Wilder, Chong, Lugo, Pike, & Rudy 2012, Berth, Bachmeyer, Kirkwook, Mauzy, Retzlaff, & Gibson, 2019; Levin, Volkert, & Piazza, 2014; Rivas, Piazza, Patel, & Bachmeyer, 2010). Functional analyses are done to determine function of behavior, but it is possible for treatments that address functions identified in the functional analysis are not guaranteed to work for every learner. In some treatment packages, such as DRA+bite fading+reinforcer manipulation+escape prevention, DRA is consistently highly effective (Penrod, Wallace, Reagan, Betz, & Higbee, 2010), but in other treatment packages, such as DRA+escape+bite fading+reinforcer manipulation and DRA+escape+bite fading, DRA is consistently ineffective (Penrod et al., 2010). DRA treatment packages have high variability in effectiveness, so using DRA as part of the intervention does not guarantee a successful treatment (Alaimo et al., 2017; Allison et al., 2012, Berth et al., 2019; De los Santos & Silbaugh, 2020; Levin et al., 2014; Najdowski, Tarbox, & Wilke, 2012; Penrod et al., 2010; Rivas et al., 2010).

Based on trends across studies, when the treatment package does not address all functions of a behavior, the treatment does not work as well as other packages that address all functions of

a behavior. This can be observed in Bachmeyer, Piazza, Frederick, Reed, Rivas, and Hadey's 2009 study where attention and attention extinction are packaged with escape and escape extinction. When attention and escape extinction are packaged together and escape and attention extinction are packaged together, the treatment is consistently ineffective (Bachmeyer et al., 2009). When attention extinction and escape extinction are packaged together, treatment becomes consistently highly effective (Bachmeyer et al., 2009).

It appears that NCR works well with EE (Allison et al., 2012), but does not work well when escape behaviors (such as elopement from the table or hitting a spoon away) are still reinforced (Berth et al., 2019). This could be because part of the function of the behavior, escape, is still being reinforced, so the behavior will likely continue to happen.

Prompt fading was consistently highly effective when it was packaged with escape extinction (Groff, Piazza, Volkert, & Jostad, 2014; Penrod et al., 2010), but had moderate-to-low effectiveness when the treatment package did not include escape extinction (Borrero, Schlereth, Rubio, & Taylor, 2013; Penrod et al., 2010; Silbaugh, Swinnea, & Falcomata, 2018). Prompt fading, also known as MTL prompting, is the opposite of LTM prompting. LTM prompting was moderate-to-highly effective for two children (Volkert, Piazza, Vaz, & Frese, 2013). This inconsistency suggests that some learners might do better with LTM prompting, while others do better with MTL prompting. Perhaps this could be because MTL prompting uses full physical guidance to "force" eating, whereas LTM prompting encourages learners to do it themselves.

Using behavior momentum in a high-p sequence showed a lot of promise for two children and the results were consistent at follow ups conducted at three, six, and twelve weeks after the completion of treatment (Penrod, Gardella, & Fernand, 2012). The high-p sequence could be a way for practitioners to increase food acceptance and clean mouth and decrease inappropriate

mealtime behavior, while avoiding escape extinction in their treatment package; however, more research is needed to determine if this can be successful for a significant number of children.

Another treatment package that did not incorporate escape extinction was BST (Seiverling, Williams, Sturmey, & Hart, 2012). During treatment, the treatment was highly effective for two out of three dyads of mother and children pairs (Seiverling et al., 2012). For one pair, the treatment did moderately increase appropriate mealtime behavior and did decrease inappropriate mealtime behavior, but it did not increase appropriate mealtime behaviors enough to be considered highly effective by the current literature review (Seiverling et al., 2012). Even though parents were given a written task analysis for conducting sessions by themselves, two out of three parents needed a refresher training on BST at a twelve week follow up (Seiverling et al., 2012). More research can be done on BST and feeding protocols.

A lag schedule was used in one study to increase the variety of foods a child ate (Silbaugh, Wingate, & Falcomata, 2016). The lag schedule, combined with response blocking, worked moderately well for the single participant (Silbaugh et al., 2016).

The current literature review demonstrates that more research is needed to determine the effectiveness and morality of different treatment packages. Previous works have indicated that behavior analytic interventions, such as escape extinction, DRA, and physical guidance of self-feeding behaviors have the most empirical support for treatment of pediatric feeding disorders (Volkert & Criado, 2020, p. 6). The current literature review suggests that despite empirical support of these behavior analytic interventions, perhaps other interventions used by behavior analysts might be better suited for treatment of feeding disorders in children. Concerns have been raised by autistic people who have received behavior analytic services which used escape extinction in feeding protocols. Currently, there is no published research to examine this topic

further. Until research has been conducted to determine the validity of these claims, despite empirical support, it may be best practice to try lag schedules of reinforcement, behavioral skills training for caregivers, high probability sequences, noncontingent reinforcement, and least-to-most prompting prior to introducing escape extinction.

Limitations of the Study Conclusions

One limitation of this study is that when gathering the information, the researcher did not take notes when a functional analysis was done to determine the functions of the behavior. A functional analysis is a comprehensive assessment that takes place over several hours or days to determine the functions of target behaviors. Functions can be hypothesized based on if treatment was effective; however, a functional analysis has been known as the industry gold standard for determining the function of behavior and saves time when implementing treatment. Due to the time constraints of a functional analysis, a relatively-new assessment has challenged the functional analysis as the industry gold standard. The interview-informed synthesized contingency analysis (IISCA) begins with an interview, like a functional analysis (Coffey, Shawler, Jessel, Nye, Bain, & Dorsey, 2020). The IISCA is then followed by a presentation of synthesized antecedents and consequences that have been identified during the interview to contribute to problem behavior (Coffey et al., 2020). The IISCA is able to be performed in different environments, whereas the functional analysis is traditionally done in a clinical setting (Coffey et al., 2020). It it possible that an IISCA could have been a more effective assessment to determine the functions of behavior than a functional analysis in the case studies reviewed in this paper.

Another limitation of the current study is the relatively small number of case studies included within the review. The researcher only used PsychINFO to gather case studies. Other

online databases that could have been used to gather sources include EBSCO and ERIC. The researcher could have also expanded the keywords that she used while gathering studies. The research could have been done over a longer period of time than the approximate three months the current literature review took, which would have allowed for more case studies to be analyzed. Potential keywords that could have been used include "feeding programming" and "food protocols ABA." It was difficult to draw generalizations from these studies because there were so few. However, even with the additional published studies, it does not consider the possibility that there may be more unpublished studies that were unsuccessful. Learning about unsuccessful studies is equally important when evaluating potential treatment packages.

Implications

Even though human behavior only has four functions, there are an abundance of ways to address problem behaviors. The current study has identified that noncontingent reinforcement, attention extinction, prompt fading, lag schedules of reinforcement, differential reinforcement of alternative behaviors, BST for caregivers, NCR, and high probability sequences need further research to determine the consistency of effectiveness for these treatment options instead of EE in feeding protocols. Because parents and caregivers spend the most time with their children, behavioral skills training, in particular, needs to be researched further. Perhaps consistent BST for caregivers could eliminate the need for behavior analytic intervention with feeding procedures. It is important to note that challenges with feeding may be outside of the scope of practice of behavior analysts. Behavior analysts should consult speech-language pathologists, feeding therapists, or other medical professionals to ensure the problem does not have a medical etiology prior to the creation of any treatment packages for feeding-related behaviors to uphold the Board Certified Behavior Analyst (BCBA) code of ethics.

It is important for practitioners to keep in mind that some autistic people who have received ABA services have claimed that escape extinction led to eating disorders in themselves. Even though there is not any empirical evidence to support or disprove these claims, practitioners need to be aware of these potential concerns when deciding their course of treatment.

Most behavior analytic research looks at the immediate consequences of a treatment and may have follow ups weeks or months after implementation; however, few or no studies in a given behavioral domain into consideration impacts that a treatment could have years down the line. Until further research has been conducted to see if there is correlation and/or causation between escape extinction and feeding protocols, it may be best for ABA practitioners to create treatment packages that do not use escape extinction until all other methods have been exhausted due to anecdotal claims. It is best practice for behavior analysts to use a multidisciplinary team when addressing problem behavior in regards to food (Volkert & Criado, 2020, p. 6). Potentially effective alternatives to escape extinction in feeding treatment packages are least-to-most prompting, high probability sequences, noncontingent reinforcement, behavior skills training, and lag schedules of reinforcement.

Table 3

Treatment Packages Effectiveness and Consistency

Treatment Package	Number Children Treated	Treatment Effectiveness	Consistency of Results Between Participants	Consistency of Results Across Studies	Follow Up Treatment Effectiveness
NCR+EE (Allison et al., 2012; Berth et al., 2019)	6	High	Consistent	Consistent	N/A
AE+EE (Bachmeyer et al., 2009)	4	High	Consistent	N/A	N/A
Extinction and Prompt Fading (Groff et al., 2014)	1	High	N/A	N/A	N/A
DRA+bite fading+reinforcer manipulation+escape prevention (Penrod et al., 2010)	3	High	Consistent	N/A	Consistent
High-p sequence (Penrod et al., 2012)	2	High	Consistent	N/A	Consistent
BST for Caregivers (Seiverling et al., 2012)	3	Moderate-high	Inconsistent	N/A	Inconsistent
DRA+EE (Alaimo et al., 2017; Allison et al., 2012; Berth et al., 2019; Levin et al., 2014; Rivas et al., 2010)	12	Moderate-high	Inconsistent	Inconsistent	N/A
LTM Prompting (Volkert et al., 2013)	2	Moderate-high	Inconsistent	N/A	N/A
NCR+Escape (Berth et al., 2019)	5	Moderate	Consistent	N/A	N/A
Lag Schedule (Silbaugh et al., 2016)	1	Moderate	N/A	N/A	N/A
DRA+Escape (Berth et al., 2019; De los Santos & Silbaugh, 2020; Najdowski et al., 2012; Penrod et al., 2010; Rivas et al., 2010)	13	Moderate	Consistent	Consistent	N/A
Physical Guidance Prompts (Borrero et al., 2013; Silbaugh et al., 2018)	5	Low-moderate	Inconsistent	Inconsistent	N/A
DRA+RC+EE (Alaimo et al., 2017)	1	Low	N/A	N/A	N/A

Treatment Package	Number Children Treated	Treatment Effectiveness	Consistency of Results Between Participants	Consistency of Results Across Studies	Follow Up Treatment Effectiveness
AE+Escape (Bachmeyer et al., 2009)	4	Low	Consistent	N/A	N/A
EE+Attention (Bachmeyer et al., 2009)	4	Low	Consistent	N/A	N/A
DRA+escape+bite fading (Penrod et al., 2010)	3	Low	Consistent	N/A	N/A
DRA+escape+bite fading+reinforcer manipulation (Penrod et al., 2010)	3	Low	Consistent	N/A	N/A

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