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Food Selectivity in Children on the Autism Spectrum: Evidencing the Effectiveness of Behavior Analytic Interventions

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ABSTRACT

Food selectivity is a major cause for concern for many children on the autism spectrum, with some children's diet restricted to one or two food sources only, such as a child only eating yoghurt or anther chid only eating potato chips. A systematic literature review was conducted to establish the effectiveness of behaviour analytic interventions that target introducing variety into the diet of these children. A total of 42 studies met inclusion criteria. Nearly all studies reported successful introduction of food variety into the children's diet. The two most frequently used behaviour analytic interventions included reinforcement and extinction procedures. Interestingly and against guidelines for evidenced-based practice, few studies reported functional assessments and/or preference assessments. The absence of these assessments did not seem to have an impact on intervention effectiveness. A discussion of this outcome together with recommendations for future research and practice are offered.

INTRODUCTION

Food selectivity is more than twice as common in children on the autism spectrum [1] than in other young children (<89% vs <40%) [2]. Food selectivity can range from food refusal to restricted diet variety (eating one or two different foods only) to consuming certain liquid foods only [3]. If not managed appropriately food selectivity can lead to severe health problems like malnutrition, weight loss, or failure to thrive [4]. Consuming a varied and healthy diet is important to promote physical health, gene activity, and pro-social behaviour [5]. Irregular eating habits can be due to health reasons (e.g., teething or swallowing issues), but most times, they are due to eating habits that have developed over time [6]. Feeding and eating disorders frequently are accompanied by challenging behaviour, like clenching teeth, turning head away, spitting out food, hitting, screaming, self-injurious behaviours, and destruction [7], potentially making meal times stressful for the child and the whole family. Applied Behaviour Analysis (ABA) [8] is the basis for a wide range of effective interventions aimed at enhancing behavioural skills and mitigating challenges for children on the autism spectrum [9,10] and other children or adults [11]. ABA-based interventions are individualised to meet the personal needs of each learner. Behaviour analysts adhere to strict ethical guidelines [12], UK-SBA, 2021).

ABA-based intervention protocols to address eating or feeding issues generally include positive reinforcement procedures [13], such as differential reinforcement of alternative behaviours (DRA) with escape extinction (an evidence-based procedure to reduce problem behaviour [8]) and stimulus fading [14], graduated exposure and

differential reinforcement [2]; Non-Contingent Reinforcement (NCR), and escape extinction, although few studies include a functional assessment [6] or a preference assessment [15]. Antecedent-based interventions also are used, such as simultaneous presentation of preferred and non-preferred foods, stimulus fading, and instructional sequences [15]. The most commonly used, however, is a multicomponent package comprised of reinforcement and extinction [16]. Most ABA-based interventions for food selectivity focus on increasing volume of foods consumed [17]. Few have focussed on the variety of food ingested [18] or problematic mealtime behaviours [19]. The main aim of this literature review was to examine the effectiveness of applied behaviour analytic interventions to address food selectivity by analysing what types of interventions have been used successfully with children diagnosed with autism spectrum. Further aims were to examine the use of functional assessment and preference assessment procedures as well as intervention fidelity.

METHOD

The systematic literature review was carried out in five phases; scoping, searching, referencing, verifying, and documenting [20]. Inclusion criteria (Table 1) were guided by the PICOC model developed by Petticrew and Roberts [21] that includes description of Population, Intervention or Exposure, Comparison, Outcome, and Context.

Table 1: inclusion criteria.

Inclusion criteria	
Type of studies	Single subject research design, group research design, thesis and book chapters and randomised controlled trials. Published in peer-reviewed journals
Type of population	Diagnosed with ASD and characterized by eating difficulties
Types of intervention	Using Applied behaviour analysis-based interventions
Types of outcome measures	Direct observation of food consumption, parental reports, reports of increase in variety of diet

Stage 1: Scoping

The "pearl-growing" [20] started with a search in Google and Google Scholar for the following terms: autism, eating, feeding, applied behaviour analysis. The resulting list of references was sorted based on their relevance to this review. The first step was to identify the relevant free-text terms. The following key-words were selected from the "pearls" (Table 2):

- Autism; autism spectrum disorder (ASD);
- Eating, feeding, feeding disorder, eating difficulties
- Behavio* intervention, functional assessment, escape extinction, reinforcement, applied behavio* analysis

Table 2: Search terms used in the systematic review.

Applied Behaviour Analysis	Eating difficulties	Autism
Evidence based treatment	Paediatric feeding	Autism Spectrum Disorder
Treatment	Mealtime behaviour problems	ASD
Antecedent	Feeding disorder	
Escape extinction	Food selectivity	
Reinforcement	Feeding behaviour	
Behavioural treatment	Dietary intake	
Shaping	Food refusal	
Fading	Feeding problems	

Stage 2: Conduct the Search

The second step was to identify subject headings by searching the pearls in the databases and note the subject headings assigned to them. The following databases were searched: PsycINFO, PubMed, and Medline. A list of relevant subject headings was reviewed by checking how the relevant texts were indexed. A combination of free-text, thesaurus, and Boolean search techniques were used. To account for spelling variations wild-card symbols were used, according to relevant instructions for each of the databases (Table 2).

The objective was to search articles published in peer-reviewed journals, however, grey literature was also searched. Grey literature included "information produced on all levels of government, academics, business and industry in electronic and print formats not controlled by commercial publishing, i.e., where publishing is not the primary activity of the producing body" [22]). The following websites were searched for theses: EBSCO, ethos, Proquest, oatd. Only one of these (oatd) generated a relevant dissertation thesis by Catherine McHugh [23]. Only articles published in peer-reviewed journals and grey literature were considered for the purpose of this research. Search results are reported the PRISMA flowchart [24] in Table 4.

Stage 3: Reference section search

A reference section search, citation searches and key author searches were carried out of all studies that were included in

the review. Furthermore, hand searches were conducted in the two most relevant scientific journals, namely the *Journal of Applied Behavior Analysis* and *Behavioral Interventions*. These searches were performed on the websites of the journals, taking into consideration article titles and abstracts. During this stage, titles and abstracts were scanned for interventions that matched the inclusion criteria, even if they were not using the pre-defined search terms. Indexing checks were carried out of all included articles and any new subject headings were introduced in the search.

Stage 4: Verification

Inter-coder data were collected by a second coder who was an experienced Board Certified Behaviour Analyst (BCBA). Inter-Coder Agreement (ICA) was calculated by multiplying by 100 the total number of articles identified for inclusion by the second coder and dividing this with the total number of articles identified for inclusion by the first coder. The ICA score was 90.32%, with only 3 articles that were not agreed on during abstract sifting.

Table 3: Stages of the search process.

Stage	Description	Steps
Stage 1	Initial search of the literature: scoping search	• Search for existing reviews and familiarise yourself with the topic and volume of literature by a scoping search on select databases • Determine which databases are to be included in the full search • Identify key search terms for each database • Develop and document a search strategy.
Stage 2	Conduct search	• Search all databases using the identified search terms and the key search principles: free-text terms and tools, thesaurus terms, operators and limits. • Conduct a search for unpublished or grey literature search • Consider the appropriateness of a methodological filter • Ensure if search is modified, this is documented
Stage 3	Bibliography search	• Search the reference lists and bibliographies of all papers for additional studies • Identify any key citations and conduct citation searches • Consider hand searching of relevant journals
Stage 4	Verification	• Check indexing of any relevant papers that have apparently been missed by search strategies • Revise strategies if necessary • Consider contact with experts to determine if all relevant papers have been retrieved
Stage 5	Documentation	Record details such as the sources searched, search strategies used, and number of references found for each source/method of searching

*Adapted from Booth, Papaioannou, and Sutton [20].

Stage 5: Documentation

All searches, search strategies, and sources documents were included in the methodology (Table 3). Highly significant articles were singled out and reported in Table 4, while Table 5 lists articles that were found in the hand search using google and google scholar.

Table 4: Highly relevant articles

	Title	Author	Journal
1	Targeted Nutritional and Behavioral Feeding Intervention for a Child with Autism Spectrum Disorder	Barnhill, K., Tami, A., Schutte, C., Hewitson, L., Olive, M.	Case Reports in Psychiatry
2	Using Graduated Exposure and Differential Reinforcement to Increase Food Repertoire in a Child with Autism	Tanner, A., Andreone, B. A. [12]	Behavior Analysis in Practice
3	Meal Time Behavior in Children with Autism	Palta, A., Saxena, R.	International Journal of Science and Research
4	An assessment of Food acceptance in Children with Autism or Pervasive Development Disorder- Not Otherwise Specified	Ahearn, W., Castine, T., Nault, K., Green, G.	Journal of Autism and Developmental Disorders
5	Applied Behavior Analysis in the Treatment of Childhood Feeding Problems	Palmer, S., Thompson, R. J., Linscheid, T. R. [51]	Developmental Medicine and Child Neurology
6	Using Simultaneous Presentation to Increase Vegetable Consumption in a Mildly Selective Child with Autism	Ahearn, W. [32]	Journal of Applied Behavior Analysis
7	Recent Studies on Feeding Problems in Children with Autism	Volkert, V., Vaz, P.	Journal of Applied Behavior Analysis
8	Feeding Problems in Children with Autism Spectrum Disorders	Ledford, J.R., Gast, D.L. [52]	Focus on Autism and Other Developmental Disabilities
9	Development and Validation of an Inventory to Assess Mealtime Behavior Problems in Children with Autism	Lukens, C. T., Linscheid, T. R.	Journal of Autism and Developmental Disabilities
10	Eating Disturbances in Autism Spectrum Disorders with Focus on Adolescent and Adult Years	Rastam, M.	Clinical Neuropsychiatry: Journal of Treatment Evaluation
11	The Treatment of Food Selectivity and Other Feeding Problems in Children with Autism Spectrum Disorders	Matson, J. L., Fodstad, J.C. [53]	Research in Autism Spectrum Disorders
12	Treatment outcomes for Severe Feeding Problems in Children with Autism Spectrum Disorder	Laud, R. B., Girolami, P.A., Boscoe, J. H. [7]	Behavior Modification
13	Functional Assessment and Behavioral Intervention for Eating Difficulties in Children with Autism: A study Conducted in the Natural Environment using Parents and ABA Tutors as Therapists	Gale, C.M., Eikeseth, S., Rudrud, E. [54]	Journal of Autism and Developmental Disabilities
14	Assessment and Behavioral Treatment of Feeding and Sleeping Disorders in children with Autism Spectrum Disorders	Kodak, T., Piazza, C.C. [55]	Child and Adolescent Psychiatric Clinics

Table 5: Articles identified in hand search.

	Title	Author
1	Pediatric feeding disorders: a quantitative synthesis of treatment outcomes	Sharp, W.G., Jaquess, J.F., Morton, J. F., Herzinger, C. V.
2	A comparison of sensory integrative and behavioural therapies as treatment for pediatric feeding disorders	Addison, L.R., Piazza, C.C., Patel, M., Bachmayer, M. H.
3	Antecedent interventions for pediatric feeding problems	Seubert, C., Fryling M.J., Wallace, M. D., Jiminez, A. R.
4	Spoon distance fading with and without escape extinction as treatment for food refusal	Rivas, K. D., Piazza, C.C., Patel, M. R, Bachmayer, M. H.
5	Treatment of selective and inadequate food intake in children: A review and practical guide	Bachmayer, M. H.
6	Treatment outcomes for severe feeding problems in children with autism spectrum disorder	Laud, R.B., Girolami, P.A., Boscoe, J. H. [7]
7	Recent studies on feeding problems in children with autism	Volkert, V. M., Vaz, P. C. M.
8	Using individualised reinforcers and hierarchical exposure to increase food flexibility in children with autism spectrum disorder	Koegel, R.L., Bharoocha, A.A, Ribnick, C.B, Ribnick, R.C., Bucio, M. O., Fredeen, R. M., Koegel, L. K. [13]
9	Using graduated exposure and differential reinforcement to increase food repertoire in a child with autism	Tanne, A., Andreone, B. E. [2]

Table 6: Types of intervention used in all studies.

Types of intervention used	Number of studies
Extinction	2
Antecedent intervention	8
Used combination of interventions	38
Consequence based intervention	2

Data analysis

Frequency data were reported for visual analysis in tables and graphs.

RESULTS

Selected articles

The initial search (carried out in 2018) identified 303 relevant articles. Of these, 85 articles were retained after title and abstract sifting; 10 were rejected during full-text sifting. Additional articles were included following a second search in 2019. The complete results of the search are presented the PRISMA flowchart [24] (Figure 1).

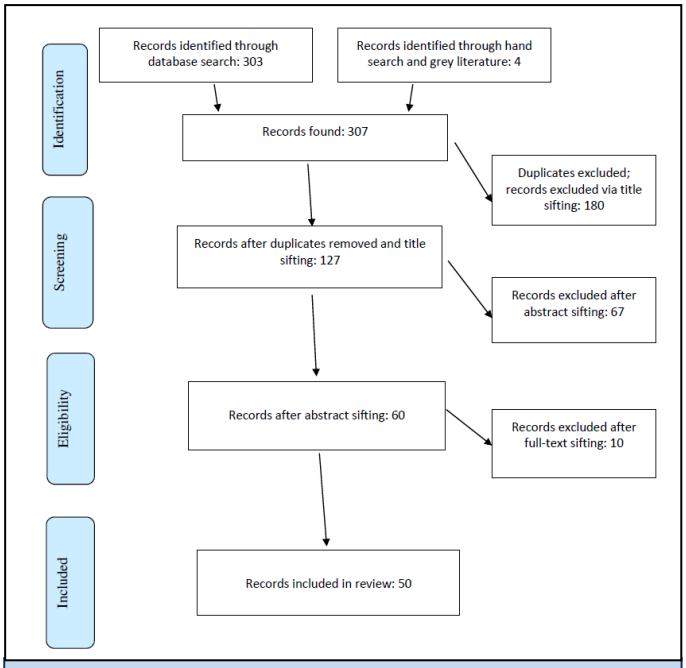

Figure 1: PRISMA flow diagram of search results.

Participants

A total of 286 participants were included across the 50 articles. All participants were on the autism spectrum and presented with feeding difficulties.

Intervention Characteristics and Outcomes

Table 6 shows details regarding the interventions for feeding difficulties that were used in the studies. The most commonly used interventions (n=38) were combined packages that included two or more components, while 8 studies used antecedent interventions, 2 studies used extinction alone, and 2 studies used consequence-based interventions. A closer look at combined packages (Table 7) revealed a high level of variability in terms of procedures: reinforcement was used most often (n=24 studies), while escape extinction was used nearly as often (n=23 studies); antecedent interventions were used in 10 studies; fading was used in 8 studies; differential reinforcement of alternative behaviours (DRA) and systematic desensitisation were used in 5 studies each; prompting was used 4 times; 3 studies each used shaping, modelling, non-removal of spoon, and non-contingent reinforcement, and planned ignoring was used in 2 studies. One study each reported using negative punishment, differential reinforcement of other behaviour (DRO), backward chaining, response

blocking, and consequence manipulation. Even though the most commonly used two procedures were reinforcement and extinction, the only 2 studies that used identical combinations of procedures were replication studies [25,26].

Most of the studies (n=45) reported a 100% success rate of their intervention package, in other words, an increase in the variety or quantity of foods consumed by participants was observed post-intervention; 4 studies did not report clear results [7,27-29]. These studies had not performed a preference assessment. Only one study did not report an increase in the variety of diet consumed by its participant [30]. This study had used an antecedent intervention and positive reinforcement and a preference assessment had been conducted.

The use of preference assessment: Whereas the majority of the studies (n=39) did not report the use of a preference assessments during the intervention, 11 studies did. Most of these 11 studies (87.5%) used a paired choice preference assessment in order to establish individualised reinforcers and all bar one [30] subsequently demonstrated a successful intervention (Table 8). Paired choice stimulus preference assessment was used as the main assessment method in 9 studies (16% of all studies; [14,31-37]). Two articles report using a multiple stimulus preference assessment (4% of all studies; [2]) and only one study used a single choice preference assessment (2% of all studies; [38] (Figure 2)).

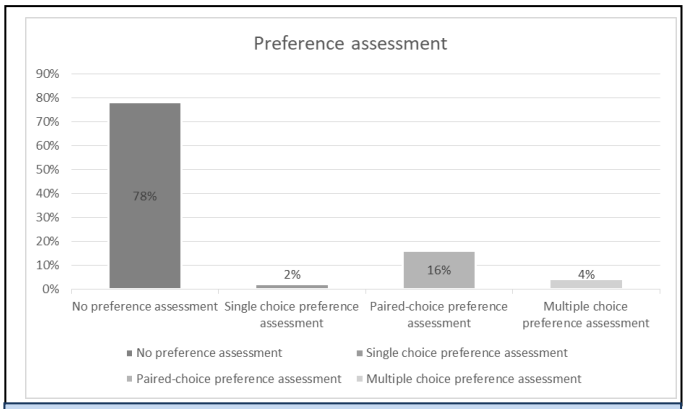

Figure 2: Percentage of studies that used different kinds of reference assessment.

The use of functional assessment: Six articles reported the use of a functional assessments to determine the function the challenging behaviours during the mealtimes (Table 9). All 6 studies demonstrate effectiveness of the interventions. Most of the studies (n=44), however, did not mention performing a functional assessment nor did they include any other exploration regarding the function of these behaviours. The only study that did not report success had not conducted a functional assessment (Figure 3).

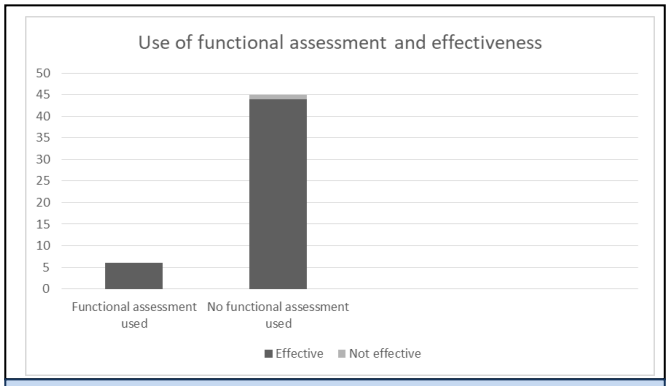

Figure 3: Use of functional assessment and effectiveness.

DISCUSSION

A systematic literature review was conducted regarding the effectiveness of Applied Behaviour Analysis-based intervention to support children on the autism spectrum who experience eating difficulties. A total of 50 eligible studies were identified and results showed that a wide variety of behaviour analytic strategies were successful. The two most widely used procedures included reinforcement and extinction. Only 11 of the studies conducting a preference assessment and only six of the studies reported conducting a functional assessment prior to the intervention. Interestingly, the absence of preference assessments or functional assessments did not seem to have a major impact on intervention effectiveness [39]. Four of the studies did not report a definitive number of participants for whom there was an increase in the variety or quantity foods eaten post intervention, thus, the percentage of success could not be calculated for these studies.

Interventions and effectiveness

A variety of applied behaviour analytic procedures were used in the studies to treat food selectivity. Whereas 38 studies used a combination of procedures, only six studies used a single applied behaviour analytic procedure. This, however, did not seem to make a difference in the effectiveness of behaviour analytic interventions overall, as only one study did not report an improvement with regards to foods consumed post-intervention. The two most frequently used intervention

procedures were reinforcement and extinction, either used alone or in combination with other procedures. Both of these procedures are evidence-based interventions that are used widely in Applied Behaviour Analysis and, in order to ensure intervention fidelity, interventionists require detailed knowledge and training [8]. Reinforcement was used explicitly in 25 studies, in a variety of combinations with other procedures but also as a standalone intervention. Most of these studies (n=22) reported successful outcomes, with 2 of them not reporting clear results and 1 study reporting lack of effectiveness as a result of using a combination of reinforcement and an antecedent procedure. These are not surprising results given that reinforcement is defined functionally as a consequence that increases the probability of behaviour [8]. Thus, if the right reinforcer is identified (via preference or reinforcer assessment) is will have the effect to increase the target behaviour, in this case, eating a variety of foods.

Extinction is a natural phenomenon that occurs when a previous reinforced behaviour is no longer reinforced and as a result the behaviour decreases and an extinction burst and spontaneous recovery is observed [8]. When extinction is used as part of an intervention programme significant caution is recommended as the procedure can have unwanted side effects, including extinction-induced aggression [40]. While 20 of the studies reviewed here included some escape extinction procedures, 19 of these studies reported successful outcomes. This is most likely due to the fact that extinction was not used as a standalone strategy, but rather as a component part of a complex combination of different individually-tailored behaviour analytic procedures most of which also included reinforcement procedures [8].

A number of behaviour analytic procedures were used less frequently, some in only one single study. This included differential reinforcement of other behaviour (DRO), backward chaining, negative punishment, non-removal of spoon, non-contingent reinforcement, and response blocking. These types of interventions were used both alone and in combination with other behaviour analytic procedures. All of these studies reported successful outcomes. It is unclear why these apparently effective interventions were not used more frequently.

The use of preference or reinforcer assessment

Preference and reinforcer assessments have become routine part of behaviour analytic interventions and are used to determine a highly motivating item or activity that potentially can be used as a reinforcer for adaptive and socially important behaviour [41]. The present review found that the majority of studies (n=39) did not conduct a preference or reinforcer assessment, or at least did not report having conducted such an assessment. While this is contrary to the generally preferred process, only one of the studies reported not having achieved successful outcomes regarding their food-related programme. All of the 11 studies that reported the use of a preference assessments reported positive outcomes.

The use of functional assessment

Since the seminal research by Iwata, Dorsey, et al. [42], Functional Assessments (FA), including functional analyses, have become a well-established part of behaviour analytic interventions [43]. FAs are used to determine how behaviour are maintained and thus can lead to more successful, precise, and effective interventions that address the function rather than the topography of the target behaviour [44]. Only 6 of the studies reviewed here had conducted a FA prior to the intervention. This relatively infrequent use of FAs was most likely due to the general view in the extant literature that escape is the primary maintaining variable for food refusal [45]. However, this may not apply to food selectivity. In fact, the 6 studies that reported performing a FA found that the maintaining consequences were positive and negative reinforcement.

Table 9: Functional assessment.

	Frequency	Effectiveness
Functional assessment used	6	6
No functional assessment used	44	44
Total	50	49
Percentage of studies using functional assessment	12 %	

There may be a number of reasons why all of the studies reviewed here, bar one, reported successful interventions, even when they did not conduct preference assessments or FAs. First, it is entirely possible that the extensive extant feeding and eating literature is right regarding the function of food related issues and that these behaviours are in fact mainly maintained by escape. Given that nearly half of the studies in this review used escape extinction successfully in their interventions seems to indicate that this may indeed be the case. However, more research is needed to establish fully if this true also specifically for food selectivity. Second, independent of the function of the behaviour, it is likely that reinforcing the targeted eating behaviour increased the future probability of that behaviour. This probability was borne out by the frequent and successful use of reinforcement as main intervention procedure. Therefore, selecting the right reinforcer becomes particularly important and future studies that address feeding and eating issues should include reports on preference and reinforcer assessments.

Third, the success of nearly all of the interventions used in the papers reviewed here indicates clearly the importance of individually tailoring interventions for children on the autism spectrum. The application of the science of behaviour analysis allows for a vast variety of procedures to be developed to ensure that each child receives a bespoke intervention package. Thus, ABA presents the scientific basis for the common conjecture that autism interventions need to be individually-tailored; one size does not fit all.

Table 7: Behaviour analytic strategies used in all studies

Study	Behavioural strategy																	
	Antecedent										Consequence							
	DRA	Systematic desensitization	DRO	Fading	Shaping	Antecedent intervention	Modelling	Prompting	Backward chaining	NCR	Response blocking	Consequence manipulation	Escape Extinction	Planned ignoring	Negative punishment	Non-removal of spoon	R+	Effectiveness
C. Paul et al. [56]		v											v					Y
J. Marshall et al. [27]		v																U
L. Seiverling et al. [25]	v			V									v					Y
C. Barahona et al. [57]						V											v	Y
J. Murphy and K. R. Zlomke. [58]														v	v		v	Y
A. C. Najdowski et al. [26]	V			V									V					Y
R.B. Laud et al. [7]						V						v						U
S. B. Fu et al. [31]							v						V				v	Y
B. C. Silbaugh and S. Swinnea. [30]						V											v	N
B. K. Wood et al. [59]								v									v	Y
W. G. Sharp et al. [60]				V									V				v	Y
W. G. Sharp et al. [28]				V				v	v				V	v		v	v	U
A. M. Kozlowski et al. [61]		v											V				v	Y
W. H. Ahearn. [32]						V												Y
J. Allison et al. [33]			v							V			V					Y
C. M. Anderson and	V												V					Y

K. McMillan. [62]																	
J.Cosbey and D. Muldoon. [63]						V										v	Y
D.M. Ewry and M. J. Fryling. [64]						V											Y
K. A. Freeman and C. C. Piazza. [65]				V									V			v	Y
K. M. Peterson et al. [66]													V				Y
H. Valdimarsdottir et al. [14]	V												V				Y
A. E. Meier and M. J. Fryling. [67]						V											Y
L. Seiverling et al. [25]		V		V									V				Y
C. R. Johnson et al. [29]					V											v	u
C. C. Ives et al. [68]					V											v	Y
C. M. Gale et al. [54]													V			v	Y
J. Tarbox et al. [69]													V				Y
A. Hodges et al. [36]					V											v	Y
B. Penrod et al. [38]						V											Y
B. Pizzo et al, 2012						V											Y
B. K. Sira and M. J. Fryling. [35]	V						v										Y
A. C. Najdowski et al, 2012																v	Y
M. Knox et al. [70]				V				v								v	Y
L. Seiverling et al. [36]													V			v	Y
W. G. Sharp and D. L. Jaquess, 2009						v											Y
B. C. Silbaugh et al. [37]											v					v	Y
A. Tanner and B. E. Andreone [2]		v														v	Y
L. T. D. Bui et al. [71]													V			v	y

D.S. Levin et al. [72]																v	v	y
T. Taylor et al. [73]																v	v	y
M.J. Trejo and M.J. Fryling [74]										v								y
L. Seiverling et al. [75]						v												y
S. Panerai et al. [76]				v									v				v	y
C.R. Johnson et al. [77]							v	v					v				v	y
H.M. Smith et a. [78]										v			v					y
W.G. Sharp et al. [79]							v						v				v	y

Table 8: Preference assessment methods and percentage of success.

Type of assessment		Frequency	Effectiveness
	single choice preference assessment	1	100
	paired-choice stimulus preference assessment	8	87.5
	multiple stimulus preference assessment	2	100
	No preference assessment used	39	100

CONCLUSION

The main aim of this literature review was to examine the effectiveness of ABA-based interventions to support children with autism who experience feeding difficulties, in particular, food selectivity. Overall, findings show that ABA-based interventions are effective, and thus have the potential to prevent problems related to malnutrition, weight loss, or failure to thrive. The second aim of this review was to analyse the correlation between conducting a functional assessment and the effectiveness of an intervention. Generally speaking, function-based intervention lead to more successful outcomes than interventions that are not based on a functional assessment. Even though using a functional assessment prior to an intervention is recommended [46-49] studies reviewed here did not adhere to this practice. The articles that reported performing a functional assessment found that the maintaining consequence for challenging behaviour was positive or negative reinforcement and they based the intervention plan on the established function of the behaviour. The studies that did not report a functional assessment also reported successful interventions. It is entirely possible that in these articles the maintaining consequence of the behaviour was assumed to be escape (as is the case in most food related studies; [50]) and nearly half of the studies used escape extinction successfully in their interventions.

On the other hand, it is possible that reinforcing the desired behaviour (i.e., eating increasing variety of foods) increased the future probability of that behaviour to an extend that led to notable changes. It is worth mentioning that the single study that did not produce a positive outcome did not use a functional assessment to establish the maintaining function of the eating difficulties. It is possible that completing a functional assessment prior to the intervention and choosing a function-based approach could have led to successful intervention in this study. Future studies should include clear descriptions of functional assessments and preference assessments to enable less experienced practitioners to replicate the results of the studies reviewed here.

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