

To cite this article: Giovanni Maria Guazzo and Consiglia Nappo (2024). FOOD SELECTIVITY IN AUTISM SPECTRUM DISORDER: A CASE STUDY, International Journal of Education and Social Science Research (IJESSR) 7 (3): 305-315 Article No. 951, Sub Id 1482

FOOD SELECTIVITY IN AUTISM SPECTRUM DISORDER: A CASE STUDY

Giovanni Maria Guazzo and Consiglia Nappo

IRFRI – Gruppo Forte, Salerno (Italy)

DOI: <https://doi.org/10.37500/IJESSR.2024.7322>

ABSTRACT

“Food selectivity” describes quite different food situations and behaviours: food rejection, limited food repertoire, and high-frequency single food intake; that is, it is an atypical complex behaviour that also has a great impact on caregivers and leads children to discriminate foods based on different parameters (shape, colour, texture, presentation, temperature, etc.) and affects 30% of the general pediatric population and more than 70% of those with autism.

In this paper, the authors implement an ABA intervention with a seven-year-old boy with autism who ate only a few foods, all with a liquid or semi-liquid consistency (milk with biscuits or yoghurt), while rejecting all other foods offered.

KEYWORDS: Autism, Food Selectivity, ABA Treatment, Changing Criterion Experimental Design

INTRODUCTION

Feeding is a primary need related to the survival of everyone, but it also represents a very important moment for social relations (intra-family, inter-family and intra-community). Almost all individuals with atypical development pre-sent deficits, more or less marked, at the time of feeding: partial and/or incorrect use of utensils (sporadic use of the napkin, dropping food from cutlery, etc.), excessive slowness in eating the meal, or on the contrary excessive voracity such that the subject steals food from other plates when he has finished his own, presence of some problem behaviours (spitting out food, throwing it at peers, etc.), selectivity (eating only certain foods, refusal to taste new foods, eating a re-determined amount of meals, etc.).

Feeding-related difficulties, therefore, directly involve caregivers who must deal with daily meal-related concerns that can become very aversive for the child and the whole family (Guazzo, 2021). Among these difficulties, food selectivity describes quite different food situations and behaviours and refers to food refusal, limited food repertoire, and high-frequency single food intake; i.e., it is an atypical compressive behaviour that also has a great impact on caregivers and leads children to discriminate foods based on different parameters (shape, colour, texture, presentation, temperature, etc.) and affects 30% of the general pediatric population and over 70% (from 67% to 89%) of those with autism (Silbaugh, Penrod, Whelan, Hernandez, Wingate, Falcomata & Lang, 2016).

The topic of food selectivity in children with autistic disorder has been extensively treated in literature (Ahearn, Castine, Nault, & Green, 2001; Bandini, Anderson, Curtin, Cermak, Evans, Scampini, Maslin, & Must, 2010; Curtin, Hubbard, Anderson, Mick, Must & Bandini, 2015), from which it can be inferred that children not only show difficulty in accepting certain types of foods and refuse to taste, touch, look at them, but, on some occasions, refuse the entire routine related to the moments of lunch and dinner (e.g., do not enter the kitchen, do not sit at the table, emit avoidance and escape behaviours, etc.).

In any case, before starting any nutrition education program, it is fundamental to have completed a medical evaluation phase to exclude the presence of organic aspects (gas- troesophageal reflux, intolerances, dental caries, etc.) that may in some way interfere with proper nutrition. Once these problems have been ruled out (should they be present, how- ever, the nutrition education program must be conducted in collaboration with physicians) we begin, as with any educative program, with an assessment phase that includes an interview with parents or caregivers to build the child's dietary history, to identify food preferences and foods that are disliked and/or rejected, to take information about mealtime-related routines (e.g., the child does not eat sitting at the table, but goes around the house or jumps on the bed), and to find out what their expectations are with respect to the intervention. Next, direct observations of the child's mealtime behaviour are con- ducted to establish a baseline.

Having concluded the assessment and baseline phases, the first key goal of the intervention is to create a positive relationship with the caregiver, who will accompany the child throughout the training and pay attention to the behaviours evoked during mealtimes and the related caregiver stress. Indeed, studies have revealed that the increase in negative behaviours during mealtimes is directly proportional to the increase in stress in families with children with autistic disorders, compared with families with typically developing children. This means that negative mealtime behaviours and parental stress are closely related to higher levels of food selectivity (Shore & Babbit, 1998; Anderson & McMillan, 2001; Najdowsky et al., 2003).

METHODOLOGY

Participant

The subject of the present study is Carlo, a seven-year-old child diagnosed with “autism spectrum disorder”. Upon analyzing the results of the various functional assessments (IPF1, VB-MAPP2), the little one presents a good functioning profile in all the skills investigated, except for school and personal autonomy skills. Of the latter, the one of greatest concern to the family is food selectivity, although the mother calls it “a small problem”, which was investigated by further assessment: interviews with the mother, a more specific assessment with respect to the problem, and direct observation during mealtimes.

All this was done to obtain as much objective data as possible, better understand the problem, and subsequently implement ad hoc treatment for Carlo.

The in-depth tests administered were:

- The Eating Habits Questionnaire (Worsley, Wang, & Hunter, 2012) was developed to assess food behaviour patterns. Eating Habits items are grouped into the following constructs: Uncontrolled Eating, Traditional Eating Style, Gulping, and Chocolate and Junk Food.

The Daily Food Log is a food diary of the foods and drinks presented and consumed by the child during all meals.

The mother's interview and evaluation revealed that:

- Carlo was very selective in his choice of foods to consume.
- He did not consume the day's meals together with the whole family, as he did not want to see other foods.
- If forced, he would enact a series of dysfunctional behaviours, which led the parents first to turn away the unwanted meal (negative reinforcement), and then to present the exclusive meal (positive reinforcement). Over the years, there was then a reconciliation on the part of the mother, who would present during all meals of the day, so only the favourite meal that the child consumed.
- When asked to recall and recount the first episode of food refusal and the subsequent learning history, the mother reported an episode of choking during weaning (first uses of baby food) and her fear of giving the peak-lo solid and/or chunky food.
- When asked to compile a list of products consumed according to category and different daily meals, the mother reported that Carlo consumed only the combination of milk and cookies during main meals (breakfast, lunch, and dinner) and yoghurt as a snack.
- In describing the time of meal preparation and presentation, the mother reported that Carlo had three meals a day characterized by half a cup of milk in which he put approximately 13 crumbly cookies, creating a homogeneous mixture. In addition to the "milk soup," he ate only one type of "yoghurt," completely refusing even a taste of other foods.

¹The Individualization of Functioning Profile Questionnaire (IPF) aims to collect information on the skills possessed (strengths) and behaviours that individuals with atypical development often adopt in interacting with the external environment (weaknesses) in order to identify the Functioning Profile and, based on it, construct an educational intervention tailored to the child to facilitate the acquisition of new skills and improve the quality of life of the little one and his or her family (Guazzo, 2022).

²The Verbal Behavior Milestones Assessment and Placement Program (VB-MAPP) assesses the developmental milestones of verbal behaviour (based on Skinner's classification), learning and social skills. It is divided into two parts: the first part consists of the assessment of the developmental milestones of learning and language, while the second part consists of the assessment of barriers; that is, it assesses all those behaviours that may hinder learning and language acquisition (Sundberg, 2008).

- Carlo not only refused to taste but also refused to even "look at" or "handle" any food other than milk and cookies (in fact, the mere sight of raw or cooked food, even in pictures, caused him to vomit).
- He did not participate in meals together with the whole family but preferred to eat before or after so as not to see other foods.
- The child had hypotonia of the entire facial musculature, which did not allow him to chew properly.

So, to summarize, despite a good functioning profile, Carlo presented severe food selectivity, which led him to consume an exclusive meal, "milk soup," and avoid any contact with other foods (sight, touch, smell).

Therefore, in agreement with the mother, a specific intervention was initiated to extinguish food selectivity and introduce a more correct diet.

Before implementing the treatment, aimed at including new foods in the subject's diet, preparatory work was carried out on several fronts:

- a. Two weeks of observation were carried out during the consumption of the main meals (lunch and dinner). In addition to observing the stages of the meal through the use of an ABC data-taking (antecedent, behaviour, and consequence), note-taking was also made of all things that characterized that moment, who was present, the duration, how the cup of milk was prepared, how it was presented (texture, colour, amount of milk and cookies), also taking photos and videos.

During the observation, the tutor was only present to observe and note down information, never interacting with the environment or changing the normal family routine related to the different meals. This observation also revealed an unbalanced, differentiated, and not-at-all-varied family feeding pattern.

- b. A great deal of motivational work was also done with the mother figure, who initially appeared very discouraged, challenged, and frightened by the presentation and subsequent implementation of the intervention.

- c. An educational contract was drawn up between the parties: the child's mother would commit to following our every instruction, and her reward would be a change in Carlo's diet; for his part, the child would commit to following all the steps of the program, and the chosen reward was a day in the park with the therapists; and our commitment on the one hand would be closeness and support to the mother, at all times during the treatment, and the final reward chosen by Carlo (Dardig & Heward, 2022).

- d. It was also assessed whether the child felt more disgust at the sight of raw or cooked food, but the result was complete homogeneity.

Procedure*Phase 1: Preparation for chewing*

Teethers were introduced to fortify the rather hypotonic facial musculature and habituate the little one to chewing food in a progressive and gradual manner. From time to time, the number of chews (closing of the teeth) and the force exerted on the rubber object by the teeth increased, as did the number of moments devoted to this activity within the learning session.

This work was initially done only with therapists. As Carlo raced through the different steps, he was also included in the daily routine under the supervision of his mother. At the end of the day, his mother reported the data collected to the therapists and any refusals or enactment of dysfunctional behavioural dynamics to avoid the task.

This activity was essential before starting a full-fledged program to introduce new foods.

Phase 2: Gradual exposure to the unpleasant object (by viewing pictures and video). During the therapy session, the child was first presented with pictures of both raw and cooked food while using his favourite game in continuous mode; then, he was shown videos of food preparation of different lengths and successive videos of people eating.

Carlo was used to viewing an increasing number of photos, and the same thing happened with the length and type of videos. Whenever the subject reached a step (e.g., n pictures viewed without emitting some escape or avoidance, he was exposed to a new step).

This exercise, too, was controlled by the mother figure. She visualized with her child at three different times of the day, and the pictures were tolerated in therapy. Thus, the mother and child also had a way to achieve success and become increasingly motivated to move forward.

Only when Carlo was able to use the 'teether' to do his exercises, in all contexts and in complete autonomy, and only when he was able to generalize the ability to observe pictures or videos of foods without implementing avoidance and escape behaviours and without inducing vomiting, was a plan made to introduce new foods.

Phase 3: Introduction of new foods

Introducing new foods involved observing several steps defined prior to treatment, which were agreed upon by the subject and the mother.

General rules:

The modification of Carlo's diet initially occurred only for lunch, leaving all other meals unchanged. Lunch took place in the presence of at least one of the two caregivers and the mother, who had only an observer role.

It was decided to proceed with the rules of routine weaning: thus, blended fruit, vegetable, and legume purees, noodles, soft seconds (omelette, cheese, ground meatballs, fish), pasta in larger sizes, and vegetables and legumes without blending.

The fruit was chosen as the initial food because its texture is very similar to that consumed by the little one: sweet, ripe, easily crushed, and not homogeneous.

To also promote timing, three different foods were presented each time.

Once the day's delivery was completed, Carlo could have access to his milk soup with cookies; of course, as the child introduced more and more foods into his diet and in larger quantities, the amount of milk and cookies presented at lunchtime was also reduced; this rule was initially adopted by the therapists, but later it was the child himself, who asked for less milk because he felt satisfied and full from the meal he had eaten;

In addition, when he ate a food introduced by the therapists at lunchtime without any problem, the latter was then reintroduced in the evening by the mother as well, and thus, consequently, the dinner and the habits of the whole family began to be changed as well.

A tutor would remotely participate in mealtime in the evening to avoid failures.

- For the little one, there was no choice; the day's goal had to be achieved before he could get up from the table.
- Each new food introduced, fruits and vegetables, it was always presented as a smoothie, and then, day by day, its consistency changed.

As new foods and new consistencies were introduced, Carlo would make a complete meal: a first course (pasta + dressing), a second course (meat, fish, or eggs + side dish), fruit, and dessert to finish. Again, the quantities were determined gradually: initially, it was accepted that the little one would taste a teaspoon of each food presented until a portion was consumed.

The child was an active participant in the process. He chose the tastiest of the three items presented, which he would be offered again later at dinner.

The treatment phase (introduction of new foods) began in January 2023, and by the beginning of May, Carlo presented a heterogeneous diet and was allowed access to "milk soup" only at breakfast.

Description of a session

The intervention sessions lasted one hour and were held at home in the kitchen once a day. When the food was already ready, Carlo had access to the kitchen, and the three bowls were placed on the table.

Different procedures were used based on the child's functioning profile and data in the literature.

As has been described, photos (of raw and cooked food) and videos (of food preparation and people eating) were first used to bring the child closer to real, direct contact with food (taste, smell, sight). Playful activities were then also organized, using food or kitchen utensils: that is, attempts were made to encourage acceptance of non-preferred foods through sensory tasks (smell and touch) that did not involve tasting the food (Coulthard & Ahmed, 2017).

During phase 3 (introduction of new foods), Carlo was invited to taste and eat one teaspoon of the three courses and had access to continuous reinforcement (video), which was activated the moment he entered the room, interrupted if he still had food in his mouth, and reactivated only if the child swallowed it, verbally reinforcing him.

For the spoon presentation, Carlo was physically helped to bring the spoon to his mouth until he opened it, sending it into extinction; all problem behaviours (desperate crying, gagging, etc.) were activated to avoid the situation.

Only at the end of the day's task could he access his cup of milk and cookies, accompanied by verbal reinforcement and his favourite video.

Baseline

The baseline is the phase of behaviour observation before the intervention is implemented. It fulfils both the descriptive function, i.e., the quantitative description of the evolution of the behaviour to be modified before the treatment begins, and the predictive function, i.e., the comparison of the data collected with those produced by implementing the intervention. Since the baseline also fulfils the predictive function, it is important that the data be stable: no decreasing or increasing trend and a low level of performance variability of subjects over time (Guazzo, 2021). In the present study, the baseline had a duration of five sessions, during which the subject was monitored through an observation form, in which the consumption of foods other than milk with cookies or milk snacks was noted.

Experimental design

We chose a changing criterion experimental design to monitor the effects of the educational intervention implemented on our patient.

The first to make use of such a design in the course of psychological and pedagogical experiments were Hall and collaborators (Hartman & Hall, 1976; Hall & Foxx, 1977); the method involves first assessing the behaviour on which it is intended to intervene and then following in several delineated phases of the same intervention that is applied by taking into consideration for each phase a different criterion of success (Guazzo, 2011, 2014): in practice, measured the baseline level, an initial parameter of behaviour is established, codified by which another more demanding one is established,

thus going on to take each phase as the baseline level for the next phase (Cottini, 2016; Bailey & Burch, 2002). By the time the rate of behaviour change meets the fixed parameter, the effectiveness of the intervention is demonstrated.

After the baseline phase, three more measurements were made monthly, stabilizing an increasingly high criterion each time, which was to be achieved quickly. Subsequent criteria involved introducing small portions of shredded banana into the mouth (first criterion), then 2 foods (second criterion), then 4 different foods (third criterion), then 8 foods (fourth criterion), and then 15 more foods (fifth criterion).

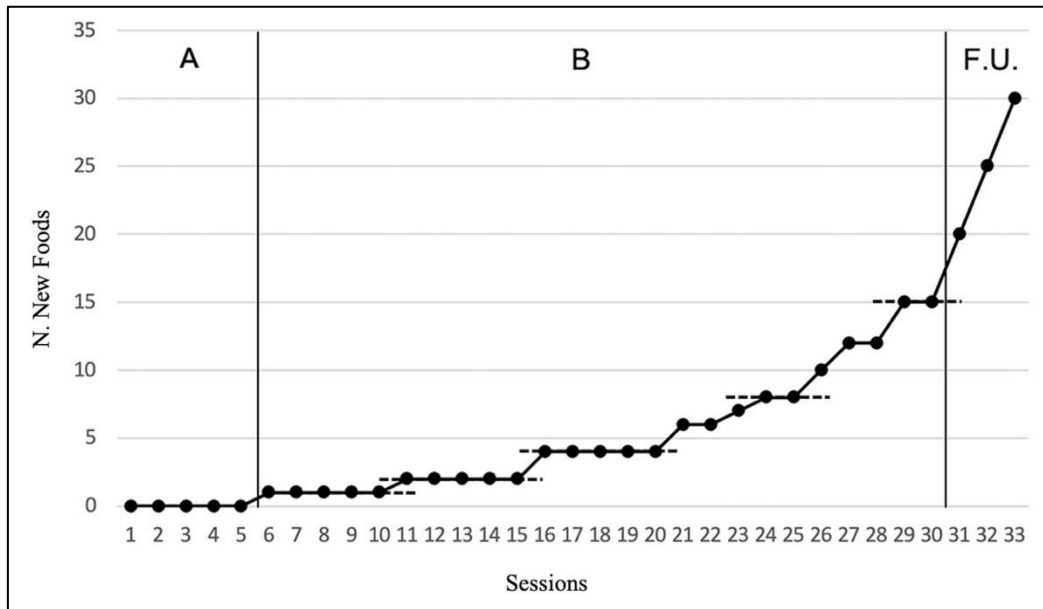
In the present intervention, phase A is the baseline phase, and phase B is the intervention phase (introducing different foods that the child had never tried). In phase B, short horizontal segments will indicate the various predetermined criteria.

In the implementation phase of the intervention, the child was able to taste a shredded banana (first criterion, whereas before, he drank the shake), and then the number of “new” foods to be introduced was increased to 2 (second criterion), 4 (third criterion), 8 (fourth), and 15 (fifth criterion) (Tab. 1 and Graph 1).

Table. 1 – Summary table of the Baseline and the various criteria introduced in the experimental design.

BASELINE	TREATMENT	
	Criterion	Introduced foods
0	I	1
0	II	2
0	III	4
0	IV	8
0	V	15

After three months of treatment, the scores of the assessment effected at baseline were compared with the last assessment, and a further assessment (follow-up) was also carried out three months later, either by direct observation or by an interview with the child, who currently eats all foods and dishes offered to him without any problems, although he prefers some dishes (Roasted meat, Pasta with tomato, Spinach, Schnitzel, Pasta and lentils, Cooked ham, Mozzarella, Chocolate, Pizza, McDonalds sandwich) over others.



Graph. 1 – Changing criterion experimental design, where A indicates the baseline, B the various criteria adopted, and F.U. the follow-ups after time.

Most interesting is the behavioural change that has occurred for the entire household, which to date, thanks to work done on Carlo, has completely changed its eating habits, consuming many more foods by preparing them with different types of cooking.

CONCLUSIONS

The analysis of the results was conducted by implementing the comparison of the scores obtained in the two assessments (pre- and post-treatment), with respect to the different foods consumed in terms of quantity per single category

In agreement with previous studies reported in the literature, combining different procedures, but especially the mixture of procedures involving the use or non-use of 'escape extinction,' increased the probability of success even in reduced time.

Obviously, the entire intervention was ad hoc, constructed on the subject, and also considered the little one's personal characteristics.

The coordination of all the figures involved and the help of the mother, who trusted the intervention plan, the experts involved, Carlo, and herself, putting aside her difficulties and the strong anxiety that the whole thing generated in her, was of great help for the success of the treatment. By the end of treatment, not only the child's eating habits changed but the entire family unit.

REFERENCES

- Ahearn, W.H., Kerwin, C.E., Eicher, P.S., Shantz, J., & Swearingin, W. (1996). An alternative treatments comparison of two intensive interventions for food refusal. *Journal of Applied Behavior Analysis*, 29(3), 321–332. DOI: org/10.1901/jaba.1996.29-321
- Anderson, C.C., & McMillan K. (2001), Parental use of escape extinction and differential reinforcement to treat food selectivity. *Journal of Applied Behavior Analysis*, 34, 511-515. DOI: 10.1901/jaba.2001.34-511
- Bandini, L.G., Anderson, S.E., Curtin, C., Cermak, S., Evans, E.W., Scampini, R., & Must, A. (2010). Food selectivity in children with autism spectrum disorders and typically developing children. *The Journal of Pediatric*, 157(2), 259-64. DOI: 10.1016/j.jpeds.2010.02.013.
- Bailey, J.S., & Burch, C.R. (2002). *Research Methods in Applied Behavior Analysis*. London: Sage Publications.
- Capaldi, E.D. (1996). Conditioned food preferences. In E.D. Capaldi (Ed.). *Why we eat what we eat: The psychology of eating*. Washington, DC: American Psychological Association.
- Cottini, L. (2016). *Fare ricerca con singoli soggetti. Principi metodologici e applicazioni in educazione speciale e in psicologia clinica*. Ottaviano, NA: IRFID.
- Curtin, C., Hubbard, K., Anderson, S.E., Mick, E., Must, A., & Bandini, L.G. (2015). Food selectivity, mealtime behavior problems, spousal stress, and family food choices in children with and without autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 45(10), 3308-15. DOI: 10.1007/s10803-015-2490-x.
- Dardig, J.C., & Heward, W.L. (2022). *Let's make a contract: A positive way to change your child's behaviour*. Oakland, CA: Collective Book Studio.
- Fiese B.H. e Schwartz C., (2008). Reclaiming the family table: Mealtimes and child health and wellbeing. *Society for Research in Child Development*, 22, 3-18.
- Guazzo, G.M. (2011). *L'analisi comportamentale applicata*. Nola, NA: IRFID. Guazzo, G.M. (2014). *ABA. Assessment comportamentale e analisi dei dati*. Nola, NA: IRFID.
- Guazzo, G.M. (2021). *L'ABA in azione*. Roma: Anicia.
- Guazzo, G.M. (2022). *IPF. Questionario per l'Individuazione del Profilo di Funzionamento*. Roma: Anicia.
- Najdowsky, A.C. et al., (2003). Parental assessment and treatment of food selectivity in natural setting. *Journal of Applied Behavior Analysis*, 36, 383-386. DOI: 10.1901/jaba. 2003.36-383



Piazza, C.C., Patel, C.R., Gulotta, C.S., Sevin, B.C., & 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, 309-324. DOI: 10.1901/jaba.2003.36-309

Piazza, C.C., Patel, C.R., Santana, C.C., Goh, H.L., Delia, C.D., & Lancaster, BC. (2002). An evaluation of simultaneous and sequential presentation of preferred and non-preferred food to treat food selectivity. *Journal of Applied Behavior Analysis*, 35, 259-270. DOI: 10.1901/jaba.2002.35-259

Shore, B.A., Babbitt, R.L. (1998). Use of texture fading in the treatment of food selectivity. *Journal of Applied Behavior Analysis*, 31, 621-633. DOI: 10.1901/jaba.1998.31-621

Sundberg, M.L. (2008). *VB-MAPP. Verbal Behavior Milestones Assessment and Placement Program*. Concord, CA: AVB Press.

Tarbox, J. Schiff, A., & Najdowski A.C. (2010). Parent-Implemented Procedural Modification of Escape Extinction in the Treatment of Food Selectivity in a Young Child with Autism. *Education and Treatment of Children*, 33, 2, 223-234. DOI: org/10.1353/etc.0.0089

Tiger, J.H., & Hanley, G. P. (2006). Using reinforcer pairing and fading to increase the milk consumption of a preschool child. *Journal of Applied Behavior Analysis*, 39, 399-403. DOI: 10.1901/jaba.2006.6-06

Worsley, A., Wang, W. C., & Hunter, W. (2012). *Eating Habits Questionnaire*. APA PsycTests. DOI: org/10.1037/t22355-000