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Single-Session IISCA and Skill-Based Treatment to reduce challenging behaviors: a single case study

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ABSTRACT

Background: Communication and social interaction deficits are one of the criteria for diagnosing Autism Spectrum Disorder. These deficits can lead to frustration and failures, with the risk of developing challenging behaviors as practical strategies to compensate for communication difficulties. This study aimed to assess the effectiveness of the Skill-Based treatment in reducing problem behaviors and enhancing communication, tolerance, and collaboration skills of a child with autism spectrum disorder, starting from the Single-Session Synthesized Functional Analysis.
Methods: We used a changing Criterion Design to study the efficacy of the training. The functional analysis was the baseline. The independent variable consisted of the IISCA (Interview-Informed Synthesized Contingency Analysis) (Hanley et al., 2014) and the treatment, which included functional communication training (FCR), tolerance training for waiting and denial (TRT), and the teaching of increasingly advanced collaboration responses. The dependent variable in the functional analysis was the number of occurrences of problem behaviors; during the treatment, we also measured independent functional communications, tolerance responses, and contextually appropriate behaviors.
Results: The intervention is still ongoing; however, the collected data demonstrate the effectiveness of IISCA and the treatment: specifically, collected data show a reduction in problem behaviors and independent acquisition of functional communication and tolerance response.
Conclusions Since this procedure based on the Omnibus Mand is still very recent, future research may focus on evaluating its long-term effects and the social significance of the results.

*Keywords***:** Autism; SBT; IISCA; Problem behavior; Functional Communication; functional analysis.

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Introduction

Behavior is the product of the interaction between an organism and its environment, producing observable, describable, measurable, and socially significant changes (Cooper et al., 2007). Two main types of behavior are traditionally distinguished: respondent behavior, elicited by antecedent stimuli (Pavlov, 1927), and operant behavior, shaped and maintained by environmental consequences (Skinner, 1938). Operant behavior is learned through the functional relationship between stimuli, responses, and reinforcement. Problem behaviors, especially in individuals with Autism Spectrum Disorder (ASD), often serve specific functions: gaining attention, escaping or avoiding tasks, accessing tangible reinforcement, or automatic reinforcement (Cooper et al., 2007). In the absence of functional communication skills, problem behaviors frequently emerge as maladaptive but effective strategies to meet needs. These behaviors are maintained through reinforcement histories and may significantly hinder learning and social participation (Hanley, 2014). Functional assessment is therefore essential to identify the maintaining contingencies of problem behaviors and to guide the development of effective, function-based interventions (Hanley et al., 2003). Traditional methods include indirect assessments (e.g., interviews, questionnaires), descriptive assessments (direct observation without manipulation), and experimental functional analyses. Among these, the Standard Functional Analysis (SFA; Iwata et al., 1994) has long been considered the gold standard due to its rigorous experimental design and replicability (Beavers et al., 2013). However, the SFA presents well-documented limitations in clinical practice. It requires multiple test conditions, it is time-consuming, resource-intensive, and involves systematically evoking potentially dangerous problem behaviors (Hanley, 2012; Dozier et al., 2022). Moreover, the SFA may lack ecological validity, as the conditions are often artificial and do not necessarily reflect the contingencies operating in natural environments (Hanley, 2014). These limitations have spurred the development of alternative approaches. One such alternative is the Interview-Informed Synthesized Contingency Analysis (IISCA; Hanley et al., 2014). The IISCA addresses the limitations of SFA by streamlining the assessment process through synthesizing multiple contingencies identified via open-ended caregiver interviews and brief structured observations. The IISCA contrasts a test condition, where synthesized contingencies are introduced following problem behaviors, with a control condition providing continuous reinforcement. This approach reduces the number of sessions required, enhances ecological validity, and increases safety by limiting the duration and frequency of problem behavior occurrences. Furthermore, Single-Session IISCA protocols have demonstrated that meaningful results can be obtained within as little as 3-5 minutes (Jessel et al., 2016, 2019; Jessel, Ingvarsson et al., 2018,). Systematic reviews confirm the IISCA's validity and effectiveness in identifying, maintaining contingencies and guiding individualized interventions, particularly for children with ASD (Beaulieu et al., 2018; Herman et al., 2018; Santiago et al., 2016). However, comparisons with SFA highlight some limitations: IISCA may overestimate the relevance of certain contingencies and lacks the precision to isolate individual functions (Fisher et al., 2016; Greer et al., 2020). Nevertheless, IISCA rarely fails to capture relevant maintaining variables and is considered especially suitable in applied settings requiring efficient, personalized, and pragmatic solutions (Slaton et al., 2017; Curtis et al., 2019). Various evidence-based treatments exist for reducing problem behaviors, including non-contingent reinforcement (NCR), differential reinforcement of alternative behavior (DRA), extinction, and token economies (Cooper et al., 2007; Durand & Crimmins, 1988). However, Functional Communication Training (FCT; Carr & Durand, 1985) is widely recognized as one of the most effective, particularly for multiply maintained problem behaviors. FCT teaches individuals to replace problem behaviors with functional, socially acceptable communication forms. Recent research emphasizes the effectiveness of combining IISCA with FCT, using the Omnibus Mand to simplify the teaching of generalized requests (Hanley et al., 2014; Ward et al., 2021). The methodological choices of this study reflect this empirical foundation. We employed the IISCA for functional assessment and a Skill-Based Treatment (SBT) model that incorporates FCT, Tolerance Response Training (TRT), and Contextually Appropriate Behaviors (CAB). This comprehensive approach aims to reduce problem behaviors while fostering stable, generalizable repertoires of communication, tolerance, and cooperation, ensuring both safety and clinical efficiency. The purpose of this study is to evaluate the effectiveness of Skill-Based Treatment in reducing problem behaviors and increasing communication, tolerance, and cooperation skills in a child with Autism Spectrum Disorder. The Single-Session IISCA served as the basis for functional assessment, guiding the individualized intervention strategy.

Methods

Participants/Subject

Participant A is a 6-year-old child diagnosed with Autism Spectrum Disorder (ASD), according to the DSM-5 diagnostic criteria (APA, 2013). We chose him for the study because of his diagnosis, significant behavioral difficulties, and severe communication challenges. The child had a high need for support in communication and social interactions and exhibited problem behaviors that interfered significantly with his daily functioning. Children with relevant comorbidities, such as severe motor disabilities or epilepsy, which could impact the effectiveness and interpretation of the intervention, were excluded from the study. A.'s verbal development level is classified as "Emergent Listener" (Greer & Ross, 2008); this means that A. had not yet acquired autonomy in following verbal instructions and had not fully developed motor imitation skills. Additionally, he emitted non-verbal vocal sounds as a means of communication. A. attended a Learning and Research Center in Northern Italy, receiving individualized rehabilitation treatment based on Applied Behavior Analysis (ABA), with ten hours of intervention per week. Over the course of the study, a total of 34 intervention sessions were conducted.

Prior to the intervention described in this study, A. had received structured training targeting foundational listener and speaker repertoires. Listener skills included responding to simple follow directions, gross motor imitation, and matching three-dimensional objects to corresponding two-dimensional representations and colors using point-to-match tasks. Speaker skills involved the acquisition of point-to-mand behavior and initial training with the Picture Exchange Communication System (PECS; Frost & Bondy, 2002). Additionally, instruction was provided to promote personal autonomy in activities such as toilet use and setting up and clearing the table during snack routines. However, none of these skill domains—except for the routines related to personal autonomy—reached a stable level of independent performance. The training process was discontinued due to the emergence and escalation of problem behaviors, which significantly interfered with instructional control and engagement. These behaviors became a barrier to further skill acquisition and prompted the need for a more targeted communicative intervention.

At the time of the study, his only method of making requests was through pointing. However, his significant difficulties in communicating his needs led to problem behaviors such as crying, screaming, and self-injurious actions (e.g., throwing himself on the floor, banging his head against surfaces, or hitting himself with his fists). Regardless of adult supervision, his parents reported these behaviors during work and play activities at home. An initial attempt to reduce these behaviors through extinction procedures—i.e., by withholding reinforcement for problem behaviors—was unsuccessful, as it did not result in a clinically significant reduction in frequency or intensity. Since these behaviors serve multiple functions—such as expressing frustration, seeking attention, avoiding or escaping demands, or self-defense—an intervention was introduced to provide him with an alternative communication method. The goal was to help him express his needs more appropriately and reduce the occurrence of problem behaviors. The intervention was carried out from November 2020 to May 2021, and was embedded within the child's ongoing ABA program, maintaining the same schedule of 10 hours per week. The sessions were implemented by a certified behavior technician under the supervision of a licensed psychologist specializing in behavioral interventions. We carried out the intervention according to ethical principles, with informed consent obtained from A.'s parents, who authorized his participation in the study.

Procedure and Measures

The dependent variable of this study is the number of occurrences of problem behaviors and/or precursors. Severe problem behaviors (R1), which are dangerous to the individual, were identified as banging the back or head against the floor, wall, or other people and hitting the head with fists. Instead, R2 indicated minor problem behaviors (crying, screaming, throwing oneself on the floor), along with the precursors, which consisted of emitting sharp vocalizations of the phoneme "A" and hitting the table with closed fists.

During the treatment phase, we also measured the dependent variable through the emission of the Functional Communication Request (FCR), Tolerance Response (TR), and collaboration responses. While the participant had continuous access to synthesized reinforcement (SR), we measured the child's engagement level. The FCR was defined as the motor action of clasping his hands together in front of the chest, while for the TR, the operator asked the child to touch the operator's hand, positioned parallel to the floor with the palm facing up. When the child demonstrated 100% of the skills acquired independently and 100% engagement, we considered the criterion met without problem behaviors and precursors for five consecutive trials. For the functional assessment, the IISCA (Hanley et al., 2014) was applied: the procedure involved the contingent delivery of reinforcers following each occurrence of the problem behaviors or its precursors. The IISCA was conducted exclusively prior to the intervention, and it was not repeated as a post-treatment measure. It was not used to establish a quantitative baseline, but rather to identify the synthesized reinforcement contingencies maintaining the participant’s problem behavior. The treatment (Skill-Based Treatment, SBT) included teaching alternative functional communication (Functional Communication Training, FCT, Omnibus Mand), tolerance training (Tolerance Response Training, TRT), and a chain of collaborative responses, starting with simple requests and progressing to more complex ones (Contextually Appropriate Behavior, CAB). The entire procedure took place within the Learning Center, attended by A. All sessions took place in the room where the child received therapy. The room had several spaces, each occupied by one student. Within their designated area, each child had access to a play zone containing boxes with various toys and books and a small table with chairs. A trained ABA practitioner conducted the intervention in a 1:1 ratio with the child. For the procedure described in this study, the materials required for data collection were used, including sheets of paper placed in the child's clipboard, a pencil, a clicker, a timer, and materials identified as reinforcers for the child's target problem behavior (ball, dice, apple, water).

During the functional analysis, Establishing Operation (EO) intervals and synthesized reinforcement (SR) intervals rapidly took turns according to the presence (SR) or the removal (EO) of the synthesized reinforcement. Experimental control was such because we observed more occurrences of the target problem behavior during EO intervals than SR intervals. The treatment analysis followed a single-subject Changing Criterion Design. The effects of Functional Communication Training (FCT) were examined by progressively increasing the complexity of the response across different phases: baseline, alternative functional communication, tolerance responses to denial and waiting, and cooperative behaviors. Before conducting the functional analysis, we gave the parents an open-ended interview (see Appendix) lasting 30 minutes to identify possible variables influencing the problem behavior. The interview consisted of three parts, each with a specific goal: (a) identifying and defining the target problem behavior and its precursors reinforced during the analysis; (b) specifying objects, events, or interactions that typically seem to evoke the target problem behavior, thus identifying the EO for the problem behavior in the test condition of the analysis; (c) specifying objects, events, or interactions following the problem behavior, identifying reinforcers and precise delivery forms, delivered as consequences for each occurrence of the target problem behavior or precursor. Subsequently, we directly observed the child during a session to develop functional hypotheses for an individualized analysis based on the hypothesized reinforcing environmental contingencies for the child's behavior.

The Interview-Informed Synthesized Contingency Analysis (IISCA) tested the environmental contingencies derived from the interview. The functional analysis included an initial control phase and a single test session (Single-Session IISCA). The control phase lasted five minutes, providing 3-5 minutes of High Reinforcement Environment (HRE), during which the child was calm, relaxed, and engaged. In this condition, the child had free access to any potential reinforcer identified during the interview. At the same time, the therapist maintained proximity without making requests and provided continuous attention if it was reinforcing. Once the child reaches the HRE condition without problem behavior, the therapist provides an auditory cue by clapping and saying "stop," marking the start of the test session and introducing all EOs for the problem behavior. During this phase (EO), the therapist removed all reinforcers: he asked the child to return them and return to the work area at the table. The therapist made requests related to ongoing programs or the reintroduction of previously proposed tasks. This phase ended when the child emitted the first instance of any problem behavior, even if it was not the target behavior but considered related to the EO. Following the emission of the problem behavior or precursor, the synthesized reinforcement (SR) was provided within three seconds for one minute, allowing the child to return to the HRE state.

The only difference between the test and control conditions was the presence or absence of the synthesized reinforcement contingency. The functional analysis concluded after four consecutive occurrences of the problem behavior or precursor being activated and placed on extinction through the synthesized reinforcement provided within three seconds. So, after reinforcement, the problem behavior or precursor ceased immediately, restoring the HRE condition; this indicated that the child reached control over the problem behavior. The synthesized functional analysis represented the baseline for the subsequent intervention, which involved teaching a functional communication request (FCR) as an alternative communication to the problem behavior (Carr & Durand, 1985), teaching a tolerance response (TR) to teach tolerance for denial and waiting, and teaching Contextually Appropriate Behaviors (CAB) following the tolerance response. The FCR taught to A. was the gesture of "hands together" in front of the chest, paired with the vocal response "Me" (although this was not required) to access synthesized reinforcement (SR) (access to the play area, have a snack, play with the ball, or obtain\avoid adult proximity). Initially, the therapist taught communication using the full physical prompt (hand-over-hand). When the precursor or problem behavior occurred, the therapist immediately prompted the communication and reinforced it within three seconds. When no problem behaviors or precursors appeared during the treatment for five consecutive sessions, the prompt faded, and the therapist placed hands on the child's elbows to assist in emitting the communication. Once the child reached the criterion, communication was taught independently, with corrections only when problem behaviors, precursors, or non-compliance occurred. A "least to most" prompt procedure (Wolery & Gast, 1984) was used to correct missed communication: verbal prompt (the therapist said "Me" to the student), model prompt (the therapist said "Me" and brought their hands together in front of their chest, ensuring the child was watching), physical prompt (the therapist placed their hands on the child's shoulders and said "Me"). For five consecutive sessions, the acquisition criterion was 100% independent FCR and 100% collaboration, with zero problem behaviors and precursors.

The training involved teaching a tolerance response following the child's FCR. In a randomized manner, the therapist would respond negatively to the child's FCR, accompanied by the vocal response "no." The response taught to the child was a high-five with the therapist, who held their hand parallel to the floor with the palm facing up. The therapist taught this response through a "most to least" procedure (Wolery & Gast, 1984) with a physical prompt. The acquisition criterion for the tolerance response was 100% independent TR and 100% collaboration, with zero problem behaviors and precursors, for five consecutive sessions. Once the criterion was met, additional tolerance training occurred before proceeding with CAB training to evaluate the generalization of the learned responses with other therapists. The teaching of CABs involved the learning of increasingly complex appropriate behaviors following the tolerance response. CAB 1 required instructional control of activity interruption and removing all reinforcers: A. had to return the reinforcer or leave the play area. For CAB 2, which required instructional control in transitioning to an alternative area, the therapist asked the child to sit at the table or sit properly if already seated. CAB 3 involved instructional control of several collaboration requests (1 to 3) within a single activity, and with A., practicing previously started work programs. The acquisition criterion was five consecutive sessions with 100% independent responses and 100% collaboration, with zero problem behaviors or precursors. During the control phase of the functional analysis, the therapist checked the box for the minute of HRE, while in the test phase, he recorded the duration of the EO. A marked "X" referred to the occurrence of problem behaviors or precursors in the corresponding box for R1 (severe problem behaviors) or R2 (minor problem behaviors and precursors). We collected data on the EO and SR intervals during the treatment phases. In the EO phase, we marked (P) if the response followed a previous prompt, or (+) if it occurred independently. In the SR phase, (+) was recorded if the child appeared engaged and calm, while (-) was used if the opposite occurred. If problem behaviors or precursors occurred, we recorded R1 and R2, regardless of whether they occurred during the EO or SR phase. The data were plotted on a line graph, showing the number of problem behaviors and precursors for each session. In a graph divided into 100 intervals, we recorded the percentage of independent, spontaneous communication, independent tolerance responses, independent collaboration responses, and engagement for each session. Inter-observer Agreement (IOA) was measured by having a second observer independently and simultaneously collecting data alongside the experimenter throughout the entire test session. To calculate IOA for problem behaviors and precursors, we divided the smaller number of occurrences by the larger number of occurrences during each SR and EO interval. We also assessed IOA for SR and EO intervals: agreement was such that the duration marked by both observers was within five seconds of each other, while there was disagreement if the difference exceeded five seconds. The five-second window was optimal because the therapist typically took three to five seconds to deliver the synthesized reinforcement. Then, we divided agreements by the total number of intervals to calculate IOA for the SR and EO intervals. *Figure 1* shows this procedure.

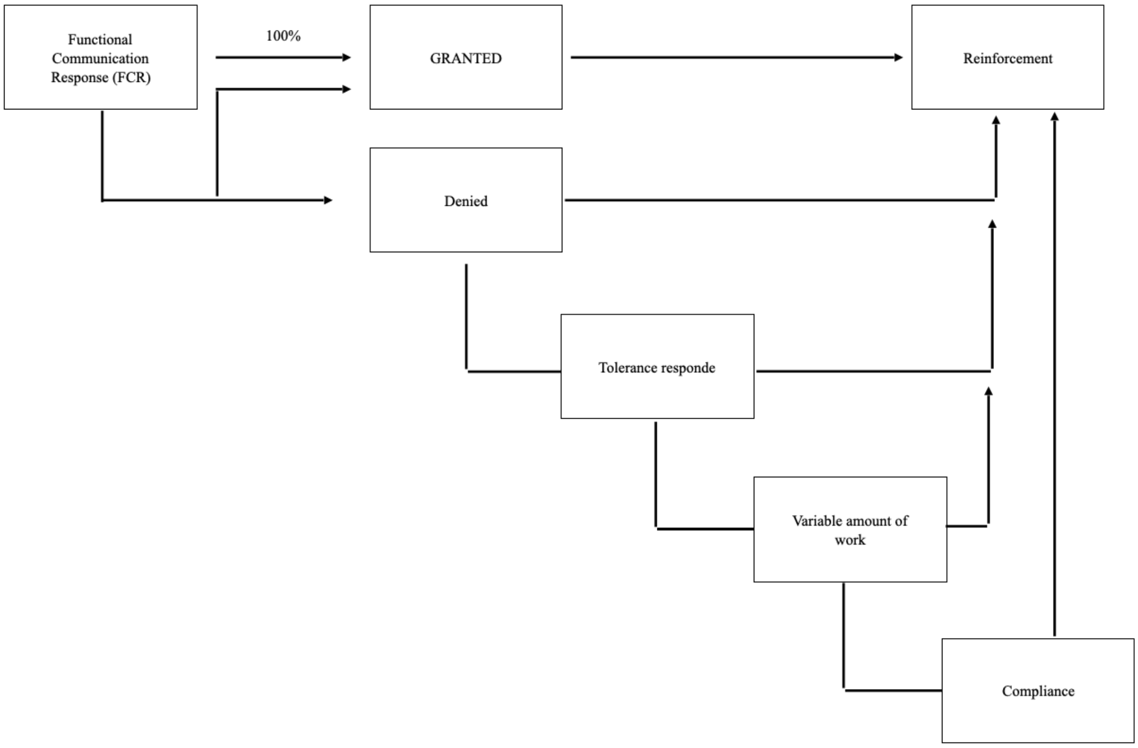

Figure 1. FCR intervention procedure

Results

Statistics and data analysis

The IOA calculated for problem behaviors was 100%; the IOA for the SR and EO duration was also 100%. The interview conducted with the parents revealed that both parents struggled to manage the child's behavioral crisis, which involved the child screaming and throwing himself to the ground, banging his feet, back, and head against the floor. The parents expressed concern and discouragement regarding the self-injurious behaviors the child engaged in, such as punching the head, head-banging, and pinching the face and body. The problem behaviors reported by the parents occurred in various situations: when the parent did not give attention to the child, when the child wanted access to edible reinforcement, or when returning home after pleasant activities. The interview suggested that many of the problem behaviors could establish a relation to the function of counter-control, defined by Skinner (1953) as "behaviors that occur in response to an aversive social control," with the sole aim of maintaining dominance in the relationship (Schramm, 2011). Direct observation of the child allowed for identifying a precursor to the problem behavior, which consists of a sharp vocalization of the phoneme "A." The results of the summarized functional analysis, shown in *Figure 2*, align with expectations.

During the control phase, in which the child had access to the synthesized reinforcement (i.e., therapist's attention, access to tangible reinforcement such as a ball, dice, snack), and when there were no demands from the adult or the child had control of the relationship, no problem behaviors or precursors emerged, and the child appeared calm and relaxed. In the test phase, when EO was present to maintain the problem behavior, minor problem behaviors or precursors (R2) occurred, quickly diminishing through the delivery of reinforcement and returning to the HRE condition. The IISCA lasted for 25 minutes, and on four occasions, the EO triggered the precursor of the problem behaviors, which all quickly extinguished, bringing the child back to an HRE condition. The test condition of the functional analysis served as a baseline for the treatment evaluation. The treatment included FCT, training in tolerance to denial and waiting and introducing increasingly complex responses following the tolerance response (CAB). *Figure 3* shows the treatment results. This study utilized a changing criterion design, in which the y-axis represented the percentage of functional communication responses, the percentage of tolerance responses, and the frequency of problem behaviors. The number of sessions and the type of prompt given is shown on the x-axis. After a session of baseline, a full prompt was given until the number of problem behavior had significantly decreased. FCT required an extended period for the independent acquisition of the functional communicative request; precisely, the child needed prolonged total prompting initially, leading to many problem behavior occurrences. In the second phase, the prompt was slightly less invasive (by touching the student's elbow) and the learning trend increased rapidly and after four sessions he managed to pass to the next stage, although the number of problem behaviours had slightly increased. The Independent phase was achieved in fewer than 10 sessions. Notably, as the participant began to independently use functional communication, problem behavior initially increased before declining sharply to zero in the final two sessions, highlighting the clinically relevant impact of the intervention. The tolerance training was brought to criterion quickly, requiring only one session per level, keeping the number of problem behaviour almost at zero. In each therapy session, the child reached the established acquisition criterion, i.e., 100% independent responses and 100% cooperation, with zero problem behaviors and precursors, for five consecutive sessions. Training of collaboration responses after denial (CAB) occurred randomly, alternating five possible outcomes following the FCR emitted by the child. For 20% of FCR occurrences, we delivered immediate reinforcement; when the FCR was denied, for 20% of occasions, the subsequent tolerance response led to reinforcement delivery; for the remaining 60% of FCRs, after the tolerance response, collaboration requests corresponding to CAB 1, CAB 2, CAB

3 were presented. Two sessions of two hours each were sufficient for acquiring the first two CABs, allowing A. to meet the criterion while the training for CAB 3 was still ongoing. Since the beginning of treatment, there has been a reduction in the number of problem behaviors and precursors; conversely, the number of independent FCRs emitted in each therapy session at the center increased. Similarly, parents report increased spontaneous communication from the child at home.

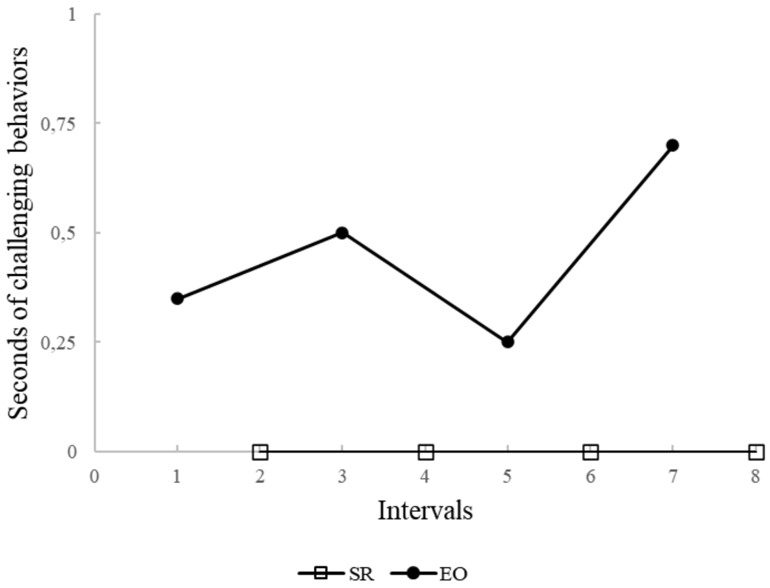

Figure 2. Synthesized Functional Analysis (IISCA)

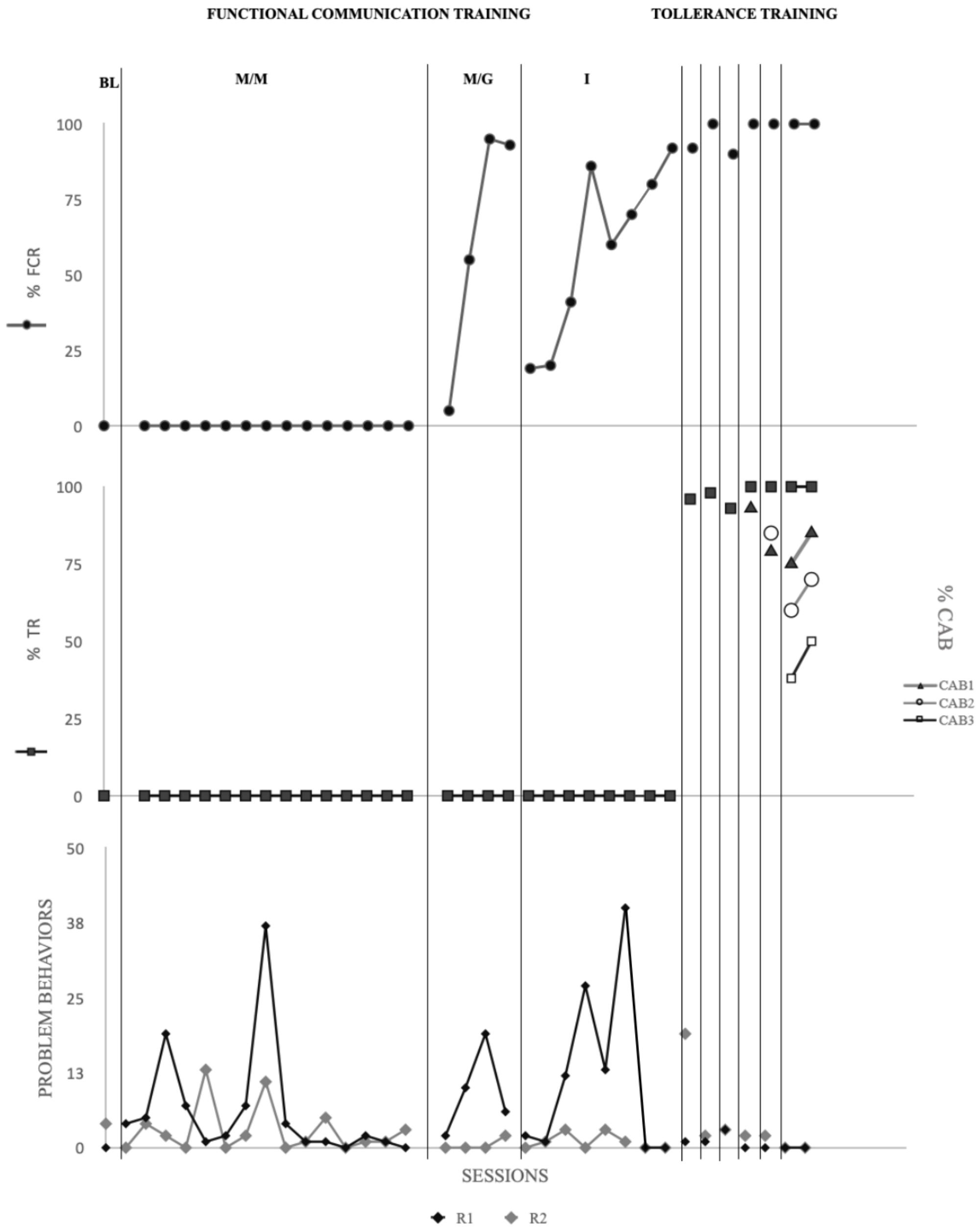

Figure 3. Treatment results. Percentage of FCR, TR, CAB, and number of problem behaviors and precursors occurrences.

Discussion

This research aimed to assess the effectiveness and utility of the IISCA and the skill-based treatment based on the Omnibus Mand procedure to reduce problem behaviors maintained by multiple functions. In line with the literature, the results showed the student's actual reduction in problem behaviors. This result confirms the hypothesis of the effectiveness of the IISCA: the interview with the parents and direct observation of the child allowed the identification of multiple functions maintaining the problem behaviors: attention, escape/avoidance, access to tangible items, and control. Direct observation of the child specifically allowed for identifying precursors to the target problem behaviors. In this way, during the functional analysis, it was possible to avoid severe problem behaviors by immediately reinforcing the precursors. Children quickly achieved control over dysfunctional behaviors by the therapist delivering all types of reinforcement at the first instance of each precursor; indeed, for four consecutive times, the precursor appeared and faded immediately. A single test session (Jessel, Hanley et al., 2018) ensured a brief functional analysis lasting 25 minutes. As supported by the literature (Mitter et al., 2019), the Omnibus Mand, understood as a generic functional communicative request (FCR) for any type of request, effectively reduced multifaceted problem behaviors. Although this treatment's implementation is ongoing, the number of problem behaviors and precursors drastically reduced during the absence and presence of synthesized reinforcement. Parents also report a decrease in the number of problem behaviors at home, particularly in intensity: the few remaining problem behaviors are mild and correspond to the R2 category of this study. The increase in spontaneous FCRs at the center and the consistent appearance of such communication at home suggests that the student has understood the cause-and-effect relationship and how easily he can obtain what he wants through the learned communication. Although spontaneous FCRs are already emerging at home with the parents, an important future goal is a generalization: for greater effectiveness, extending the procedure to the house is helpful, considering the initial situation that involved a considerable number of severe problem behaviors even in the home context. Generalization with other figures and in different life contexts and the transfer of effects over extended periods will be subsequent objectives following the acquisition of CABs.

The empirical demonstration of the effectiveness of the Omnibus mand procedure in reducing severe problem behaviours represents a significant contribution to the literature on applied behaviour analysis. In particular, when dysfunctional behaviours are maintained by multiple sources of reinforcement - e.g. attention, access to tangible objects and escape from demands - the identification and implementation of effective interventions is particularly complex. The Omnibus mand procedure provides a functional and pragmatic strategy for teaching an alternative communicative response that simultaneously gains access to all relevant reinforcers. This makes it possible to rapidly reduce the frequency and severity of problem behaviour, establishing a more stable and predictable environmental control. Furthermore, the Omnibus mand can serve as an initial phase for subsequent communication discrimination interventions, in which more specific demands are gradually introduced to promote more refined communication. An experiment that systematically demonstrates how the use of an Omnibus mand leads to a significant decrease in severe problem behaviours in the presence of multiple reinforcers therefore has a relevant impact on both a theoretical and application level. Such evidence supports the effectiveness of interventions focusing on functional communication and offers useful guidelines for the treatment of neurodevelopmental disorders.

Limits of the research and future prospective

The complexity of the treatment implemented in this study may represent a limitation for its generalization to natural settings and for its use by individuals without specific training. At the center, multiple therapists alternated in working with A., which may also be considered a procedural limitation. The presence of different implementers across sessions could have resulted in inconsistencies or inaccuracies in the application of the intervention. In recent months, several staff members at the center have observed an increase in A.'s motor stereotypies—particularly repetitive hand movements—likely maintained by automatic reinforcement. This behavioral pattern may suggest that the child is engaging in a new form of countercontrol, possibly as an alternative strategy to assert control in social interactions (Schramm, 2011). In this regard, future directions could include an intervention focused on understanding the functions of these stereotypies and conducting a thorough assessment of the child's individual sensory profile. Although the single-session Interview-Informed Synthesized Contingency Analysis (IISCA) may have the limitation of not isolating individual contingencies and thus may fail to identify the specific role of each reinforcer class (Fisher et al., 2016), it nonetheless represents a valuable and efficient tool for conducting functional assessments within the Skill-Based Treatment model. The use of a single test condition allows for time and resource efficiency without compromising the clinical utility of the analysis. Given the novelty of this procedure, further research is warranted to evaluate the long-term effectiveness of both single-session IISCA and Skill-Based Treatment, as well as to assess the social validity of their outcomes. A potential limitation of using an omnibus functional communication response (FCR) for multiply controlled destructive behavior is that one or more of the requested reinforcers may not always be available. This situation could increase the risk of a resurgence of problem behavior if reinforcement conditions degrade. Additionally, due to the inherent lack of specificity of the Omnibus Mand (e.g., the use of "Me"), unfamiliar listeners may find it difficult to identify and provide the appropriate reinforcers. This limitation could hinder the child's ability to access reinforcement reliably in less structured or novel environments. As such, a possible long-term objective could involve the progressive differentiation of mands—potentially supported by the introduction of an augmentative and alternative communication (AAC) system—in order to enable the child's communicative partners to more accurately interpret and meet his needs.

A further methodological limitation of the present study is that no post-treatment Interview-Informed Synthesized Contingency Analysis (IISCA; Hanley, Jin, Vanselow, & Hanratty, 2014) was conducted. Consequently, we cannot empirically confirm whether the synthesized contingencies identified at baseline remained unchanged following intervention or whether new functions emerged over time. Future studies should include a follow-up IISCA to evaluate the maintenance or potential shift of response functions and to strengthen the functional validity of treatment effects. In addition, no post-intervention or follow-up data were collected regarding the frequency or intensity of problem behavior, which limits the ability to assess the durability of treatment effects over time. Although parents reported observable improvements in the home environment, these reports were not systematically measured or quantified, and no information was collected from other relevant settings such as school or extracurricular contexts. This lack of data across environments restricts the evaluation of generalization and social validity of the intervention outcomes.

Despite the aforementioned limitations, the present study offers valuable preliminary insights into the use of synthesized functional analyses and Omnibus Mand and interventions within applied settings. The findings contribute to expanding the empirical base on innovative communication strategies for individuals with neurodevelopmental disorders who exhibit multiply controlled problem behaviors. By transparently addressing methodological constraints and highlighting areas for future research—such as the inclusion of follow-up assessments and evaluation across multiple naturalistic contexts—this work lays important groundwork for refining and validating functional communication treatments. Consequently, it represents a meaningful step forward in both clinical practice and research, supporting ongoing efforts to improve intervention effectiveness and generalization.

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Declaration of Interest statement

Declarations of interest: none

Authors' contribution

All authors contributed to and have approved the final manuscript.

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APPENDIX

Open-Ended Interview for Functional Analysis Developed by Gregory P. Hanley, Ph.D., BCBA-D (originally developed in August 2002; revised in August 2009)

Child/Client: ________________________________

Interviewee's relationship to the client: ______________________________

Date of interview: ___________________________________

RELEVANT CONTEXTUAL INFORMATION

1. Date of birth and age: __ - __ - __ ___ years ___ months Male/Female
2. Description of communication skills.
3. Description of play skills and preferred activities.
4. What else does the child prefer?

QUESTIONS TO GUIDE THE DESIGN OF A FUNCTIONAL ANALYSIS

To develop an objective definition of observable problem behaviors:

5. What are the problem behaviors? How do they manifest?

To determine which behaviors the functional analysis will focus on:

6. Which single behavior concerns you the most?
7. What are the three most concerning behaviors? Are there any other behaviors that worry you?

To identify necessary precautions during the functional analysis:

8. What is the intensity level of the problem behaviors, and how does their intensity vary? Is there a risk of these behaviors causing harm or injury to the student or others?

To support the identification of precursors to dangerous problem behaviors, which can be the focus of the functional analysis instead of more dangerous behaviors:

9. Do problem behaviors tend to occur in clusters or as isolated outbursts? Are there any behaviors that typically precede others? (e.g., screaming before hitting)?

To Identify Antecedents That May Be Incorporated into the Functional Analysis Test Condition:

10. What are the conditions or situations in which the problem behavior is most likely to occur?

11. Are there specific activities during which the behavior regularly occurs?
12. What seems to trigger the problem behavior?
13. Does the problem behavior occur when you interrupt activities or routines? Please describe.
14. Does the problem behavior occur when it becomes clear that things will not go as the student wants? If so, describe what the student often tries to control.

To Define How to Conduct the Test Condition and the Specific Consequences That May Be Incorporated into the Test Condition:

15. How do you and others typically react to the problem behavior?
16. What do you do to help the student calm down once the problem behavior has occurred?
17. What do you do to distract the student and prevent the problem behavior from occurring?

In Addition to the Above Information, to Gain Further Insight into the Motivation Behind the Problem Behavior and to Support the Design of the Test Condition:

18. Do you think the student is trying to communicate something through their problem behavior?
19. Do you think this behavior might be a form of self-stimulation? If so, what gives you this impression?
20. Why do you think the student engages in the problem behavior?

Interviewee: _______________________