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Functional Communication Training to Increase Asking Behavior in a Child with Multiple Disabilities (ASD with Comorbid ADHD and IDD)

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Abstract

Children with ASD comorbid ADHD and IDD often experience severe communication deficits, including difficulties in displaying appropriate asking behavior, leading them to obtain desired objects without permission. Therefore, an effective intervention is needed to improve functional asking behavior. This study aimed to evaluate the effectiveness of Functional Communication Training (FCT) in increasing asking behavior in a child with ASD, ADHD, and IDD. The proposed hypothesis was that FCT would increase the frequency of asking behavior. This study employed a single-subject research design with an A–B design (baseline–intervention–follow-up). The measuring instrument consisted of direct observation using a trial-by-trial behavioral recording checklist completed by the researcher. The participant was a 10-year-10-month-old boy diagnosed with severe ASD (CARS = 50), severe IDD (IQ < 55), and combined-type ADHD. The intervention consisted of four prompt-fading stages (physical, gestural, verbal, and independent prompts), followed by post-test and one-month follow-up assessments. Data were analyzed using descriptive graphical analysis and supported by the Percentage of Non-overlapping Data (PND). The results showed that the frequency of independent asking behavior increased from 0% during baseline to 81%, 83%, and 81% across the three follow-up assessments, with no overlapping data between the baseline and intervention phases. These findings indicate that FCT was effective in increasing asking behavior in a child with ASD, ADHD, and IDD. This study suggests that FCT may be an effective intervention for improving functional communication in children with complex neurodevelopmental conditions.

Keywords: functional communication training, asking behavior, ASD, ADHD, IDD

1. Introduction

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder characterized by persistent deficits in social communication and interaction, accompanied by restricted and repetitive patterns of behavior, interests, or activities (Heward et al., 2017; Sauer et al., 2021). One of the most significant communication difficulties experienced by children with ASD is the inability to express their needs appropriately through requesting behavior (mand). When functional requesting skills are absent, children often rely on maladaptive behaviors, such as taking desired objects without permission, tantrums, or aggression, to obtain reinforcement.

Communication difficulties become more severe when ASD co-occurs with other neurodevelopmental conditions. Epidemiological studies indicate that more than 70% of children with ASD have at least one psychiatric comorbidity, with ADHD being among the most prevalent (Brookman-Frazee et al., 2018; Lai et al., 2019; Lugo-Marín et al., 2019; Simonoff et al., 2008), a finding corroborated by a recent meta-analysis identifying ADHD as one of the most common neurodevelopmental comorbidities associated with ASD (Rong et al., 2021). Children with ASD and comorbid ADHD consistently demonstrate poorer social functioning, adaptive behavior, inhibitory control, and executive functioning than children with ASD alone (Ames & White, 2011; Rao & Landa, 2014; Sinzig et al., 2008; Yerys et al., 2009), a pattern that is paralleled by more pronounced structural brain abnormalities observed in this group (Mizuno et al., 2019). Communication difficulties are compounded further when intellectual developmental disorder (IDD) co-occurs with ASD, as IDD independently constrains language development, adaptive functioning, and learning ability. The

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coexistence of ASD, ADHD, and IDD is therefore likely to compound impairments in communication, attention, behavioral regulation, and learning, rendering communication interventions considerably more challenging.

Functional Communication Training (FCT) is one of the most empirically supported function-based interventions for reducing challenging behavior by teaching an alternative communicative response that serves the same function as the problem behavior (Ghaemmaghami et al., 2021). Rather than suppressing problem behavior directly, FCT teaches individuals to communicate their needs appropriately, thereby reducing the likelihood of maladaptive behaviors. A systematic review by Gerow et al. (2018) concluded that FCT is an evidence-based intervention with consistent effectiveness across a variety of developmental disabilities. In Indonesia, Tedjawidjaja & Hartiani (2021) also demonstrated that FCT effectively increased requesting behavior in children with ASD using a picture-based communication approach.

Despite this strong evidence, most previous FCT studies have involved children with ASD without IDD or significant ADHD symptoms. Consequently, little is known about whether FCT remains effective for children presenting with a more complex clinical profile, namely severe ASD accompanied by severe IDD and comorbid ADHD. This population is likely to experience greater difficulties in sustaining attention, controlling impulses, and acquiring new communication skills, which may influence the effectiveness of behavioral interventions. Therefore, empirical evidence regarding the application of FCT in children with multiple and severe neurodevelopmental conditions remains limited.

To address this gap, the present single-subject study evaluated the effectiveness of FCT in increasing requesting behavior in a 10-year-10-month-old boy diagnosed with severe ASD, severe IDD, and combined-type ADHD who had no functional verbal communication. The intervention employed a prompt-fading procedure consisting of physical, gestural, verbal, and independent prompts to facilitate the acquisition of functional requesting behavior.

Based on this rationale, the study aimed to evaluate the effectiveness of FCT in increasing the frequency of requesting behavior in a child with ASD, ADHD, and IDD. The proposed hypothesis was that the participant's requesting behavior would increase following the implementation of FCT compared with the baseline condition.

2. Methodology

This study employed a single-subject research design with an A–B design, consisting of a baseline phase followed by an intervention phase. Repeated measurements were conducted on the same participant throughout the baseline, intervention, post-test, and follow-up phases to evaluate changes in the target behavior. This design was selected because the study aimed to examine the effectiveness of an individualized intervention for a child with a unique clinical profile, namely severe Autism Spectrum Disorder (ASD) with comorbid Attention Deficit Hyperactivity Disorder (ADHD) and Intellectual Developmental Disorder (IDD).

The participant was a 10-year-10-month-old boy, the first of four siblings, who attended Grade 5 at a public special needs school in Semarang, Indonesia. He had been diagnosed with ADHD at the age of three by a pediatrician. Psychological assessment conducted prior to the intervention, including interviews, behavioral observations, and standardized psychological tests, confirmed that the participant met the diagnostic criteria for ASD, ADHD, and IDD according to DSM 5-TR (APA, 2022). Assessment results indicated an IQ below 55 on the Snijders-Oomen Non-Verbal Intelligence Test (SON), corresponding to a mental age of approximately 2 years and 6 months. The Psychoeducational Profile-Revised (PEP-R) showed a developmental age equivalent to 1 year and 2 months. The participant also obtained a score of 50 on the Childhood Autism Rating Scale (CARS), indicating severe autism, while the parent and teacher versions of the Vanderbilt ADHD Diagnostic Rating Scale (VADRS) met the criteria for inattentive, hyperactive-impulsive, and combined ADHD presentations. The participant had no functional verbal communication and demonstrated limited nonverbal communication, accompanied by a history of taking objects or food without requesting permission both at home and at school.

The target behavior measured in this study was asking behavior. Data were collected using direct observation and trial-by-trial recording completed by the researcher. During the baseline phase, observations were conducted across three sessions lasting approximately 90–120 minutes each to record the frequency of asking behavior and instances of taking objects without permission. During the intervention phase, each session consisted of 10–13 trials, in which the participant was trained to produce asking behavior using Functional Communication Training (FCT) with a progressive prompt-fading procedure, including physical, gestural, verbal, and independent prompts. Participant performance was scored as the percentage of successful trials, calculated by dividing the number of successful trials by the total number of trials and multiplying by 100. A performance criterion of 80% correct responses was established before progressing to the next prompt level.

As part of the initial assessment, several standardized psychological instruments were administered to establish the participant's clinical profile, including the Snijders-Oomen Non-Verbal Intelligence Test (SON), Psychoeducational Profile-Revised (PEP-R), Childhood Autism Rating Scale (CARS), and the parent and teacher versions of the Vanderbilt ADHD Diagnostic Rating Scale (VADRS). These instruments are standardized measures with established psychometric properties and were used solely for diagnostic and descriptive purposes.

The research procedure consisted of three baseline sessions, followed by intervention sessions employing a prompt-fading hierarchy, and concluded with one post-test session and one follow-up session. Each intervention session lasted approximately 45–60 minutes. The intervention focused on increasing functional requesting behavior while reducing the participant's tendency to obtain desired objects without permission. Progression from one prompt level to the next was determined by the participant's achievement of the predetermined mastery criterion.

The intervention was divided into four phases: Phase 1 (physical prompt), Phase 2 (gestural prompt), Phase 3 (verbal prompt), and Phase 4 (independent/no prompt).

Table 1. Activities in Each Intervention Phase

Phase	Prompt Type	Mastery Criterion	Intervention Activities
1	Physical prompt	At least 80% correct requesting responses with physical prompting.	Physical prompts were delivered by guiding the participant's hand toward the communication board, assisting the participant in selecting the appropriate picture card, guiding the participant to reach toward the communication partner, and helping the participant place the picture card into the communication partner's hand.
2	Gestural prompt	At least 80% correct requesting responses with gestural prompting.	Gestural prompts were delivered by pointing to the communication board, indicating the appropriate picture card, and pointing toward the communication partner to signal that the picture card should be exchanged.
3	Verbal prompt	At least 80% correct requesting responses with verbal prompting.	Verbal prompts consisted of sequential instructions: *"Go to the communication board," "Take the picture of the item you want,"* and *"Give it to the communication partner."*
4	Independent (no prompt)	At least 80% correct independent requesting responses without prompts.	No prompts were provided. The researcher observed whether the participant independently approached the communication board, selected the appropriate picture card, picked it up, and exchanged it with the communication partner.

Each phase consisted of two sessions, although additional sessions were provided when the participant had not yet achieved the mastery criterion. Each session consisted of 10 trials involving the researcher, the participant, and a communication partner.

Data analysis was conducted using visual graphical analysis by comparing changes in performance across the baseline, intervention, post-test, and follow-up phases. Changes in level, trend, and variability were examined descriptively. To

complement the visual analysis, intervention effectiveness was quantified using the Percentage of Non-overlapping Data (PND), which represents the proportion of intervention and follow-up data points exceeding the highest baseline score.

3. Results and Discussion

Based on the intervention conducted, the results were as follows:

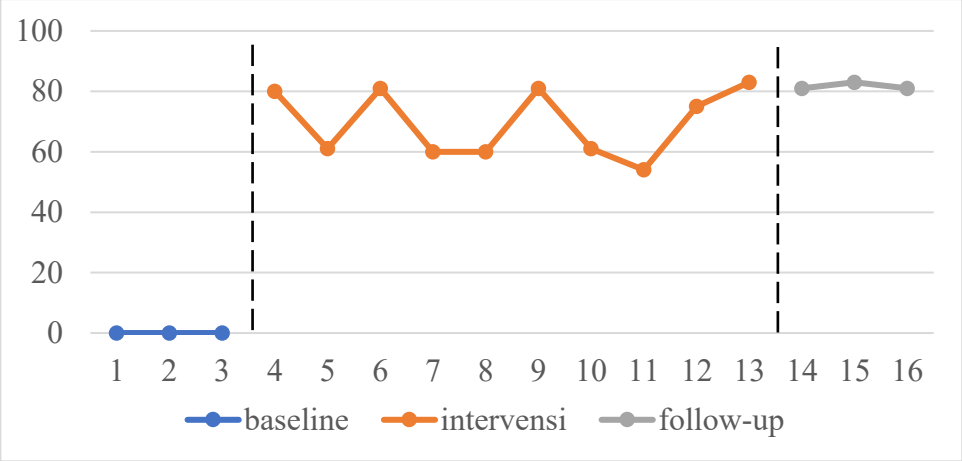


Figure 1. Comparison of the target behavior across the baseline, intervention, and follow-up phases

Before the intervention, a three-day baseline assessment was conducted to establish the participant's initial level of requesting behavior. The results showed that, on the first day, the participant displayed 14 instances of inappropriate requesting behavior (obtaining desired objects without permission) and refused the prompts provided on five occasions. On the second and third days, 13 instances of the same behavior were recorded on each day, with only one appropriate requesting response occurring after the delivery of a physical prompt. These findings indicated that, prior to the intervention, the participant had not yet acquired functional requesting behavior and frequently refused the researcher's prompts.

The intervention was implemented through four prompt-fading phases (physical, gestural, verbal, and independent), with a mastery criterion of at least 80% correct responses in each phase. During Phase 1 (physical prompt), the participant reached the mastery criterion in the first session, achieving 8 of 10 successful trials (80%), although physical prompts were refused in the remaining two trials. In Phase 2 (gestural prompt), performance temporarily declined in the second session (8 of 13 trials; 61%) before reaching the mastery criterion in the third session (9 of 11 trials; 81%). A similar pattern was observed in Phase 3 (verbal prompt), with performance remaining at 60% during the fourth and fifth sessions before improving to 81% (9 of 11 trials) in the sixth session. During Phase 4 (independent/no prompt), the participant required a longer adjustment period, with performance fluctuating at 61%, 54%, and 75% across the seventh to ninth sessions before ultimately reaching the mastery criterion in the tenth session (10 of 12 trials; 83%).

The post-test, conducted one day after the intervention, and the three follow-up assessments, conducted one month later, demonstrated that the participant maintained independent requesting behavior at 81% (first follow-up), 83% (second follow-up), and 81% (third follow-up) of all requesting opportunities. This represented a substantial improvement from the baseline phase, during which the participant did not demonstrate any independent requesting responses (0%). Furthermore, no data points from the intervention or follow-up phases overlapped with the baseline level of independent requesting behavior, resulting in a Percentage of Non-overlapping Data (PND) of 100%, indicating a highly effective intervention according to conventional effect-size criteria for single-subject research.

Several practical challenges were encountered during the intervention. School activities scheduled outside regular class hours frequently conflicted with the intervention sessions, and the participant was absent from school on several occasions. These factors affected the consistency of the intervention schedule and may have contributed to fluctuations in performance across sessions.

Discussion

The findings of this study demonstrated that Functional Communication Training (FCT) effectively increased appropriate requesting behavior in the participant. Independent requesting behavior improved from 0% during baseline to 81–83% during the post-test and one-month follow-up assessments. These findings support the study hypothesis that FCT increases requesting behavior compared with the baseline condition.

The present findings are consistent with previous studies demonstrating the effectiveness of FCT in replacing challenging behavior with functionally equivalent communication responses. A systematic review by Gerow et al. (2018) identified FCT as an evidence-based intervention across various developmental disabilities, while Ghaemmaghami et al. (2021) concluded that FCT has consistently demonstrated effectiveness in clinical practice. The results also extend the findings of Tedjawidjaja & Hartiani (2021), who reported that FCT effectively increased requesting behavior in children with ASD in Indonesia.

The improvement observed in this study can be explained by the fundamental principle of FCT, namely replacing challenging behavior with an alternative communicative response that produces the same functional outcome (Ghaemmaghami et al., 2021). Prior to intervention, the participant typically obtained preferred items by taking them without permission. Through FCT, this behavior was gradually replaced with appropriate requesting behavior, which provided access to the same reinforcer. The prompt-fading procedure, progressing from physical to gestural, verbal, and finally independent responding, enabled the participant to acquire functional requesting skills despite severe IDD and the absence of functional verbal communication.

Performance fluctuations observed during the intervention were expected and are commonly reported during prompt-fading procedures. Temporary decreases in performance likely reflected the participant's adjustment to progressively reduced assistance before independent responding became established. This pattern was particularly evident during the independent phase, which required more sessions to achieve the mastery criterion than the preceding phases. The participant's comorbid ADHD may also have contributed to this pattern, as deficits in attention, inhibitory control, and executive functioning are known to interfere with the acquisition and maintenance of newly learned behaviors (Ames & White, 2011; Sinzig et al., 2008).

An important contribution of this study is the extension of the evidence base for FCT to children with more complex neurodevelopmental conditions. Previous studies have primarily involved children with ASD without severe IDD or significant ADHD symptoms. In contrast, the present participant presented with severe ASD, severe IDD, combined-type ADHD, and no functional verbal communication. The findings suggest that FCT remains effective even in children with multiple and severe neurodevelopmental conditions, thereby supporting the broader applicability of this intervention in clinical practice.

Several limitations should be acknowledged. First, the A–B single-subject design without a reversal phase or control condition limits causal inference because improvements may have been influenced by factors other than the intervention. Second, behavioral observations were recorded by a single researcher without inter-observer agreement, increasing the possibility of observer bias. Finally, interruptions caused by school activities and participant absences affected the consistency of the intervention schedule and may have contributed to performance variability across sessions. Future studies should incorporate stronger experimental designs, multiple observers, and a larger number of participants to strengthen the evidence regarding the effectiveness of FCT in children with ASD, ADHD, and IDD.

4. Conclusion

The findings of this study indicate that Functional Communication Training (FCT) with a progressive prompt-fading procedure (physical, gestural, verbal, and independent prompts) effectively increased requesting behavior in a child with severe ASD, severe IDD, combined-type ADHD, and no functional verbal communication. The participant's independent requesting behavior improved from 0% during baseline to 81–83% during the post-test and one-month follow-up assessments, with a PND of 100%, indicating a highly effective intervention. These findings extend the existing evidence supporting the use of FCT in children with complex neurodevelopmental conditions who have been underrepresented in previous research.

From a practical perspective, the findings suggest that FCT can be implemented by psychologists, teachers, and caregivers to promote functional requesting behavior in children with similar clinical characteristics. Consistent implementation, structured intervention schedules, and supportive learning environments are recommended to optimize intervention outcomes.

Future research should employ more rigorous single-subject designs, such as multiple-baseline or reversal designs, to strengthen internal validity. In addition, future studies should include formal inter-observer agreement measures, replicate the intervention with participants presenting similar clinical profiles, and examine the generalization and long-term maintenance of requesting behavior across different settings and communication partners.

5. Declarations

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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