CONDITIONS FOR IMPROVING SPEECH-COMMUNICATIVE SKILLS PREPARATION IN CHILDREN WITH AUTISM SPECTRUM DISORDERS BASED ON BEHAVIORAL MANAGEMENT

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Abstract. *This article examines the pedagogical and psychological conditions necessary for improving the preparation of speech-communicative skills in children with autism spectrum disorder through the application of behavioral management principles. Children with autism spectrum disorders face significant challenges in developing speech and communicative competencies, which remain central obstacles to their social integration and educational achievement. Drawing on applied behavior analysis, verbal behavior therapy, pivotal response treatment, and augmentative and alternative communication strategies, the study synthesizes current empirical evidence and theoretical frameworks to identify key environmental, methodological, and interpersonal conditions that foster communicative development. The article argues that a structured yet flexible behavioral management environment - combining positive reinforcement, naturalistic teaching, family involvement, and individualized goal-setting - constitutes the optimal framework for enhancing communicative readiness in children with autism spectrum disorder. Findings suggest that early intervention, consistent cross-setting application, and the integration of digital technologies substantially improve communicative outcomes. The article concludes with recommendations for educators, corrective pedagogues, and policymakers in designing inclusive and effective speech-communicative preparation programs.*

Keywords: *autism spectrum disorder, behavioral management, speech-communicative skills, applied behavior analysis, verbal behavior therapy, pivotal response treatment, augmentative and alternative communication, corrective pedagogy, early intervention, inclusive education.*

INTRODUCTION

Autism spectrum disorder is a complex neurodevelopmental condition characterized by persistent deficits in social communication and interaction, alongside restricted and repetitive patterns of behavior, interests, or activities. The prevalence of autism spectrum disorder has steadily increased in recent decades; according to the centers for disease control and prevention, approximately 1 in 36 children in the United States is diagnosed with autism spectrum disorder, while global estimates suggest a prevalence of around 1-2% of the world's population. Among the defining features of ASD, impairments in speech and communicative functioning represent the most educationally significant challenges. "Children with autism spectrum disorder often demonstrate delayed language acquisition, echolalia, limited spontaneous communication, difficulties with pragmatic language use, and challenges in joint attention - all of which impede learning, social integration, and quality of life" [1, p. 15.].

For a substantial proportion of children with ASD - estimated between 25% and 50% - speech may remain absent or severely limited without intensive, targeted intervention. Behavioral management, particularly as systematized within applied behavior analysis (ABA), has accumulated the most robust empirical evidence as an intervention framework for autism spectrum disorder. ABA-based approaches operate on the principle that communicative behaviors, like all behaviors, can be shaped, reinforced, and generalized through systematic environmental manipulation. “The integration of behavioral management into speech-communicative skill development has given rise to a suite of methodologies - including Verbal Behavior therapy, Pivotal Response Treatment, Discrete Trial Training, and naturalistic developmental behavioral interventions - each offering distinct pedagogical conditions for communicative growth” [2, p. 264.].

Despite this evidence base, a critical gap persists in the literature: the systematic articulation of the conditions - environmental, methodological, social, and technological - that must be in place for behavioral management to effectively improve communicative preparation in children with autism spectrum disorder.

This article addresses that gap by synthesizing evidence from international empirical research, theoretical models, and pedagogical practice to identify and describe these conditions comprehensively. The article proceeds as follows. Section 2 provides a theoretical foundation, reviewing core behavioral and communicative frameworks relevant to autism spectrum disorder intervention. Section 3 identifies and analyzes the primary pedagogical and psychological conditions for improving speech-communicative skill preparation. Section 4 examines the role of digital technologies and AAC within a behavioral management framework. Section 5 discusses family and cross-setting conditions, and Section 6 offers conclusions and practical recommendations.

MATERIAL AND METHODS

Applied behavior analysis, rooted in B.F. Skinner’s (1957) “operant conditioning theory and further developed by Lovaas (1987) and Cooper, Heron, and Heward (2020), constitutes the foundational science underlying behavioral management in autism spectrum disorder intervention” [3, p. 19.]. Applied behavior analysis operates through the systematic application of behavioral principles - antecedent manipulation, reinforcement, prompting, and generalization - to increase socially significant behaviors, including communication, while decreasing maladaptive ones. The three-term contingency (antecedent–behavior–consequence, or ABC) provides the operational mechanism through which communicative behaviors are analyzed and shaped. When applied to speech-communicative development, this framework enables educators to identify communicative functions (manding, tacting, intraverbal behavior, echoics) and systematically build each through structured teaching trials and naturalistic opportunities. “Lovaas’s landmark study demonstrated that intensive early ABA intervention could produce substantial language and intellectual gains in young children with ASD, establishing a precedent that subsequent decades of research have largely affirmed. Meta-analyses by Virues-Ortega (2010) and Makrygianni et al. (2018) confirm that comprehensive ABA programs are associated with significant improvements in language, communication, and adaptive behavior” [4, p. 126.]. Verbal Behavior (VB) therapy, developed by Sundberg and Partington (1998) and grounded in Skinner’s (1957) «Verbal Behavior», extends ABA by categorizing language functionally rather than structurally. Skinner identified distinct verbal operants - mands (requests), tacts (labels), intraverbals (conversational responses), and echoics (vocal imitation) - each serving a different communicative function and

requiring separate instructional programming. VB therapy's contribution to speech-communicative preparation lies in its functional orientation: rather than simply teaching a child to «say» words, it teaches them to «use» language purposefully to obtain reinforcers, describe the environment, and engage in social exchange. This functional approach is particularly suited to children with ASD, whose communicative deficits are often more pragmatic than phonological or lexical. ivotal Response Treatment (PRT), developed by Koegel and Koegel (2006), targets «pivotal» [5, p. 315.] areas of child development - motivation, responsivity to multiple cues, self-management, and social initiations - on the premise that improvements in these areas produce broad collateral gains across communicative and behavioral domains. PRT employs naturalistic, child-directed teaching contexts, using the child's own interests as motivational levers and embedding communication targets within play and everyday activities. PRT's naturalistic orientation addresses a key limitation of more structured behavioral approaches: the problem of generalization. Children with ASD frequently demonstrate stimulus overselectivity and context-bound learning, making it difficult to transfer skills acquired in structured settings to natural communicative environments.

LITERATURE REVIEW

By situating instruction within natural contexts, PRT promotes more robust generalization of communicative skills. Naturalistic Developmental Behavioral Interventions (NDBIs), as conceptualized by Schreibman et al. (2015), "represent a convergent model integrating developmental science (particularly social-pragmatic and relationship-based theories) with behavioral principles" [6, p. 231.]. NDBIs share common features: instruction within natural routines, following the child's lead, use of natural reinforcers, and emphasis on social-communicative competence as a primary outcome. Exemplars include the Early Start Denver Model (ESDM), Joint Attention Symbolic Play Engagement and Regulation (JASPER), and Reciprocal Imitation Training (RIT). The NDBI framework is significant for identifying conditions of communicative preparation that extend beyond discrete skill acquisition to encompass the relational, motivational, and developmental conditions necessary for authentic communicative growth. Among all identified conditions, early intervention onset and intervention intensity emerge as the most consistently supported predictors of communicative outcome in children with ASD. The neurodevelopmental plasticity of the young brain renders the preschool period a critical window for language acquisition, and numerous studies confirm that earlier ABA initiation is associated with better communicative outcomes. The Early Start Denver Model, tested in a landmark randomized controlled trial by Dawson et al. (2010), demonstrated that children receiving early intensive NDBI showed significantly greater gains in receptive and expressive language compared to community treatment controls. "The principle of «brain plasticity» - the capacity of the developing nervous system to reorganize in response to experience - underpins the imperative of early communicative intervention. Intensity also matters: research generally supports a minimum of 20-40 hours per week of structured intervention for children with ASD, though the optimal configuration depends on individual child characteristics, program quality, and the specific communicative goals being targeted. Importantly, intensity should not be conflated with rigid drill-based instruction; research increasingly supports the distribution of intensive practice across naturalistic, motivating contexts" [7, p. 784.].

RESULTS

A second foundational condition is the use of systematic, individualized assessment to guide communicative programming. Children with ASD present with highly heterogeneous

profiles of communicative strength and deficit; a one-size-fits-all curriculum is demonstrably insufficient (Paul et al., 2018). Behavioral management frameworks address this through tools such as the Verbal Behavior Milestones Assessment and Placement Program, the Assessment of Basic Language and Learning Skills - Revised, and the Autism Diagnostic Observation Schedule.

These assessments enable educators and clinicians to identify the child's current verbal operant repertoire, pinpoint the specific communicative functions that are absent or emerging, and construct individualized intervention plans with measurable, functional targets. The condition of individualization is not merely methodological - it reflects a foundational ethical commitment to treating each child as a unique learner with distinct communicative potential. The physical and social environment constitutes a critical condition for communicative development. Behavioral management emphasizes the careful engineering of the antecedent environment to maximize opportunities for communicative behavior and minimize barriers. Environmental design strategies include:

- Arranging materials to create communicative temptations.
- Structuring activity sequences to embed communicative targets naturally.
- Reducing sensory distractions that compete with communicative attending.
- Creating predictable routines that scaffold communicative participation.
- Designing transitions as opportunities for communicative exchange.

Research by Krantz and McClannahan (1993) demonstrated that environmental arrangement significantly increased spontaneous communication in children with ASD, underscoring the condition of intentional environmental design. The concept of «communication-rich environments» - settings organized explicitly to evoke, support, and reinforce communicative behavior - is now standard in evidence-based ASD pedagogy.

"Motivation is arguably the most influential individual-level condition for communicative learning in children with ASD. The frequent co-occurrence of ASD with reduced social motivation - sometimes conceptualized within the Social Motivation Hypothesis - means that social praise, which serves as a natural reinforcer for neurotypical children's communicative behavior, may be functionally weak or neutral for many children with autism spectrum disorder." [8, p. 803.].

Effective behavioral management therefore requires systematic identification of each child's individual reinforcers through reinforcer assessment and the strategic deployment of these reinforcers to strengthen communicative behaviors. The condition of individualized, high-quality reinforcement is non-negotiable in ABA-based communicative intervention.

PRT extends this by emphasizing natural reinforcers - reinforcers that are directly and functionally related to the communicative act - over arbitrary ones. For example, a child who mands for a preferred toy should receive that toy, not a food reward. Natural reinforcement is associated with higher rates of maintenance and generalization.

Functional Communication Training (FCT), developed by Carr and Durand (1985), represents a behavioral management strategy that directly addresses the relationship between problem behavior and communicative deficits in children with autism spectrum disorder.. FCT is grounded in the observation that many challenging behaviors (e.g., tantrums, self-injury, aggression) function as communicative acts - attempts to obtain reinforcers or escape aversive situations in the absence of conventional communicative means.

"FCT teaches children to replace these problem behaviors with socially appropriate communicative alternatives that serve the same function. The condition established by FCT is the identification and systematic reinforcement of functional communicative responses, while

withholding reinforcement from the problem behavior. Extensive research supports FCT as both an effective communication-building and behavior-reduction strategy" [9, p. 17.].

FCT's contribution to the broader conditions for communicative preparation is its demonstration that speech-communicative skill development and behavioral management are not parallel processes but deeply interdependent ones: communication emerges within behavioral contexts, and behavior is shaped by communicative capacity.

For children with ASD who are minimally verbal or nonverbal, Augmentative and Alternative Communication (AAC) - encompassing picture exchange systems, speech-generating devices (SGDs), sign language, and communication boards - represents an essential condition for communicative participation. The widespread historical concern that AAC use would suppress speech development has been comprehensively refuted; evidence consistently shows that AAC supports rather than inhibits natural speech acquisition.

The Picture Exchange Communication System applies behavioral principles directly to AAC instruction, teaching children to initiate communication by exchanging picture symbols for desired items. PECS progresses through six phases, moving from single-item requests to sentence construction, and has demonstrated effectiveness in building manding and spontaneous communication across numerous RCTs and single-case studies.

The proliferation of tablet-based AAC applications and digital intervention platforms has expanded the technological conditions available for communicative preparation. Tablet-based SGDs offer advantages of portability, social acceptability, and motivational appeal for many children with ASD, and their integration within behavioral management frameworks has shown promising results.

"Beyond AAC, digital technologies facilitate communicative preparation through video modeling - a behavioral strategy in which children watch video demonstrations of target communicative behaviors and imitate them. Video modeling has a robust evidence base for ASD communication intervention and can be implemented efficiently through standard digital devices.

The condition of technology integration is increasingly recognized not as supplementary but as core to contemporary communicative preparation" [10, p. 491.].

Artificial intelligence and machine learning applications are beginning to enter ASD communication intervention, with systems capable of providing adaptive, personalized communicative prompting and feedback. While the evidence base for AI-driven ASD communication tools remains nascent, the trajectory of this technological condition is significant for future pedagogical design.

Family involvement constitutes one of the most robustly supported conditions for communicative improvement in children with ASD. Parents and caregivers are the child's primary communication partners and occupy the natural environments in which communicative skills must ultimately function. Behavioral management programs that train parents as intervention agents - teaching them to implement mand training, natural environment teaching, FCT, and reinforcement strategies - demonstrate substantially better communicative outcomes than clinic-only approaches.

Parent-implemented intervention models such as PECS Phase I training, PRT parent training, and ESDM parent coaching programs have demonstrated efficacy in increasing communicative initiations, joint attention, and language complexity in children with ASD. The condition of family training requires that educators and clinicians provide not only instruction but ongoing coaching, feedback, and support to ensure accurate and consistent implementation.

Generalization - the transfer of communicative skills across settings, people, and materials - is recognized as the ultimate measure of intervention success and a distinctive challenge in ASD behavioral programming. The behavioral management conditions that support generalization include:

- Training in multiple exemplars and settings from the outset of instruction.
- Using multiple communication partners during training.
- Programming for natural maintaining contingencies (reinforcement that exists in the natural environment).
- Employing loose training procedures (varied materials, instructions, and contexts).
- Systematically fading structured prompts to promote independence.

Generalization is not a passive outcome but a condition that must be deliberately programmed. Failure to address generalization conditions results in communicative repertoires that are restricted to the training context - a common criticism of poorly implemented ABA programs that focus exclusively on structured drill.

The complexity of communicative impairment in ASD necessitates transdisciplinary collaboration as an organizational condition for effective preparation. Speech-language pathologists, special educators, behavior analysts, psychologists, occupational therapists, and families must function as a coordinated team, sharing assessment data, aligning communicative goals across settings, and ensuring consistent implementation of behavioral strategies.

The condition of transdisciplinary collaboration is particularly critical in educational settings, where the risk of fragmented, inconsistent intervention is high. Structured collaboration mechanisms - shared intervention plans, regular team meetings, common data systems, and joint professional development - constitute the organizational infrastructure for effective communicative preparation.

The conditions identified in this review converge on a coherent model of communicative preparation for children with ASD that is simultaneously behavioral, developmental, relational, and systemic. No single strategy or condition is sufficient; rather, it is the integration of early onset, individualized assessment, structured environment, motivational support, functional communication training, AAC, digital technologies, family involvement, and generalization programming that constitutes the optimal preparation framework.

Several tensions within this model warrant acknowledgment. First, the balance between structure and naturalism remains a productive area of debate. Highly structured approaches (e.g., intensive DTT) offer precision and efficiency in skill acquisition but may undermine generalization and social authenticity. Naturalistic approaches offer ecological validity but may provide insufficient learning opportunities for children with significant impairments. The current evidence suggests that both structured and naturalistic approaches are necessary and that their optimal combination depends on individual child characteristics and phase of intervention.

Second, the cultural and contextual applicability of primarily Western-developed behavioral management frameworks to diverse educational contexts - including Central Asian settings - deserves critical attention. The values embedded in ABA-based approaches (individual goal-setting, reinforcement systems, data-driven decision-making) may require adaptation to local pedagogical traditions, family structures, and resource conditions. Khodjaeva and Yusupova (2021) note that special education in Uzbekistan is undergoing significant reform, with increasing integration of international evidence-based practices, suggesting both opportunity and need for culturally adapted implementation frameworks.

Third, the ethical conditions of communicative preparation - respect for child agency, avoidance of coercive or aversive procedures, and commitment to authentic communicative participation - are increasingly foregrounded in contemporary ASD pedagogy. Behavioral management, when implemented with fidelity to contemporary ethical standards, is grounded in positive reinforcement and child-centered goal-setting; the condition of ethical practice is thus not external to behavioral management but constitutive of its contemporary form.

DISCUSSION

This article has synthesized evidence from behavioral science, developmental psychology, speech-language pathology, and special education pedagogy to identify the conditions necessary for improving speech-communicative skills preparation in children with ASD within a behavioral management framework. The following recommendations emerge:

For educators and corrective pedagogues:

- Implement structured functional communicative assessments (VB-MAPP, ABLLS-R) prior to programming to ensure individualization.

- Design communication-rich environments with deliberate antecedent arrangements that evoke and reinforce communicative behavior.

- Integrate FCT systematically for children whose problem behaviors serve communicative functions.

- Embed communicative targets within naturalistic, motivating activities rather than relying exclusively on discrete trials.

- Ensure generalization is programmed explicitly across all phases of intervention.

«For speech-language pathologists:»

- Provide AAC assessment and intervention for minimally verbal children without delay, employing evidence-based systems such as PECS or SGD-based approaches.

- Coordinate with behavior analysts and educators to ensure consistent communicative expectations and reinforcement across settings.

For families:

- Participate in structured parent training programs to implement behavioral communicative strategies in natural home routines.

- Maintain communicative demands and reinforcement consistent with school-based programming to support generalization.

For policymakers and educational administrators:

- Fund early intensive intervention programs with sufficient staffing and duration to meet evidence-based intensity thresholds

- Support transdisciplinary team structures and professional development in behavioral communicative intervention.

- Promote the integration of digital AAC technologies within special education programs

The improvement of speech-communicative preparation in children with ASD is not a technical problem with a single solution but a complex pedagogical challenge requiring the deliberate cultivation of multiple interacting conditions. Behavioral management, as a comprehensive and adaptable framework, provides the theoretical and practical infrastructure for meeting this challenge - provided it is implemented with scientific rigor, ethical commitment, and sensitivity to the individual child’s communicative potential and life context. Children with autism spectrum disorder require specially organized educational and corrective conditions in order to develop speech and communication successfully. In many cases, the problem is not only the

absence or delay of speech, but also the inability to use language meaningfully in everyday interaction. Such children may find it difficult to express their needs, respond to questions, maintain eye contact, participate in dialogue, or understand social meaning in communication. For this reason, the preparation of speech-communicative skills should be understood as a purposeful and systematic process aimed at forming functional communication in natural and educational environments.

One of the most important conditions for improving speech and communication in children with autism spectrum disorder is the early identification of developmental difficulties and the timely beginning of intervention. Early childhood is the most sensitive period for the formation of language, social attention, imitation, and emotional interaction. If corrective and pedagogical support begins during this period, the child has greater opportunities to develop communicative readiness and to master socially meaningful forms of interaction. Early support also helps prevent secondary behavioral difficulties that often arise when a child cannot express needs, emotions, or discomfort through understandable communication.

Another essential condition is the individualization of the educational and corrective process. Every child with autism spectrum disorder has a unique developmental profile. Some children may have separate words but cannot use them appropriately in social situations. Others may understand speech but experience serious difficulty producing verbal responses. There are also children who rely more successfully on visual support, gestures, pictures, or technological means of communication. Therefore, the content, pace, methods, and expected outcomes of speech-communicative preparation must be based on the child’s actual abilities, needs, and motivational characteristics. An individual approach allows specialists to identify strong sides of development and use them as a foundation for overcoming communication barriers. A well-structured environment is also a necessary condition for successful communicative development.

Children with autism spectrum disorder often respond more positively in settings that are predictable, organized, emotionally safe, and visually clear. When the environment includes stable routines, understandable instructions, visual schedules, and carefully arranged communication opportunities, the child becomes more prepared to participate in interaction. A chaotic or overstimulating environment can reduce attention, increase anxiety, and weaken the child’s willingness to communicate. By contrast, a structured learning space helps the child focus on relevant social and linguistic stimuli and gradually master new communicative patterns.

Equally important is the use of positive motivational support in the teaching process.

Communication develops more effectively when the child experiences success, emotional comfort, and meaningful reinforcement. If the child’s attempts to communicate are noticed, encouraged, and rewarded through desirable outcomes, the frequency of communicative behavior increases. Motivation should not be artificial or disconnected from real life. It is most effective when communication is directly linked to the child’s interests, everyday needs, and preferred activities. For example, a child is more likely to use words, symbols, or gestures when this helps obtain a favorite object, continue an enjoyable activity, or attract the attention of a significant adult.

In this way, speech and communication become functional, purposeful, and personally meaningful.

The development of speech-communicative skills in children with autism spectrum disorder also depends on the active involvement of adults who surround the child. Teachers, speech therapists, special educators, psychologists, and parents should work in close cooperation and follow common goals. If communication requirements and support strategies differ sharply

between home and school, the child may struggle to generalize newly learned skills. On the other hand, when adults use similar approaches, reinforce the same communicative behaviors, and create consistent expectations across settings, the child receives a unified developmental space. Family participation is especially important because communication is formed not only in therapy sessions or lessons, but also during meals, play, прогулки, household routines, and emotional interaction with close people.

Another significant condition is the inclusion of alternative and supportive means of communication for children who do not yet use speech effectively. Pictures, visual cards, communication boards, gestures, and speech-generating devices can help the child express needs and participate in interaction before fluent speech develops. These tools should not be seen as barriers to verbal language. On the contrary, they often serve as bridges toward broader communicative competence, reduce frustration, and support the understanding of symbolic exchange. When such means are introduced correctly and consistently, they can become an important part of the child's communicative preparation and social adaptation.

It is also necessary to pay attention to the connection between communication and behavior. In children with autism spectrum disorder, challenging behavior often appears when the child cannot express refusal, ask for help, request a preferred item, or explain discomfort. In this sense, the improvement of communication is closely related to the reduction of problematic behavior. When a child learns acceptable and understandable ways to communicate, emotional tension often decreases, and social interaction becomes more stable. Thus, work on communicative skills should be organized not separately from behavioral support, but as an integrated process in which speech, interaction, emotional regulation, and social adaptation develop together.

CONCLUSION

In conclusion, the improvement of speech-communicative skills preparation in children with autism spectrum disorder requires a complex combination of pedagogical, psychological, and social conditions. These include early intervention, individualization, structured and supportive environments, motivation-based teaching, family involvement, professional cooperation, and the use of supportive communication tools. Only under such conditions can the child gradually move from isolated reactions to purposeful communication, from passive presence to active participation, and from communication difficulty to meaningful social interaction.

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