

Effects of Interactive Reading on Verbal Communication in Preschool Children with Autism: A Postprint

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Abstract

International research indicates that interactive reading is emerging as an exploratory intervention approach for early language abilities in children with autism. This paper systematically reviews and analyzes empirical studies on interactive reading interventions for oral communication in preschool children with autism. The findings demonstrate that interactive reading interventions yield positive effects on vocabulary development and verbal (active responding) in children with autism, while the effects on verbal (active initiation of communication) remain contested. However, due to the small sample sizes in these studies, the efficacy of interactive reading interventions in improving oral communication in children with autism warrants further research and investigation. Future studies are expected to explore and validate the facilitating effects of interactive reading interventions on both active responding and active initiation of communication in preschool children with autism within larger samples, and to further examine the maintenance and generalization of oral ability improvements.

Full Text

Preamble

The Effects of Interactive Reading Interventions on Oral Language of Preschool Children with Autism Spectrum Disorders

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Abstract

Foreign studies suggest that interactive reading is a newly emerging intervention for children with Autism Spectrum Disorders (ASD) in oral language skill. This paper summarized and analyzed the related researches on the effects of interactive reading interventions on the oral language of preschool children with ASD. The results indicate that interactive reading interventions show positive impacts on vocabulary development and spontaneous response in preschool children with ASD, but have discrepant effects on their spontaneous initiations. However, due to the small samples of these studies, the effects of interactive reading interventions on oral language of autistic preschool children needs to be further studied. It is expected that future research will explore and verify the effects of interactive reading interventions on the spontaneous response and initiations of preschool autistic children in a large sample, and the maintenance and generalization of the improvements on their oral language skill should also be investigated.

Keywords: children with autism spectrum disorders (ASD); interactive reading; intervention; oral language

1. Early Oral Language Development in Children with Autism Spectrum Disorders

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder characterized by core symptoms of social communication impairments and restricted, repetitive patterns of behavior, interests, and activities. According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V), diagnosis requires meeting four criteria: (1) Persistent deficits in social interaction across multiple contexts, manifested in three areas: (a) deficits in social-emotional reciprocity, including abnormal social approach, failure of normal back-and-forth conversation, and reduced sharing of interests and emotions; (b) deficits in nonverbal communicative behaviors used for social interaction, including poorly integrated verbal and nonverbal communication, abnormalities in eye contact and body language, and deficits in understanding and use of gestures; and (c) deficits in developing, maintaining, and understanding relationships, including difficulties adjusting behavior to suit various social contexts, difficulties with imaginative play, and lack of interest in peers. (2) Restricted,

repetitive patterns of behavior, interests, or activities, manifested by: (a) stereotyped or repetitive speech, motor movements, or use of objects; (b) insistence on sameness, inflexible adherence to routines, or ritualized patterns of verbal or nonverbal behavior; (c) highly restricted, fixated interests that are abnormal in intensity or focus; and (d) hyper- or hyporeactivity to sensory input or unusual interest in sensory aspects of the environment. (3) Symptoms must be present in the early developmental period (though they may not become fully manifest until social demands exceed limited capacities). (4) Symptoms cause clinically significant impairment in social, occupational, or other important areas of current functioning.

Social communication impairment is a primary symptom of ASD, with children showing pervasive difficulties in social interaction and joint attention. While typically developing children share experiences through verbal and nonverbal means such as comments and gestures, children with ASD demonstrate delays in early social language skills, including responding to others and initiating communication verbally, making goal-directed pointing gestures, and using speech or gestures to make requests.

Oral language abilities vary widely among children with ASD; some fail to develop language altogether, while others develop speech that is not functional for communication. Regardless of language level, all children with ASD continue to exhibit pragmatic difficulties in the social use of language, showing persistent challenges at both linguistic levels (verbal turn-taking, perspective-shifting) and nonverbal levels (eye contact, facial expressions), which affects their ability to interact successfully with others, including peers.

Oral language expression in children with ASD can predict their later reading comprehension abilities. Oral language comprises several linguistic domains, including structural skills (such as vocabulary, semantics, and syntax) and higher-order language skills (such as inference, concepts, and narrative). Even when structural language abilities are intact, children with ASD may exhibit reading comprehension difficulties associated with deficits in higher-order language skills like inference. Some children with ASD have mastered sufficient receptive vocabulary but cannot express higher-level mental activities or oral narratives according to grammatical processing and lexical organization.

2. Interactive Reading Interventions for Promoting Oral Communication Skills in Preschool Children with ASD

During interactive reading, children engage in reciprocal interactions with adults while learning early literacy skills. The goal of early interactive reading is to create balanced exchanges between adults and children, where adults serve not as primary instructors but as equal partners in interaction to enhance children's reading engagement and interest. Thus, interactive reading creates opportunities for children to actively respond and initiate social interactions while

providing broad reading experiences. Interactive reading emphasizes shared reading with interactive elements and dialogic reading, which has evolved from shared reading with stronger interactive components.

2.1 Development of Interactive Reading Interventions

(1) Shared Reading

Shared reading, also known as repeated story reading, read-aloud, interactive reading, story time, or literacy lessons, broadly refers to the practice of adults reading aloud to children while encouraging interaction through questioning, evaluating story content, and expanding children's responses. Shared reading is a well-researched method that can transform young children's literacy abilities, particularly in oral language development.

Simple adult-led reading where children act as passive listeners does not improve children's oral expression or literacy skills. Research indicates that reading quality matters more than quantity, and adults' reading styles influence children's interactive performance during reading and their oral language development. Adult reading styles can be categorized into three types: (a) describers, who focus primarily on describing story content and labeling words; (b) comprehenders, who use more inference and prediction during reading; and (c) performance-oriented readers, who emphasize children's performance in shared reading activities, such as having them predict story content before reading and evaluate it afterward, but with minimal participation during reading. Children with lower vocabulary levels benefit from "describer" styles, while those with higher vocabulary levels benefit from "performance-oriented" styles. When adults actively ask children about pictures or story content and use strategies to encourage questioning, evaluating characters, and retelling stories, children show greater language progress and interest in dialogue.

(2) Dialogic Reading

Dialogic reading is a more interactive method developed from shared reading that uses a series of prompts to encourage children's verbal expression and provides immediate feedback, making children active participants and storytellers. Adult strategies in dialogic reading are divided into two groups based on children's ages: for 2-3-year-olds and 4-5-year-olds.

Strategies for reading with 2-3-year-olds include: (1) using WH-questions to guide children in naming objects or understanding simple plot elements; (2) building on children's responses to ask related follow-up questions; (3) repeating children's answers with positive encouragement; (4) providing models when children have difficulty; (5) giving feedback on children's responses; (6) adjusting reading pace according to children's interests; and (7) making reading a fun activity. As children's abilities increase, more advanced strategies are introduced: (1) using open-ended questions; (2) expanding children's answers by adding information and syntactic complexity; and (3) maintaining children's interest by encouraging conversational turn-taking.

For 4-5-year-olds, adults use the PEER procedure (see) and CROWD prompt strategies (see). PEER stands for Prompt, Evaluate, Expand, and Repeat, where instructors use questions to elicit children's responses about story content, provide appropriate evaluation and expansion after children respond, and finally repeat the question to have children answer again to confirm their understanding. CROWD prompts include Completion Prompts, Recall Prompts, Open-ended Prompts, WH-Prompts (Who/Where/What/Why/How), and Distancing Prompts. These involve using sentence completion to practice target vocabulary, using open-ended and WH-questions to elicit appropriate responses, and using recall of story content combined with connections to life experiences to enhance learning retention, ultimately hoping children can independently serve as storytellers.

Dialogic reading is considered effective for improving young children's language and early literacy because children actively participate in reading, their engagement is reinforced, and adult feedback serves as an appropriate language model. Parent- or teacher-implemented dialogic reading can promote children's oral expression, such as increased frequency, richness, and depth of different vocabulary uses, with effects generalizing to different reading partners and children with varying language levels and socioeconomic backgrounds.

2.2 Related Studies on Interactive Reading Interventions for Oral Communication in Preschool Children with ASD

Due to the inherent social communication impairments in children with ASD, participating in interactive shared reading presents many challenges (such as joint attention, turn-taking, and eye contact). However, existing interactive reading intervention studies have demonstrated that with systematic instructional strategies from adults, children with ASD can successfully participate in reading activities and improve their ability to interact verbally with others.

The foreign literature reviewed in this study was searched via Google Scholar, limited to studies published within the 10-year period from 2012 to 2022, using keywords "reading interventions," "picture book," "autism," "oral language," and "early literacy." Twenty-two studies using reading interventions to improve outcomes for children with ASD were identified from electronic databases including APA PsycNet, Dialnet, SAGE, ResearchGate, Academia, ERIC, Society for Research in Child Development, OhioLink, and Open Access Theses and Dissertation. The search results showed that dialogic reading intervention and shared reading intervention appeared most frequently. Given the interest in improving oral language skills in preschool children with ASD, the age range was limited to 3-8 years, resulting in 12 studies using shared reading or dialogic reading interventions to improve oral language skills in preschool children with ASD. Although Bellon et al. (2000) was outside the search timeframe, it was included due to frequent citation in the identified studies. These studies are summarized in .

These studies used two interactive reading intervention methods to improve oral communication skills in preschool children with ASD, but differed in participant selection criteria, specific implementation procedures, and intervention outcomes, which are elaborated below:

(1) Participant Selection Criteria

Selection criteria primarily included ASD diagnosis, children's language abilities, age, educational stage, and reading interest. All studies required ASD diagnosis documentation, though sources varied: some used clinical diagnoses, others school or community diagnoses, and some did not specify diagnostic origin. Some researchers re-evaluated children using scales to confirm ASD characteristics before experiments. Two studies also recruited children with pervasive developmental disorder in addition to ASD. Regarding language level, most studies required children to express themselves using at least 2-3 words, though some had higher requirements. For example, Mucchetti (2013) required children to have a vocabulary of 20 words or fewer, while D' Agostino et al. (2018) required children to verbally communicate with adults for at least 10 minutes with prompting. Three studies required children to meet professional testing standards, including Fleury and Schwartz (2017), who required children to achieve at least a 2-year-old language level on the Peabody Picture Vocabulary Test and Expressive One-Word Picture Vocabulary Test, and Hudson et al. (2017), who set a minimum standard score of 55 on the Expressive One-Word Picture Vocabulary Test. Regarding age, only two studies required children to be no older than 6, while others did not specify but had participants no older than 8. For educational stage, only two studies explicitly required children not to have received primary education. Regarding reading interest, four studies required children to sit and participate in reading for 5 minutes, with three reporting parental indication of children's interest in reading or regular parent-child reading.

Studies by Mucchetti (2013) and Rodrigues-Queiroz et al. (2020) recruited the oldest children (ages 6-8) who were already in early elementary grades. Results showed increased frequency of correct responses to story-related questions for all children, with one participant in Rodrigues-Queiroz et al. (2020) able to actively ask story-related questions. The positive intervention effects may be related to relatively better cognitive abilities. D' Agostino et al. (2018) found increased active commenting frequency post-intervention, with generalization to new contexts, possibly related to their language level requirements. Additionally, in three parent-child reading studies, parents reported children's interest in reading and ability to sustain 5 minutes of engagement, and results showed significant increases in vocabulary level and speech frequency after interactive reading interventions. Therefore, one might hypothesize that children's cognitive abilities, language levels, and reading interest may positively influence interactive reading intervention effects—that is, children with better cognitive and language abilities and reading interest may show enhanced intervention outcomes.

(2) Specific Implementation Procedures

Studies varied in their implementation of interactive reading interventions, with some adding auxiliary strategies such as verbal prompts and visual supports, and a few employing additional intervention methods. Studies were evenly split between shared reading and dialogic reading interventions. Shared reading is an empirically supported activity suitable for early childhood development, with broad strategies including Bellon et al.'s (2000) scaffolding strategies (sentence completion, multiple-choice questions, WH questions, and expansion), Mucchetti's (2013) 9-step task analysis strategy (adapted from Browder et al.'s 10-step teaching procedure involving teacher modeling and child participation), Fissel's (2018) creation of rich teaching opportunities, D'Agostino et al.'s (2018) use of action prompts and verbal cueing systems to guide active commenting, and two parent-child studies focusing on strategies to promote vocabulary development, print concepts, story understanding, and narrative structure.

Dialogic reading is a more systematic and interactive method for improving oral expression, including traditional PEER (Prompt, Evaluate, Expand, Praise) procedures and CROWD prompts, as well as adapted strategies. Fleury et al. (2014) used traditional dialogic reading, while Whalon et al. (2015) combined RECALL strategies with dialogic reading, adding visual prompts and joint attention facilitation. Fleury and Schwartz (2017) added verbal prompts to traditional dialogic reading. Some studies combined interactive reading with other interventions, such as D'Agostino et al. (2018) adding token and tangible reinforcement to shared reading, Rodrigues-Queiroz et al. (2020) using differential social reinforcement in dialogic reading, and Hudson et al. (2017) incorporating phonological awareness interventions.

Given the social communication impairments and variable oral language abilities in children with ASD, interactive reading intervention studies modified traditional shared or dialogic reading methods to encourage active participation, such as simplifying questions and providing answer choices, and added auxiliary strategies like verbal prompts, visual supports, modeling, or reinforcement. Shared reading implementation strategies were more variable and flexible, while dialogic reading was more systematic and specific, though both lacked unified standards for quantification and evaluation, potentially affecting intervention outcomes for oral communication skills in children with ASD.

(3) Intervention Outcomes

Five studies used interactive reading interventions to promote overall improvements in literacy and language skills while addressing joint attention and maladaptive behaviors. Hudson et al. (2017) improved receptive and expressive vocabulary and phonological awareness through dialogic reading activities. Fissel (2018) created rich teaching opportunities in small-group reading activities, using prompting and modeling to increase joint attention and reduce maladaptive behaviors. Three parent-child studies focused on vocabulary, print concepts, story content, and narrative structure, finding that as parents increased their use of interactive reading interventions, children's use of different vocabulary

and speech frequency increased significantly.

Seven studies focused primarily on improving language skills in preschool children with ASD, building upon and innovating previous work. Bellon et al. (2000) used scaffolding strategies to reduce echolalia and increase spontaneous language in a single case study. Mucchetti (2013) used task analysis to increase correct question-answering frequency but measured only active responding, not spontaneous initiation. Fleury et al. (2014) similarly measured only active responding despite showing increased oral communication frequency. Whalon et al. (2015) first distinguished oral communication into active responding and active questioning/commenting, finding that three of four participants increased correct, spontaneous responding to factual and inferential questions, but only two increased active questioning or commenting. Fleury and Schwartz (2017) clarified operational definitions, dividing oral communication into active responding and active initiation (including questions or comments), finding increased active responding but no change in active initiation frequency. D' Agostino et al. (2018) used shared reading to promote active initiation (defined as pointing to a target while making a verbal comment), finding increased active commenting that maintained and generalized to new books. Rodrigues-Queiroz et al. (2020) used Fleury and Schwartz' s (2017) verbal prompting strategies in dialogic reading to examine active initiation, finding that one child actively asked contextually appropriate questions about story content or illustrations.

In summary, shared reading focused on overall improvements in literacy and language, while dialogic reading focused on oral communication, clarifying operational definitions of active responding and active initiation and quantifying both behaviors separately. Two dialogic reading studies promoted active initiation in some children, but with small samples—Whalon et al. (2015) had only 2 of 4 participants increase active questioning/commenting, and Rodrigues-Queiroz et al. (2020) had only 1 of 2 participants initiate communication. Therefore, interactive reading interventions show positive effects on improving active responding but require further research on promoting active initiation.

Among the 12 studies, Bellon et al. (2000) was a case study, Fissel (2018) was a group intervention, and the remaining 10 used one-on-one formats. Three were parent-child studies where researchers trained parents to implement interventions at home, four trained special education teachers or psychologists, and others were researcher-implemented. Sample sizes varied from single cases to 133 children in Hudson et al. (2017), the largest and longest study. Only three studies included control groups (Hudson et al., 2017; Westerveld et al., 2017; Westerveld et al., 2021), and only four examined maintenance and generalization (Whalon et al., 2015; D' Agostino et al., 2018; Westerveld et al., 2017; Westerveld et al., 2021). Thus, while interactive reading can be used in both case studies and group interventions, implementer type, sample size, and experimental design may affect outcomes, requiring examination of implementation fidelity.

Despite variations in selection criteria, procedures, and outcomes, these 12 stud-

ies demonstrate that interactive reading interventions positively impact vocabulary development, oral interaction, and joint attention in preschool children with ASD, making it a worthwhile approach for improving language skills. The studies represent continuous exploration and innovation in oral communication for children with ASD, including verbal turn-taking, nonverbal sharing, and joint attention. However, current evidence shows positive effects on active responding but requires further investigation of active initiation, representing a future research direction.

3.1 Current Research Limitations

Differences in operational definitions of oral communication, prompting strategies, and experimental designs across interactive reading intervention studies affect measurement and evaluation, thereby influencing intervention effects on oral communication skills in preschool children with ASD.

(1) Inconsistent Operational Definitions of Oral Communication

Whalon et al. (2015) and Fleury and Schwartz (2017) divided oral communication into active responding and active initiation, with identical definitions for active responding (verbal answers to questions) but different definitions for active initiation. Fleury and Schwartz (2017) defined active initiation as verbal questions or comments, while Whalon et al. (2015) further distinguished: (a) verbal questions/comments and (b) nonverbal showing/sharing, such as pointing to books. D'Agostino et al. (2018) included only active initiation, defined as pointing to a target while making a verbal comment. These definitional differences affected results: Fleury and Schwartz (2017) found increased active responding but no change in active questioning/commenting; Whalon et al. (2015) found increased active initiation in 2 children but did not specify whether this was verbal or nonverbal; D'Agostino et al. (2018) found increased active commenting that maintained and generalized. Thus, unclear operational definitions directly impact intervention effectiveness.

(2) Non-Standardized Prompting Strategies

Only some studies used appropriate prompting strategies based on children's language abilities. Whalon et al. (2015) used visual prompts, Fleury and Schwartz (2017) and Rodrigues-Queiroz et al. (2020) used only verbal prompts, while D'Agostino et al. (2018) used both. Although verbal prompting is less intrusive than physical assistance, children with weaker language skills may need visual prompts (e.g., pictures) before transitioning to verbal prompts. Different prompting strategies may thus affect intervention outcomes.

(3) Limited Examination of Maintenance and Generalization

Only two shared reading studies (D'Agostino et al., 2018; Westerveld et al., 2017) and one dialogic reading study (Whalon et al., 2015) examined maintenance and generalization, making it uncertain whether effects persist over time or generalize across contexts.

(4) Lack of Augmentative Communication Tools

While some studies allowed children to use symbols, pictures, or gestures to respond (e.g., pointing to symbols on answer boards or pointing to books), none provided evidence of children using these tools for active initiation. The inability of interactive reading to promote active initiation in all children may stem from insufficient augmentative communication support.

(5) Small Sample Sizes

Except for Hudson et al. (2017) with 133 participants, most studies had fewer than 10 participants, likely due to one-on-one formats and the challenges of working with children with ASD. Larger samples are needed to demonstrate generalizability.

(6) Few Randomized Controlled Studies

Only three studies included control groups (Hudson et al., 2017; Westerveld et al., 2017; Westerveld et al., 2021), limiting causal inferences about intervention effectiveness.

(7) Inadequate Outcome Measurement

Some studies used professional scales to assess autism severity and language ability pre-intervention but relied on parent, teacher, or clinician reports post-intervention without re-assessment, failing to fully demonstrate intervention effects.

3.2 Future Research Directions and Prospects

Based on these limitations, future interactive reading intervention research in China should address the following:

(1) Clarify Operational Definitions

Define oral communication as active responding and active initiation, with further subdivisions for active initiation (verbal questions, verbal comments, or nonverbal showing/sharing with verbal comments) and differential scoring.

(2) Implement Rigorous Experimental Designs

Include control groups to compare intervention methods and add generalization phases to demonstrate that active responding and initiation during intervention generalize to other contexts.

(3) Use Flexible Prompting Strategies

Adapt verbal or visual (picture) prompts based on children's language abilities, allowing children to use pictures for answering, questioning, or commenting to encourage active participation.

(4) Combine with Other Interventions

Integrate interactive reading with reinforcement strategies to manage maladaptive behaviors and promote verbal interaction.

(5) Measure Participation

Include observational measures of participation (e.g., looking at books/pictures, looking at teacher, turning pages, touching story props) and address maladaptive behaviors (e.g., self-talk, leaving activity, playing with unrelated objects).

(6) Adapt Materials

Incorporate answer boards, 3D teaching aids, sticky notes, and pictures to promote active verbal interaction.

(7) Increase Sample Sizes and Use Rigorous Measurement

Implement interventions with larger samples and employ more stringent assessment methods.

Interactive reading is a simple, feasible intervention for both case studies and group settings that can be implemented in schools or homes. Future research should empirically investigate its effects on oral communication, particularly active initiation, in Chinese preschool children with ASD, optimizing procedures through clear operational definitions, auxiliary strategies, maintenance and generalization phases, and participation measurement.

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Note: Figure translations are in progress. See original paper for figures.

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