

Critical Review:

The effects of shared reading interventions on language outcomes in children with Autism Spectrum Disorder

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This critical review examines the effectiveness of shared reading interventions on the language outcomes of children with Autism Spectrum Disorder. Study designs include single subject designs and randomized controlled trials. Overall, the research indicates that shared reading interventions are beneficial for some language outcomes in children with Autism Spectrum Disorder. Recommendations for future research and clinical practice are discussed in the review.

Introduction

Autism Spectrum Disorder (ASD) is considered one of the most common developmental disorders, and affects roughly 1 in 66 Canadian children and youth (NASS, 2018). It is a disorder which is characterized by challenges in communication and social skills (American Psychiatric Association, 2013). ASD has a highly heterogeneous population, as the disorder can range on a spectrum from mild to severe, depending on its impact on an individual's daily life. Many children with this disorder face communicative challenges on a daily basis, including difficulties with their expressive and receptive language skills. They may present with difficulties in reading comprehension, oral language, and phonological awareness (D'Agostino et al., 2018). Children with ASD are also known to have difficulties with joint attention and reciprocal social interactions, as well as being able to attend and participate for extended periods of time in an activity. These are all skills which are used during shared reading interventions (Fleury & Schwartz, 2017).

Shared book reading intervention is a well-researched method for intervening in the early language and literacy development of young children (Coogler et al., 2018). It is an interactive approach that involves an adult/caregiver reading aloud to a child while encouraging verbal interaction through the use of prompting, questioning, and discussions (Mucchetti, 2013). Shared book reading is positively correlated with levels of phonological awareness, oral language, and print awareness in young children, which are all skills that predict future reading success. Studies have revealed the occurrence of these positive language and literacy outcome effects in both typically developing children and children with language disorders (Hudson et al., 2017). In studies of children with language impairments, shared reading intervention has been found to

increase verbal turns, semantic and grammatical complexity (Crowe, Noris, & Hoffman, 2000), verbal response rate to questions, and increased vocabulary and MLU (Dale, Crain-Thoreson, Notari-Syverson, & Cole, 1996). There is a small body of growing research on how this type of intervention also affects the language outcomes of children with ASD. It is important to examine the existing literature to determine whether shared reading interventions can have a positive effect on the language outcomes of children with ASD and whether this is an appropriate treatment method for this population.

Objectives

The primary objective of this paper was to critically evaluate existing literature regarding the effects of shared reading interventions on language outcomes in children with Autism Spectrum Disorder. The secondary objective is to propose clinical implications and recommendations for future research.

Methods

Search Strategy

Computerized databases including PubMed, PsycINFO, Medline, and Google Scholar were searched using the following terms:

(shared reading) OR (dialogic reading) AND
(child) OR (preschool) AND (autism)

The search was limited to articles written in English.

Selection Criteria

Studies selected for inclusion in this review paper were required to measure or describe language outcomes of children with ASD in interventions involving shared reading of a text with an adult.

Data Collection

Results of the literature search yielded 6 articles congruent with the selection criteria mentioned above. Study designs included one randomized controlled trial and five single subject designs.

Results

Single-Subject designs

Single-subject designs are designs in which the subject's behaviour is measured during a baseline control period, followed by manipulation during a treatment period. A change in behaviour from baseline to treatment demonstrates effectiveness of the manipulation. These designs are advantageous in studying heterogeneous populations, and therefore are appropriate methods for testing hypotheses related to individuals with ASD. However, interpretation of the results from this type of design must be made cautiously due to the small sample size.

A study conducted by **Fleury and Schwartz (2017)** examined the effects of a modified dialogic reading intervention on oral language outcomes for children with ASD. They evaluated its impact on the verbal participation and expressive vocabulary of nine preschool children, using a variation of a multiple baseline design across groups, with single-subject design methodology. Following an established baseline over 4-7 weeks, participants received individual intervention four times a week for five weeks. Verbal participation was assessed through videotapes of the sessions and was appropriately coded, and probes were used twice a week for expressive vocabulary measures.

This study used specific and appropriate selection criteria which was adequate for the design. Individual information on all participants was provided. The authors administered standardized language tests prior to intervention, as well as the Gilliam Autism Rating Scale (GARS; Gilliam, 2006) in order to provide further characterization of the participants.

Treatment proceedings were appropriate for the design. Interventionists used in this study were paraeducators who were familiar with the students in this study, and intervention took place in their classroom, which provided a natural environment for treatment. Appropriate methods were used to select the books for this study, and books were randomized between baseline and intervention sessions.

Appropriate visual and statistical analyses were used to evaluate oral language participation during intervention. In order to evaluate the influence of ASD severity on reading participation, the authors created composite severity scores for the participants

and evaluated the data additionally on severity groups, which helped to account for the heterogeneity in this population. Results of these analyses indicated all children, regardless of the severity of ASD, significantly improved in their book-specific vocabulary knowledge. Participants also became more efficient at responding to questions and comments during reading, but made no changes in verbal initiation. Researchers also developed a social validity questionnaire for the paraeducators, who found the therapy to be beneficial to students and easy to implement.

Some limitations of this study were its lack of data on generalization and maintenance of the language outcomes evaluated. Therefore it remains unknown whether the learned vocabulary was maintained or generalized to other activities.

Overall, this study provided highly suggestive evidence that dialogic book reading can be an efficient intervention for increasing book-specific vocabulary and verbal responding in preschoolers with ASD.

Coogle et al. (2018) presented findings of a single-subject alternating treatments design in which they analyzed the effects of dialogic reading intervention with and without the use of technology enhanced books. They studied its effects on vocabulary acquisition when compared to baseline. Participants in this study included four preschoolers with ASD. Intervention consisted of a dialogic reading approach that targeted 10 specific vocabulary words, 1-4 times a week for a maximum of five sessions or until criteria were reached. A vocabulary probe was given following intervention, which consisted of the ten target words and four known words. Children were also tested on their definitional knowledge of the vocabulary items during baseline and maintenance phases.

This study was replicated across two books which were selected from the Dialogic Reading curriculum. Target vocabulary was randomly assigned to conditions for each participant, and the order of presentation of the books was randomized for each child to prevent order effects. Prior to intervention, participants were familiarized with the books and Surface tablet used during therapy, and the books were pre-recorded on the tablet for consistency purposes.

This study conducted appropriate visual analysis however did not supplement the study with any statistical analyses. Results of the analyses revealed that in both conditions participants showed improvements in vocabulary naming, and there was no conclusive evidence whether one intervention method was more effective than another. Three out of

four of the participants showed improvements in definitional knowledge. Results also revealed effective maintenance of vocabulary one week post intervention.

Due to time limitations, long-term maintenance and generalization were not measured. Also due to cancellations, intervention was sporadic for some participants. Another weakness is that the procedure to define the vocabulary items received no expert review as it was developed by one of the authors of this study.

The level of evidence offered by this study is suggestive that both paperback and technology enhanced dialogic reading interventions improve vocabulary acquisition in preschoolers.

Kim et al (2018) examined the effects of a shared reading intervention on narrative story comprehension in children with ASD. Following a single-subject multiple baseline across participants design, three students ages 6-8 were given individual treatment three times a week until criteria was reached. Comprehension was measured after each session by asking participants to answer ten multiple choice questions based on the narrative content of that session. The maintenance phase occurred three weeks post-intervention and was completed when participants achieved a stable or increasing trend in comprehension.

The selection criteria of the participants were adequate for the design, and the researchers provided descriptive individual information on all participants. All participants were able to verbally communicate with others and had decoding skills, so the effects of this study may not be generalized to all severity types of ASD.

The treatment setting took place in an autism clinic, and treatment was administered by a graduate student. It is possible that the lack of a natural setting may have impacted the testing results. For the intervention materials, researchers decided to use only 1 book, in order to control for difficulty level and increase experimental control. The storybook was chosen based on a variety of criteria, including grade level, pictures, format, and story setting, which were appropriate for the methods and outcome measures.

The researchers completed appropriate visual and statistical analyses. Results of these analyses revealed significant improvements in narrative comprehension for all participants, as well as maintenance of improvements over time. Social validity of the intervention was also evaluated through the use of questionnaires provided to the participants and their behaviour therapists. Results

revealed that this intervention method was enjoyable and beneficial.

A weakness of this study is its small sample size. As well, the study lacked measures of the participants' cognitive and language abilities through standardized assessments. This information would have helped to generalize the data to those with similar characteristics.

Overall, the level of evidence offered by this study is suggestive that shared reading intervention is effective in improving narrative story comprehension in children with ASD.

A study conducted by **Mucchetti (2013)** examined the effectiveness of a teacher-led adapted shared reading intervention on story comprehension in minimally-verbal children with ASD, when compared to baseline reading. The researcher used a multiple baseline across participants with alternating treatment design. Participants included four students with ASD, ages 6-8, and three teachers with special education teaching credentials. Students received 6-8 individual intervention sessions. Adapted shared reading included the use of props, visuals, and prompts, using 3 different books in alternating order. Comprehension was measured through six questions during the story reading. Students responded to questions by verbalizing, pointing, or removing a symbol/word from a response board and giving it to the teacher.

The author's use of appropriate screening and standardized measures for the participants provided adequate descriptive profiles of the students. As well, the use of a classroom setting and teacher-led intervention provided a more natural testing environment. The researcher established an appropriate baseline, and intervention was initiated with successive students at least three sessions apart. Although the majority of the treatment proceedings were outlined clearly, some aspects were missing, such as the length of intervention sessions and duration/intensity of the treatment period.

Appropriate visual and statistical analyses were conducted in this study. Results of these analyses revealed that all students had better story comprehension in intervention compared to baseline. Further, teacher feedback revealed that this intervention is easy to implement and meaningful for their students.

Overall, the level of evidence of this study is suggestive. It lends support for the use of shared reading interventions for minimally verbal students with ASD.

Whalon et al. (2015) evaluated the use of an adapted shared reading intervention called RECALL

(Reading to Engage Children with Autism in Language and Learning), which employs a prompting hierarchy and visual supports. They investigated its effects on correct spontaneous responding to fact and inference based questions and verbal and nonverbal initiations during shared reading, using a multiple baseline across participants design. Four participants with ASD ages 4-5 received RECALL intervention three days a week for 2.5 months. Intervention was provided by two doctoral students, and participants received intervention alongside a peer from their class, who served as an interactive reading partner. Sessions were videotaped and all of the child's responses during intervention were adequately coded for analysis.

The treatment proceedings and data collection methods were clearly outlined in a way that was easily understood and allows for replication of the study. Adequate descriptive information of the participants was also provided, including results from standardized tests prior to intervention to assess their level of language and literacy skills.

The researchers completed an appropriate statistical analysis using effect size. Results of these analyses showed that all students decreased the frequency of incorrect responding, and increased their correct spontaneous responding to narrative content questions, when compared to baseline book reading. Gains were maintained for two of the participants. Three of the participants also improved their initiation frequency, but gains were gradual. Social validity questions revealed that teachers observed a positive impact of the intervention on the participants in the study.

Limitations of this study include its small sample size as well as a lack of generalization measures. Another limitation is that individual modifications had to be included for two of the participants due to behavioural challenges, and introduction of question initiation was introduced later on in their intervention, which could have affected the internal validity.

This study provided somewhat suggestive evidence that a dialogic reading intervention improves communication skills in young children with ASD. However, based on the findings of this study, this intervention may result in modest gains only.

Randomized Controlled Trials

Randomized Controlled Trials are studies in which the subjects are randomly assigned to experimental or control groups. An advantage to this study design is that the randomization prevents skewing and removes bias from the results.

Hudson et al. (2018) conducted three consecutive randomized controlled trials to evaluate the effectiveness of interactive book reading and phonological awareness interventions on the vocabulary and emergent literacy of preschoolers with ASD. A total of 133 children from 57 classrooms across all three cohorts participated in this study. Participants received intervention 3-4 times a week for 7-15 minutes per session, over 20 weeks. For each cohort, children were randomized to one of two conditions. In Cohort 1, the two conditions were interactive book reading (IBR) or control group, in Cohort 2 they were phonological awareness (PA) or control, and Cohort 3 was IBR or PA. Appropriate standardized tests were administered pre and post treatment to measure expressive and receptive vocabulary, listening comprehension, and phonological awareness. However, these tests are normed on a typically developing population and results may not have fully captured the growth of the participants.

The authors provided adequate descriptions of inclusion criteria as well as detailed participant demographics. Selection criteria for this study did not require a clinical diagnosis of ASD by a psychologist or physician, rather identification by the school district. This may have affected treatment results; however the authors argued that they wanted a sample that was representative of preschoolers in public school programs, in which many individuals don't receive a clinical diagnosis until later in life.

The treatment proceedings were clearly outlined in a way that is easily understood and allows for replication of the study. Treatment took place in the natural setting of the classroom; however the study could have benefited from using interventionists that were school personnel rather than outside tutors. This study increased their experimental control by controlling for time spent on classroom activities that were similar to the interventions.

The researchers used appropriate statistical analyses in this study. Results of these analyses showed that children in the IBR condition had significantly greater improvements in receptive and expressive vocabulary, as well as listening comprehension, whereas those in the PA condition showed significant improvements in phonological awareness. The results revealed generalization of children's vocabulary and comprehension skills, since effects were tested on broad measures of the skills, and not specific to the books themselves, which is a strength of this study.

Overall, this study provides highly suggestive evidence that interactive book reading is

an effective intervention for improving vocabulary and comprehension skills in children with ASD.

Discussion

A critical analysis of the existing literature revealed that shared reading interventions have positive effects on the receptive and expressive language of children with ASD, including improvements in expressive and receptive vocabulary, listening comprehension, and verbal turn-taking. Additionally, the studies by Fleury and Schwartz (2017) and Mucchetti (2013) revealed that teachers and paraeducators may be easily trained to adequately provide this type of intervention in the school setting.

However, inherent weaknesses of the single subject designs, such as small sample size and low generalizability to the population reduce the strength of evidence in this analysis. Another common limitation is that the studies analysed provided minimal data for maintenance and generalization of improved language skills. Three of the six studies provided maintenance data 1-3 weeks post intervention, but it was limited and there was no information on long term maintenance. As for generalization of language skills, all studies except for Hudson et al. (2018) used language measures for specific content of the interventions instead of standardized measures. While these results should be interpreted with some caution due to these limitations, overall the findings presented with suggestive and significant results.

Future Research Considerations:

In future studies of shared reading interventions for children with ASD, the following recommendations should be considered:

- a) Future research should employ study designs that incorporate larger sample sizes and use a control group to increase the confidence of clinical implementation.
- b) Use standardized language measures to determine the generalizability of results.
- c) Complete long-term follow up measurements to determine if improvements were maintained.
- d) Study the use of shared reading intervention in small groups and classroom wide.

Clinical Implications

The studies presented provide overall suggestive evidence that shared reading intervention is an effective method for improving expressive and

receptive language abilities in children with ASD. Based on the findings of the review, it is recommended that shared reading intervention be considered as a possible language intervention method for children with ASD, and may be applied to the clinical setting as well as the classroom setting. Further, based on the findings of several studies in this review (Coogle et al., 2018; Fleury & Schwartz, 2017; Mucchetti, 2013; Whalon et al., 2015), the researchers suggest that employing adaptations to the intervention, such as the use of visuals and tactile objects, may help to keep children with ASD engaged in the intervention. These adaptations are ones that interventionists should consider in their practice.

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