

**Critical Review:
Effectiveness of parent-directed language intervention for preschool children with autism spectrum disorder**

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This review examines the published evidence examining the effectiveness of parent-directed language interventions for global language outcomes in preschool children with ASD. Although there is increasing evidence supporting the use of parents as interventionists when working with young children with ASD, a recent Cochrane review by Oono et al. (2013) found parent-directed interventions to be less effective than other forms of interventions or “business as usual” and waitlist control groups. The purpose of the present study was to re-examine the issue of parental intervention in light of more recent research. An updated review found nine randomized controlled trials looking at global language outcomes in preschool children with ASD.

Introduction

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder characterized by restricted and repetitive patterns of behaviours, deficits in social interactions, and difficulties in both verbal and nonverbal communication (American Psychiatric Association, 2013). In recent years, earlier identification of ASD has been made possible due to better and more reliable screening tools (Schertz, 2013). Early identification and intervention in the preschool years has been associated with better communicative outcomes later in life (Charman & Baird, 2002).

Due to the rising prevalence in ASD (Dawson et al., 2010), it is imperative that best treatment practices targeting communication for children with ASD be investigated and implemented at a young age. Many available intervention programs target communication skills through the instruction of communication strategies to parents (Casenhiser, 2013). Much of the available literature has suggested that parents can serve as effective interventionists. Research has shown that parental involvement in treatment allows for increased generalizability of skills due to continual learning opportunities for children (Burrell & Borrego, 2012; McConachie, 2007). McConachie’s (2007) systematic review of parent-implemented intervention for children with ASD revealed that parent training is effective for improving children’s communication skills, as well as parent-child interactions.

Despite the increasing evidence supporting the use of parents as interventionists, a recent Cochrane review found that parent-directed interventions generally do not result in better language outcomes compared to other forms of interventions, including waitlist or “business as usual” control groups (Oono et al., 2013). Upon investigation of the Cochrane review, only a limited number of the included studies actually reported

on language-related outcomes, as it also examined outcomes such as pragmatics, parent-child interaction, and child behaviour. Using an expanded number of studies, including studies published since the Cochrane review, the effectiveness of parent-directed interventions on global language outcomes was investigated in this review. For the purposes of this review, global language outcomes included syntactic and semantic language measures.

Objectives

The primary objective of this paper was to critically evaluate existing literature addressing the effectiveness of parent-directed language intervention programs for preschool children with ASD.

Methods

Search Strategy

Online databases including PsycINFO, Scopus and Eric were searched using the following terms: [(parent training OR parent education OR parents as teachers) AND (language OR communication) AND (intervention OR effectiveness OR efficacy) AND (autism OR ASD)]. Reference lists of searched articles were also examined to obtain relevant articles.

Selection Criteria

Studies included in this review had to a) involve a parent-directed intervention delivered individually or by group; b) include a communication/language coaching component; c) include random assignment to a “business as usual”, waitlist, or therapist-implemented comparison group; d) report at least one global language outcome at both pre- and post- intervention time-points; e) include participants with ASD/at-risk of ASD in both the parent-intervention and comparison group; and f) include participants with a mean age

within the preschool age range (<6 years of age). The search was limited to articles available in English.

Data Collection

This literature search yielded nine randomized controlled trials fitting the specified inclusion criteria.

Results

Randomized Controlled Trials (RCT)

Randomized controlled trials are considered to be the gold standard for research designs. RCTs more strongly validate research outcomes. Random assignment to intervention and control groups helps to control for bias and extraneous variables. Randomized controlled trials provide level-one evidence in accordance with the Oxford Centre for Evidence-based Medicine Levels of Evidence (2009), and greater confidence can be placed in the results of RCTs than other research designs. Although RCTs are very high quality studies, weaknesses may include higher time and monetary costs, and potential ethical issues of withholding treatment from the control group.

Carter, Messinger, Stone, Celimli, Nahmias, and Yoder (2011) conducted an RCT study evaluating the effectiveness of Hanen's *More Than Words*® intervention program on child pragmatic skills, parental responsivity, and child communication skills. For the purposes of this review, only the child communication outcomes were examined. A group of 62 children with ASD were randomly assigned to either the intervention or "business as usual" control group. Intervention using the *More Than Words* program consisted of parent training over 3.5 months in both weekly group sessions and three individual sessions. The intervention was a low-intensity and short-term program, and comprised less intervention hours than other studies included in this review.

Child and parent characteristics and details of the intervention procedure were described in detail. Participants were randomized effectively using random number generator software. Gold standard language tests were used to assess expressive and receptive language outcomes. Blinding of participants and researchers was not possible, however, researchers who coded language sample videos were blind to the treatment condition. High inter-observer reliability was reported. Appropriate statistical tests were employed in the analysis of results. Although a number of participants withdrew from the study and did not complete measures at all three measurement times, data from these participants were still included if they completed measures at baseline (Time 1) and at either Time 2 or 3. These were treated as "partial" intent to

treat. Results of the study revealed that the intervention group did not make statistically significant improvement in communication outcomes directly post-treatment (Time 2) or at nine month follow up (Time 3). However, a moderator variable effect of baseline object interest was found to affect outcomes. Children in the intervention group with more limited object interest at baseline showed more improvements in language.

The study provided compelling evidence that the *More Than Words* intervention did not significantly improve global language outcomes in all preschool children with ASD. However, it highlighted the effectiveness of the *More Than Words* program for children with low object interest at baseline.

Casenhiser, Shanker, and Stieben (2013) conducted an RCT to examine the impact of the MEHRIT intervention program on the social interaction and language skills of preschool children with ASD. This intervention focused on teaching children functional skills through caregiver involvement. Parent-training intervention was done with a therapist two hours per week, and the parent was then required to work on the targeted skills for a minimum of three hours per day for 12 months. Although language was targeted as part of the intervention, social communication skills received a larger focus. Participants in the control group received community treatment while on the waitlist for the intervention. Appropriate statistical analyses were employed to look at changes in social communication skills, parent behaviours and language. For the purposes of this critical review, only language outcomes were included, however no significant differences were found.

A group of 51 children and their parents, of which 25 were randomly assigned to the intervention group, participated in the study. Inclusion and exclusion criteria were clearly specified, and demographic information about the participants and their parents were reported. Researchers coding and scoring were blind to the treatment condition, but the nature of the study did not allow for blinding of participants. Objective gold standard language assessments administered by speech-language pathologists (S-LPs) were used, and developmental language quotients were constructed for each participant from the total scores of both standardized tests. Participants in the control group all received different community services, leading to heterogeneity in the control group's gains. Overall, this study provided compelling level-one evidence that implementation of the MEHRIT intervention did not lead to significant changes in global language outcomes of preschool children with ASD.

Dawson et al. (2010) conducted a study to investigate the impact of the Early Start Denver Model (ESDM) intervention on adaptive behaviour, autism diagnosis and language outcomes in preschool children with ASD. Although the primary focus of the ESDM intervention program was child behaviour, there was a language component to the intervention, thus allowing the study to be included in this critical review. The intervention program followed a detailed curriculum and was delivered in each participant's home by a trained therapist working with the parent five days per week for two-hour sessions over the course of two years. Parents were also asked to track their use of the ESDM strategies during daily activities. Participants in the "assess and monitor" control group received services in the community. Appropriate statistical analyses revealed significant gains in both expressive and receptive language outcomes, especially in the second year of the intervention.

A group of 48 children and their parents participated in the study, of which 24 were randomly assigned to the ESDM intervention group. Although three participants dropped out prior to completion of the study, only those who completed the two years of intervention were included in the analysis. Randomisation was achieved through the use of random permuted blocks of four. The study did not report much information about parent characteristics, although child demographics were noted. The study employed appropriate inclusion and exclusion criteria when selecting participants. Gold standard objective language tests were administered at baseline, one year after start of intervention (T2) and again after conclusion of the study (T3).

This study provided compelling evidence that implementation of the ESDM intervention lead to significant gains in receptive and expressive language outcomes. The results of this high quality study support the use of parents as interventionists in the treatment of preschool children with ASD, and extend to the importance of early intervention.

Green et al. (2010) investigated the effectiveness of a parent-directed communication-focused intervention on social and communication outcomes in preschool children with autism. A group of 152 children and their parents were randomly assigned to either the Preschool Autism Communication Trial (PACT) intervention group or to the community services control group. Participants in the intervention group received individualized biweekly two-hour sessions over the course of six months, followed by monthly boosters for six months. Parents were also encouraged to practice

using strategies at home with their child for 30 minutes per day.

Strengths of this study included a large sample size, the randomization process, detailed exclusion and inclusion criteria, high treatment fidelity and good inter-rater reliability. Other strengths included high adherence to treatment, detailed reporting of the intervention methods so replication would be possible, and rigorous data analysis on intention-to-treat basis. Although gold standard language measures were used, one of the two language tests was a parent-report measure, and these are inherently more subjective. Other limitations included low attrition to endpoint and lack of reporting on how treatment fidelity was measured.

Appropriate statistical testing was completed and although some small gains in receptive and expressive language outcomes were reported, these results were not significant. While the PACT intervention did yield significant improvements in parent-child interactions, this study provided compelling evidence that the PACT intervention did not significantly improve global language outcomes in preschool children with ASD.

Jocelyn, Casiro, Beattie, Bow, and Kneisz (1998) conducted an RCT to evaluate a community-based caregiver coaching intervention and its effects on language, caregiver knowledge about ASD, autism symptomology, and family functioning. For the purposes of this review, only the global language outcome measures were investigated. A group of 35 preschool children with ASD were randomized to either the Autism Preschool Program (APP) intervention or the "business as usual" control group. The intervention took place in community daycare centers and consisted of both individual and group sessions over 12 weeks. Both the children's parents and daycare workers participated in the intervention, and intervention consisted of three to six hours per week.

Detailed demographic and clinical characteristics of the sample were reported. All aspects of the study including participant selection, randomization, methods, and analysis were well documented and appropriate. Other strengths of this study included blinding of assessors to group assignment, and a large language component of the intervention. Limitations of the study included a small sample size of 36 participants with only 16 in the intervention group, an absence of reporting on treatment adherence, and a lack of gold standard outcome measures. The study employed four self-report measures and one developmental profile measure, but these measures are not yet well supported by research.

Appropriate data analyses revealed a statistically significant difference in global language outcomes between the intervention and control group after 12 weeks. This study provided highly suggestive evidence supporting the efficacy of the APP intervention for enhancing language development in preschool children with ASD.

Rahman et al. (2016) conducted an RCT study to examine the effectiveness of the Parent Mediated Intervention for Autism Spectrum Disorder in South Asia (PASS) in low-income and middle-income countries. The study took place at two sites: Goa, India and Rawalpindi, Pakistan. A group of 65 children who met criteria for ASD were randomly allocated to either the intervention or “treatment-as-usual” comparison group. Those in the treatment group participated in one-hour individual clinic or home sessions every two weeks for six months. The study examined both parent-child interaction outcomes and child language outcomes at baseline and post treatment; however, only the results of the child language outcomes were relevant to this review.

Recruitment, selection criteria and randomization of participants were described in great detail. Variables including treatment center and functional impairment were controlled for. The study employed a well-designed single blind RCT in which separation between the pre/post assessors and the intervention therapists was maintained. Assessors were blind to the treatment allocation. The intervention proceedings were clearly described, allowing for future replication. Another strength of the study was that it contributed to the limited data on children in ASD outside of North America. Gold standard language tests were used to assess pre/post global language outcomes, however all were parent report measures. Parent report measures are inherently more subjective and subject to bias than behavioural measures. The researchers acknowledged the study might have been underpowered to detect effects of intervention on the parent-report measures. Appropriate statistical tests were employed, and no significant differences in global language outcomes were found between the control and intervention groups. This study provided strong suggestive evidence that implementation of the PASS intervention did not significantly improve global language measures in children with ASD in low and middle income countries in South Asia.

Schertz, Odom, Baggett, and Sideris (2013) conducted an RCT study examining the effectiveness of the Joint Attention Mediated Learning (JAML) intervention program on social communication and language outcomes including turn-taking, responding to

joint attention, initiating attention, and receptive and expressive language. The JAML intervention is a parent-directed approach targeting preverbal social communication development within parent-child relationships. This intervention was delivered through 16 weekly home sessions over approximately seven months, and comprised of a combination of video examples, print materials, learning principles and recorded observations. Parents were also required to practice strategies with their child for 30 minutes per day. A group of 23 preschoolers were randomly assigned to either the JAML intervention or to the control group. Participants in the control group received services commonly available in the community, as well as a modified short treatment program following completion of post measures.

Strengths of the study included an extremely detailed account of the home visit sessions and study proceedings, detailed eligibility determination, use of multiple standardized outcome measures, randomization, and observational data being coded by blind assessors. Moreover, assessment and intervention were both conducted in the family home which provided a natural and authentic environment to capture an accurate picture of the participants’ abilities. Limitations of the study included a small sample size that likely underpowered the results, lack of diversity of participants leading to reduced generalization, and the fact that the language measures used were subtests of general child development and adaptive behaviour measures rather than language-specific assessments.

Appropriate statistical tests revealed significant intervention-x-time interactions for receptive language and for a general communication sub-test for participants in the intervention group. Expressive communication measures showed a moderate effect size favouring the intervention group, and a study with more power may have been able to detect significant differences. Overall, this study provided compelling evidence that the JAML intervention lead to improvements in global language measures in preschool children with ASD.

Solomon, Van Egeren, Mahoney, Huber, & Zimmerman (2014) examined the effectiveness of the Play and Language for Autistic Youngsters (PLAY) intervention on parent-child interaction, parent stress, language and development, and autism symptomology in young children with ASD. The study conducted an RCT in which a group of 128 children and their parents were randomly assigned to either the intervention or community services control group. This parent-directed intervention was delivered through individual sessions and consisted of three-hour monthly parent coaching

sessions for one year. Video-recording, modeling, coaching and written feedback were provided throughout the sessions.

Effective randomization, a large sample size, appropriate inclusion criteria, high treatment fidelity, blinding of assessors and high inter-rater reliability were strengths of the study. Additionally, the study reported their power analysis used to determine appropriate sample size for recruitment. Gold standard language measures were used to examine pre/post global language outcomes. Rigorous statistical analyses were also completed, however, no significant differences were found between groups. Overall, the study provided compelling evidence that the PLAY intervention did not yield significant changes in global language scores.

Tonge, Brereton, Kiomall, Mackinnon, & Rinehart, (2014) conducted an RCT evaluating the effectiveness of two different levels of language intervention on adaptive behaviour, parent stress and language outcomes in preschool children with ASD. Only global language outcomes were examined for the purposes of this review. Each intervention level was evaluated against each other and against the control group receiving regular community services. The first intervention level, Parent Education and Behaviour Management (PEBM), followed a detailed manual with accompanying skills training practice with both the parent and child. The second intervention level, Parent Education and Counselling (PEAC), received the same manual-based education programme, however, no skills training was provided, and parents attended sessions without their children. Intervention took place over 20 weeks, and participants in both intervention groups received 1-1 ½ hours of intervention per week, in both individual and group sessions.

Strengths of this study included a large sample size of 105 preschool children, who were randomly assigned by computer software to one of the three conditions. Two levels of intervention also added to the strength of the study, as it allowed investigation of the effectiveness of the skills training component. The researchers were rigorous in their analysis of the data and described how they handled participants who dropped out by replacing them with equivalent stratified cases. Steps were taken to maintain treatment fidelity and these steps were described in detail. Weaknesses of the study included a very limited description of the exclusion or inclusion criteria, and the fact that only one test was used to measure language outcomes. Additionally, unlike other studies included in this review, the post intervention (T2) measures were

completed at six-month follow-up, rather than immediately following completion of the intervention.

Appropriate statistical tests were employed and treatment comparisons and individual contrasts between the groups were not significant for global language outcomes. However, significant differences were found between group and pre-treatment scores, indicating that the effect of the intervention on language outcomes was dependant on pre-test level of communication skills. The PEBM intervention was associated with greater improvements for increasing global language skills for children with larger pre-test communication delays. Overall, this study presented compelling evidence that the PEBM intervention was more effective than the PEAC or control group on global language outcomes for children with greater baseline language delays.

Discussion

This critical review found mixed results for the effectiveness of parent-directed interventions on global language outcomes in preschool children with ASD. Three studies found significant improvements in global language outcomes for children in the treatment group following intervention (Dawson et al., 2011; Jocelyn et al., 1998; Schertz et al. 2013). Four studies found that the treatment group did not make significant gains in global language measures post intervention (Casenhiser et al., 2013; Green et al., 2010; Solomon et al., 2014, Rahman et al., 2016). Finally, two studies found no significant differences between groups post intervention, however a moderator variable effect was found to cause significant differences in favour of the intervention group (Carter et al., 2011; Tonge et al., 2014). Specifically, children in the intervention group who had greater language delays at baseline showed significant improvements on global language measures post intervention.

The mixed findings of this review suggest some support for parent-directed language interventions. Interestingly, interventions that did yield significant differences in the treatment groups' global language outcomes tended to be more intensive, included individual delivery, and required greater daily parent practice. No negative effects of the parent-directed interventions were found. Overall, high levels of evidence support the findings of this critical review, as all studies in the review were well designed RCTs providing strong level-one evidence.

Clinical Implications

The importance of early language intervention in children with ASD cannot be overstated. The overall

mixed findings from this critical review suggest support for both parent-directed interventions and community services implemented by therapists, as most studies in this review compared intervention to a community services control group. Upon examination of the interventions included in this review, important variables for clinicians to consider when implementing parent-directed interventions include length, intensity and focus of the intervention, delivery method, and language assessments used for pre/post measures. These variables differed in each intervention, so their effects could not be directly compared. However, these variables should be taken into account when designing or implementing interventions in clinical practice. Future research is still required to further investigate full effectiveness of parent-directed language interventions. However, for the time being, clinicians can consult reviews such as this one to examine the effectiveness of specific parent-directed interventions.

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