

Critical Review:
The impact of social-pragmatic treatment approaches on the language and communication skills of preschool-aged children with autism spectrum disorder

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This critical review examines the effect of social-pragmatic treatment approaches on the language and communication skills of preschool-aged children with autism spectrum disorder (ASD). Study designs include three randomized controlled trials, two controlled trials, and three quasi-experimental cohort studies. Results revealed some inconsistencies in findings across studies. However, overall, research suggests positive outcomes for the broad category of social-pragmatic treatment approaches in the promotion of language and communication skills for this group of children.

Introduction

Autism is a developmental disorder that interferes with a person's ability to communicate and engage in social interaction (Nicolosi, Harryman, & Kresheck, 2004). Social-pragmatic treatment approaches represent a group of interventions that aim to facilitate the communication and language abilities of preschool-aged children with autism spectrum disorder (ASD). These approaches, which came out of the pragmatics revolution in the late 1970s, emphasize a naturalistic approach to therapy. That is, activities and events that occur naturally in the child's daily environment and routines represent the ideal context for learning (Prizant & Wetherby, 1998). As a result, social-pragmatic interventions adopt a 'train-the-trainer' philosophy, in which the caregivers of children with ASD are taught strategies to facilitate their child's communication development, which they then use within their day-to-day interactions with their child. These approaches are also described as being developmental in nature, requiring instruction to be tailored to the child's developmental stage.

According to Aldred, Adams and Green (2004), the social-communication difficulties common to children with ASD are often manifested in weak or poorly timed communicative signals, which "draws parents into a didactic controlling style of discourse" (p. 1421). Social-pragmatic treatments promote a facilitative interaction style between caregivers and their children. Increased caregiver sensitivity for both verbal and non-verbal communicative attempts is typically the focus. Facilitative interaction involves following the child's interests and motivations, responding unconditionally to communicative attempts and the meaning behind them, modeling communicative functions, expanding and elaborating on the child's communication, and adjusting language to the child's level. This interaction

style has been shown to increase the motivation and participation of young children compared to more directive interaction styles, which have been shown to have the opposite effect (Prizant & Wetherby, 1998). Often, social-pragmatic approaches also target joint attention and joint action routines, as these skills are considered vital to emerging communication and language ability (Aldred et al., 2004).

Social-pragmatic approaches are frequently contrasted with behavioral approaches, which emphasize repetitive practice of separate skills within an operant learning paradigm (Prizant and Wetherby, 1998). Behavioral approaches, particularly Applied Behavioral Analysis (ABA), are currently the most common early treatments for children with ASD, and are also the interventions that receive the most government support and funding. Research into the effectiveness of behavioral interventions is certainly more plentiful than for social-pragmatic interventions (Rogers & Vismara, 2008). Yet, there exist a small and growing number of research studies examining the effectiveness of using social-pragmatic approaches with children with ASD. Certainly, these approaches have been widely accepted into current clinical practice despite the paucity of research evidence that exists.

Approaches that utilize caregiver training have been praised for their cost-effectiveness and feasibility (Rogers & Vismara, 2008; Solomon, Necheles, Ferch & Bruckman, 2007). In fact, Solomon et al., (2007) estimated the yearly cost of intensive treatment delivered by professionals to be between \$25,000 and \$65,000. Social-pragmatic approaches, which have caregiver training at their core, have the ability to provide a substantial therapeutic cost-savings, with professionals assuming a less direct, consultative role. Obviously, this has important implications for governments providing funding to early intervention

programs, as well as for parents of children with ASD who may not be able to afford other more direct treatment options.

Objectives

The primary objective of this paper is to critically evaluate existing literature on the effectiveness of social-pragmatic treatment approaches on the language and communication skills of young children with ASD. The secondary objective of this paper is to provide recommendations for future research endeavors in the area of social-pragmatic treatment approaches for language and communication development in children with ASD.

Methods

Search Strategy

Computerized databases, including ERIC PlusText, PsychINFO, Proquest, and PubMed, were searched using the following strategy: ((autism)) or ((ASD)) AND ((intervention)) or ((treatment)) AND ((developmental)) OR ((relationship)) OR ((pragmatic)). Reference lists of articles were hand searched for further relevant studies.

Selection Criteria

Studies selected for inclusion in this critical review paper were required to examine the impact that a naturalistic, developmentally-focused, social-pragmatic treatment approach had in fostering language and/or communication skills in preschool aged children with ASD. The search was limited to studies that employed an experimental or quasi-experimental research design.

Data Collection

Results of the literature search yielded the following eight studies: three randomized controlled trials (RCT), two controlled trials, and three quasi-experimental cohort studies.

Results

The following studies are ranked in order of credibility.

Aldred, et al., (2004) investigated the effectiveness of a social communication intervention using an RCT study design. Participants in the study were 28 young children with a clinical diagnosis of autism, stratified for age and baseline severity. The children were randomly assigned to either the experimental group or the control group. The experimental treatment group (n = 14) received the social communication intervention along with routine care, whereas the control group (n = 14) received routine care only. The social communication treatment

aimed to increase joint attention, parental sensitivity and responsiveness, and parental adapted communication strategies. Children were assessed, using multiple standardized assessment tools, by raters blind to the subjects' group status prior to commencing intervention and at a 12-month follow-up.

The authors completed analyses of 5 separate dependent measures using various statistical procedures. Analysis of covariance (ANCOVA) using children's chronological age and severity at baseline as covariates was conducted to assess the impact of the treatment on autistic symptoms as measured by the Autism Diagnostic Observation Schedule (ADOS). Results of this analysis revealed a significant treatment effect ($F = 10.3$; $p = 0.004$) for the 'reciprocal social interaction' subdomain of the ADOS, but not for the 'communication' subdomain. Analysis of language outcomes, as measured by the MacArthur Communicative Developmental Inventory, revealed that the experimental treatment group made significantly greater gains in expressive language skills ($F = 18.5$; $p < 0.001$) as compared to the control group. However, a non-significant difference between groups was found for language comprehension ($F = 2.93$; $p = 0.1$). This discrepancy in findings for expressive and receptive language is difficult to interpret. Video recordings of parent-child interaction during free play sessions were analyzed for frequency of child communicative acts and joint attention. Results of the analysis revealed a significant increase in child communicative acts ($F = 4.65$) for the treatment group as compared to the control group. No significant differences were found between the groups on levels of child joint attention ($F = 1.70$; $p = 0.204$).

The results of this study revealed positive changes in social engagement, reciprocity, communication and language skills for a group of children with autism with varied verbal and cognitive ability. While this study has many strengths, particularly with regard to methodology and research design, interpretation of the results should be guided by consideration of the study's weaknesses. The large number of dependent measures utilized in the study greatly increased the probability of a Type I error occurring. Thus, the statistical chance of any one result reaching significance was increased, weakening the statistical strength of the study's findings. Further, the researchers relied on a parental report measure to determine improvement in language skills (MacArthur Communicative Developmental Inventory). As noted by the researchers, the social communication intervention received by the treatment group may have increased parental awareness and observation of language skills, potentially resulting in a biased evaluation of language ability.

While the above-mentioned limitations reduce confidence in the findings, the study's methodological strengths provide strong evidence in support of a social-pragmatic treatment approach. Further, the fact that positive outcomes were seen in children of varied age and skill levels suggests that this intervention may be capable of accommodating the heterogeneous nature of ASD, a finding of particular clinical relevance.

Jocelyn et al., (1998) conducted an RCT study examining the effectiveness of a community-based treatment model that emphasized facilitating the language and social development of 35 young children with autism or Pervasive Developmental Disorder - Not Otherwise Specified (PDD-NOS). The children were randomly assigned to either an experimental treatment group or a control group. Children in the experimental treatment group ($n = 16$) received a 12-week intervention program consisting of parent and daycare worker training in addition to standard day care. Children in the control group ($n = 19$) received standard day care only. The experimental treatment focused on providing caregivers with general information about autism, as well as teaching strategies to engage the children communicatively and socially. Children were assessed prior to initiating treatment and again at a 12-week follow-up by a researcher blind to the children's group assignment.

Multivariate analysis of variance (MANOVA) was used to compare the pre- and post-test assessment results between groups on measures of receptive and expressive language. No significant differences between the experimental and control groups were found on a dual psychologist and parental report measure of autistic symptomology, which included a language subtest (Autism Behavior Checklist) ($p = 0.28$). However, a statistically significant difference between the two groups was detected on the language subtest of a developmental assessment tool (The Early Intervention Developmental Profile: ages 0-36 months; The Preschool Developmental Profile: ages 36-60 months) ($F = 0.87$; $p = 0.008$). Language ability was the only sub-skill found to improve on this measure following the experimental intervention, suggesting that language skills might be particularly amenable to a social-pragmatic treatment approach.

This study showed a positive outcome for a social communication treatment approach on language ability in a relatively short period of time (12 weeks). However, an Internet search revealed a paucity of information outlining the purpose, reliability, validity, and normative data of both the Early Intervention Developmental Profile (EIDP) and the Preschool

Developmental Profile (PSDP). Without this information it is difficult to evaluate the appropriateness of using these assessment tools for this study. As well, the fact that language ability did not improve on an alternative assessment tool (Autism Behavior Checklist) brings into question the validity of the EIDP and the PSDP and their current findings. The study's positive result may have been an artifact of the outcome measure selected rather than a true improvement in ability. However, the time period for intervention was short. A longer pre- and post-treatment interval may have yielded additional positive outcomes. The authors acknowledged the statistically significant number of single parents in the control group ($p = 0.047$) as another limitation of the study. This difference in family composition may have impacted the study's results, thereby reducing the generalizability of the findings.

These limitations certainly weaken the level of evidence provided by the study. Yet, a high-level research design and the finding of improved language outcomes following a markedly short intervention period impart a moderately-strong level of evidence and significant clinical importance to the study's results.

Drew et al., (2002) sought to explore whether an intervention program that employed a social-pragmatic approach to language intervention would result in better communication skills than children receiving local services only. Twenty-four primarily nonverbal children diagnosed with ASD were included in this RCT study. The children were randomly assigned to either the experimental treatment group or the control group. The experimental treatment group ($n = 12$) received the social pragmatic intervention along with local services, whereas the control group ($n = 12$) received local services only. The social-pragmatic treatment approach focused on teaching parents various social communication strategies such as the promotion of joint attention and joint action routines, imitation, non-verbal requests and turn-taking games. The children were assessed prior to commencing the intervention and again approximately 12 months later.

ANCOVA using the children's age as a covariate was conducted to examine the effect of the treatment approach on language ability. Results revealed a non-significant treatment effect for language comprehension as measured by the MacArthur Communicative Developmental Inventory ($F = 3.1$; $p = 0.09$). In terms of expressive language, no statistically significant group differences were found on this same measure of language development. However, a statistically significant treatment effect for expressive language as measured by the Autism Diagnostic Interview-Revised

was found. In particular, more children in the treatment group developed speech (single words and phrases) than in the control group. Once again, this inconsistent result for expressive language, as measured by two separate assessment tools, is difficult to interpret.

While this study was useful in revealing minor positive effects of a social-pragmatic treatment approach, there were significant limitations that restricted the ability to draw compelling conclusions. Most notably, pre- and post- intervention assessments were not conducted by examiners blind to each child's group status, posing a threat to both the internal and external validity of the study. The authors identified several other potentially confounding variables. Firstly, the experimental treatment group possessed a significantly higher baseline non-verbal IQ than the control group ($F = 14.8$; $p < 0.001$), making it difficult to attribute the treatment effects to the social-pragmatic intervention rather than to a fundamental group difference. The authors cited the lack of treatment fidelity measures as another limitation of the study. Specifically, the study failed to control for consistency of treatment protocols across subjects in the experimental group. Further, the study relied on parental report measures for evaluating the effects of the treatment on language ability. Generally, parental report measures are considered less reliable than more objective, behavior-based assessment tools. Lastly, during the course of the study, 3 children in the control group commenced home-based behavioral intervention programs. Although the researchers utilized the intention-to-treat principle for these participants, the presence of an intensive alternative treatment approach offers an additional threat to internal validity, which was further compounded by the study's small sample size.

Taken together, these limitations considerably weaken the level of evidence provided by this study. Accordingly, very few clinical applications can be drawn from these results.

Salt et al., (2002) evaluated the effectiveness of a social-developmental intervention program designed to promote non-verbal communication, imitation, language, and social interaction in children with autism. Twenty children diagnosed with autism were included in this controlled trial study. Children were categorized into either a treatment group ($n = 14$) or a waiting list control group ($n = 6$). Assessment took place prior to initiating treatment and again at a 10-month follow-up by a rater blind to the children's group status.

MANOVA was conducted to examine group differences in child functioning and development. Follow-up results showed that children in the treatment

group demonstrated significantly better adaptive skills as measured by the Vineland Adaptive Behavior Scales. However, no significant differences were found between groups on the communication subtest of this measure. Further, study results failed to reveal a significant difference between groups on a measure of expressive and receptive language ability (MacArthur Communicative Development Inventory). Rather, both the treatment and the control group were observed to make language gains. Although no significant differences were found on a direct measure of language ability, a significant treatment effect was found on a measure of motor and vocal imitation ($F = 4.6$; $p < 0.05$). Imitation is frequently cited as an important foundational skill for receptive language and communicative skills. A videotaped observation measure was employed to assess improvement in non-verbal communication ability (Early Social Communication Scales). Children in the treatment group demonstrated significantly greater improvement on the sub-skills of joint attention ($F = 5.07$; $p < 0.05$) and social interaction ($F = 5.66$; $p < 0.05$). The third sub-skill, requesting, just missed statistical significance ($p < 0.6$).

While this study showed positive outcomes for several areas of development, non-significant differences were found on measures of both language and verbal communication ability. However, the researchers identified two important potential research confounds. Firstly, the control group possessed a significantly higher IQ than the treatment group at the study's outset ($F = -2.78$; $p = 0.01$). The comparable language gains of the treatment and the control groups may be partially attributed to this factor. Secondly, 3 of 5 children in the control group completed Hanen training while on the waiting list. The Hanen program is an independent social-pragmatic intervention focusing on language and communication development. Clearly, this factor had the potential to increase the control group's results, particularly for the measures of language and communication ability.

These potential confounds considerably weaken the validity of the study's findings. As well, the lack of randomization into groups prevents the ability to make causal links between the data, further weakening the level of evidence offered by this study.

McConachie et al., (2005) evaluated the effectiveness of the 'More Than Words' Hanen Center program. More Than Words is a social-pragmatic intervention designed to facilitate social communication for children with ASD. It should be noted that this intervention program is the same one that posed a confound in the previous study authored by Salt et al. (2002).

Participants in the study were 51 children with suspected ASD, stratified for diagnostic category. Stratification yielded two subgroups: 'core autism' ($n = 29$) or 'not core autism' (i.e., PDD-NOS ($n = 17$) or other early childhood developmental disorder ($n = 5$)). Children were categorized into either an immediate intervention group ($n = 26$) or a delayed control group ($n = 25$). The delayed control group consisted of children on the waiting list for the social-interaction intervention. Assessment took place prior to initiating treatment and again at a 7-month follow-up by raters blind to the children's group status.

ANCOVA using type of autism as a covariate was conducted to examine the effect of the treatment on language and communication ability. Follow-up results showed that the intervention group had a significantly larger receptive and expressive vocabulary size, as measured by the MacArthur Communicative Development Inventory, than the control group ($p < 0.001$). However, no significant differences were found between the groups on a measure of social-communication (Autism Diagnostic Observation Schedule).

In general, the findings of this study are mixed in terms of the differential impact of the treatment on vocabulary versus social-communication. Limitations of this study included use of a parental report measure to assess language ability (MacArthur Communicative Development Inventory) and the lack of randomization to create groups. In addition, participants were not required to hold a formal diagnosis of autism or PDD-NOS to be entered into the study. In fact, 5 participants included in the study were informally identified as having an early childhood developmental disorder other than ASD. This lack of participant control reduces the generalizability of the findings. Given these limitations, this study offers a moderate level of evidence.

Solomon, et al., (2007) investigated the effectiveness of the PLAY Project Home Consultation program (PPHC), which uses principles of the DIR/Floortime model approach. The PPHC is a social-pragmatic intervention focusing on the language, social, and behavioral deficits of young children with ASD. Sixty-eight children diagnosed with autism, PDD-NOS, or Asperger syndrome were included in this quasi-experimental cohort study. Children were assessed prior to initiating treatment and again approximately 12 months later.

Two-tailed paired t-tests were performed to identify changes in functioning after intervention. Results of the study revealed that children made significant gains on a general measure of social/pragmatic development

(Functional Emotional Assessment Scale – FEAS) ($p < 0.0001$). Specifically, the authors reported that 45.5 percent of children “made good to very good functional developmental progress” at follow-up (p. 216). While this assessment tool does not directly measure language or communication skills, the domains of communication and social interaction are incorporated into the general developmental score.

Results of this study suggest that the social-pragmatic treatment had a positive outcome on general development. Yet, the absence of a comparison group limits the ability to ascribe a causal relationship between the treatment and the increase in FEAS scores. Further, FEAS is an assessment tool created by developers of the DIR/Floortime model approach, and as such, was not an independent measure of functioning. Thus, this assessment tool might reflect improvement in skills directly targeted by the DIR/Floortime model intervention rather than actual developmental improvement. As noted by the researchers, future research endeavors would benefit from use of a more objective measure of development as well as the inclusion of more in depth and direct measures of language and communication ability. While these limitations certainly weaken the study's credibility, the large statistical result and a fairly large ($n=68$) sample size offer this study a moderate strength of evidence.

Mahoney and Perales (2005) examined the effectiveness of Responsive Teaching, a social-pragmatic treatment program targeting the developmental and socioemotional needs of young children. Parents of children in the program were taught strategies to engage their children in more responsive interactions. In this quasi-experimental study, children with pervasive developmental disorders (PDDs) were compared with children with various other developmental disabilities (DDs). Children were assessed prior to commencing intervention and again at a 12-month follow-up.

MANOVA was conducted to examine post-treatment changes in developmental functioning. Both groups of children were found to make significant gains in expressive ($F = 33.27, p < 0.001$) and receptive ($F = 47.40; p < 0.001$) language on an observational measure of development (Transdisciplinary Play Based Assessment). In addition, an analysis of variance (ANOVA) revealed significant improvements in persistence, attention, involvement/interest, initiation, cooperation, joint attention and affect, as measured by an observational assessment of behavioral engagement (Child Behavior Rating Scale) ($p < 0.001$).

Results of this study suggest that the social-pragmatic treatment approach was effective in improving both language and communication skills for children with PDDs. However, the absence of a control group limits the ability to attribute a causal relationship between the intervention and the findings. Further, the authors utilized non-standardized assessment tools, putting into question the validity and reliability of these instruments and their subsequent results. Overall, the study offers a moderate level of evidence.

Gutstein, Burgess, and Montfort (2007) conducted a study involving 16 children diagnosed with autism (n=5), Asperger syndrome (n = 7), or PDD-NOS (n = 4). This retrospective quasi-experimental cohort study examined the effectiveness of Relationship Development Intervention (RDI), an intensive cognitive-developmental intervention for young children with ASD. Pre-treatment data was available for 12 of the 16 children, and post-treatment data was available for all 16 children. Each child was assessed at a minimal 30-month follow-up.

MANOVA was conducted to compare the pre- and post-test assessment results. Results indicated that, as a group, the children improved significantly on both the 'communication' ($p < 0.0001$) and 'reciprocal social interaction' ($p < 0.004$) subdomains of the Autism Diagnostic Observation Schedule (ADOS). A significant treatment effect was also discovered on a parental report measure of autistic symptomology (Autism Diagnostic Interview – Revised (ADI-R)), which included the constructs of communication and social interaction ($p = 0.0001$). According to the researchers, these improvements in functioning resulted in a number of children no longer meeting criteria for autism as measured by the ADOS and the ADI-R.

The retrospective nature of the study, a small sample size, and the absence of a comparison group, are significant methodological weaknesses. In general, the sample of children included in the study was not representative of the typical population of children on the autism spectrum in terms of both IQ, which was required to be at least 70, and diagnosis (i.e., autism, Asperger syndrome, PDD-NOS). Further, as noted by the authors, families of children included in the analysis sought out the RDI program, which is an expensive and intensive treatment option. As a result, the subjects reflected a restricted and highly committed participant group. Additionally, this study's follow-up period was considerably longer than the follow-up periods utilized in the other studies described in this review, making comparisons about effectiveness difficult. Certainly other factors, such as maturation, could have contributed to the study's positive outcome during a

longer follow-up period. Lastly, potential researcher bias should be considered when interpreting the results. The study's main researcher is also the developer of RDI. Independent, neutral research would provide stronger evidence in support of this treatment.

Despite a strong statistical result in support of the RDI treatment approach, a comparably weak research design in conjunction with the above-mentioned limitations afford this study a moderately weak level of evidence. As a result, clinical application of these findings is difficult to evaluate.

Recommendations

While each of the studies reviewed demonstrated a positive outcome on the language and/or communication skills of young children with ASD, findings were somewhat inconsistent. For example, Aldred et al. (2004) found a significant treatment effect for expressive but not receptive language, whereas Salt et al. (2002) found non-significant results for both expressive and receptive language ability. Similarly, Drew et al. (2002) obtained discrepant results for expressive language using two separate assessment tools. Mixed findings could be explained by the diversity within the social-pragmatic treatment programs themselves. Programs might differ on critical variables such as the intensity of treatment offered and the strategies used, making comparisons difficult or even impossible. Inconsistent results could also be an artifact of the different assessment tools used across the studies. The types of assessment tools employed in the studies varied greatly in terms of standardization, normative population, level of formality, and the construct being measured. Lastly, many of the studies included children with diverse skills and cognitive levels, reflecting the heterogeneity of the disorder. However, if unaccounted for, factors such as severity of symptoms and IQ level could crucially alter a treatment's success.

As mentioned previously, the studies included in this critical review all employed an experimental or quasi-experimental research design. Inclusion of such high-level research designs increases the credibility of the studies' findings as a whole. Thus, although there were inconsistent findings with regards to language and communication outcomes, results generally suggest that social-pragmatic treatments improve these skills in young children with ASD. Yet, in order to clarify this relationship and further improve the level of evidence offered by the existing literature, additional research should be conducted. Future research should be directed towards better identifying the aspects of these approaches that are associated with positive outcomes.

As well, emphasis should be placed on distinguishing between the children who benefit the most from these treatments, and those who gain little from them. Lastly, future research should consider employing comparisons between social-pragmatic treatments and other, established treatments in terms of treatment effectiveness and cost benefit. Such comparisons would better clarify the clinical applicability of these approaches.

Clinical Implications

Despite inconsistent findings between some of the studies analyzed in this critical review, positive outcomes for language and communication ability were reported across the studies. Therefore, clinicians would be justified in using these approaches with children with ASD. However, it is vital that clinicians be cognizant of the shortcomings of the current research, particularly when applying these treatments to a diverse group of children with ASD.

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