Critical Review: Is a developmental social-pragmatic intervention approach beneficial in developing language and communication skills in children with autism spectrum disorder?

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This critical review examines the effect of developmental social-pragmatic intervention approaches on language and communication skill development in children with autism spectrum disorders (ASD). Study designs include two randomized clinical trials (RCT), three single-subject multiple baseline designs, and one case-series post test only design. Results of the studies examined revealed encouraging outcomes in the use of developmental social-pragmatic treatment approaches for children with ASD in the areas of language and communication.

Introduction

Autism is a "severe developmental disability in which core impairments in language and reciprocal social communication have a profound influence on children's social development into adulthood" (Aldred, Green & Adams, 2004, p. 1420). In the early 1990s autism diagnoses began to soar and as of 2009, 1 in 110 children in the United Stated have an autism spectrum disorder (ASD) (Centers for Disease Control and Prevention, 2009). With this growth the problem of finding effective intervention approaches takes on heightened urgency.

Early intervention approaches typically use a traditional behavioural approach, also referred to as discrete trial training or Applied Behavioral Analysis (ABA), and are also the interventions that receive the majority of government funding. Despite documented success in teaching highly specific skills using such approaches, several limitations have been noted: training occurs in highly structured environments which limits variability in teaching style to promote the generalization of learned behaviours and spontaneous use of skills, deterioration of learned skills without delivery of contingent reinforcement, limited maintenance of learned skills, and targeting isolated skills rather than in the context of other co-occurring social-communicative behaviours is not representative of natural adult-child interactions (Ingersoll & Schreibman 2006). Studies examining the effectiveness of traditional behavioural intervention approaches are more abundant in research than for developmental social-pragmatic approaches (DSP), however research is growing.

In response to criticisms that highly structured, behaviourally based programs may inhibit the spontaneous use of skills in children with ASD, there has been an increased interest in approaches that target spontaneous communication (Ingersoll, Dvortcsak, Whalen & Sikora, 2005). The National Research Council (2001) highlighted this interest by making functional, spontaneous communication its first educational priority for children with autism. The DSP treatment approach is a naturalistic strategy for teaching social-communication skills to children with ASD. (Ingersoll et al., 2005). DSP has been referred to as the interactive model, or the child-orientated approach. Included in this class of social-communication intervention strategies are specific interventions such as Hanen, the SCERTS model, and Floortime/DIR (Ingersoll et al., 2005).

The social-communication difficulties common in children with ASD include communication signals that are weak, infrequent, or poorly timed. Such behaviour tends to draw communicative partners into a didactic, dominating style of discourse which uses adult-orientated initiations and strategies to take over from the child's topic and control and redirect the child's focus of attention to that of their own (Aldred, Green & Adams, 2004). A DSP approach advocates increased sensitivity and responsiveness to the autistic child's verbal and nonverbal communicative intentions (Aldred et al., 2004). The DSP model is based on theory that language develops within affect filled interactions between the child and their communicative partner. Within activities and events that occur naturally in the child's environment, the adult engages in child-initiated interactions that are based on the child's interests and attention, with the adult arranging the environment to encourage initiations from the child (Ingersoll et al., 2005). Strategies are used to facilitate communication development by modeling communicative functions, elaborating and expanding on the child's communication, treating all communicative attempts, unconventional and preintentional, as if they were meaningful and purposeful, and adjusting language to that of the child's level (Ingersoll et al., 2005).

The DSP model rests on the processes and facts of typical language development to assure each child's acquisition of a symbolic language system and access to the empowerment and joys of social communication (Gerber, 2003). In the DSP model, the pre-linguistic developments that occur before the first words are as important to consider as the linguistic ones, because they set the path for the first words. Often in the DSP approach such skills as joint attention, joint action routines, imitation and symbolic play are targeted as

such skills are considered essential to language and communication skill development (Solomon, Necheles, Ferch, & Bruckman, 2007).

Objectives

The primary objective of this paper is to critically evaluate existing literature on the effectiveness of DSP intervention approaches on the language and communication skill development in children with ASD. The secondary objective of this paper is to provide future research recommendations in the area of DSP intervention approaches for children with ASD.

Method

Search Strategy

Computerized databases including CINAHL, PubMed, Proquest, Google Scholar, PsychINFO, ERIC and Sage were searched using the following search Terms: ((Autism) AND (developmental intervention)), ((Autism) AND (naturalistic intervention)), ((DIR/ Floortime) AND (autism)), ((Social communication) AND (autistic children), ((Naturalistic approach) AND (autism)), ((Autism) AND (communication), ((Naturalistic approach). Reference lists of articles were manually searched for further studies relevant for the purpose of the critical review.

Selection Criteria

Studies selected for inclusion in this critical review paper were required to investigate the impact that a DSP approach to intervention had on language and communication skill development in children with ASD. No limits were set on the demographics of research participants or outcome measure.

Data Collection

Results of this literature search yielded the following six studies: two randomized clinical trials (RCT), three single-subject multiple baseline designs, and one case-series post test only design.

Results

Aldred, Green, and Adams (2004) used a RCT, level 1 evidence, to examine the effectiveness of a social communication intervention approach with 28 young children with ASD. The treatment approach was used to measure if there were increases in shared attention, parental sensitivity, parental responsiveness, and adapted parental communication strategies that included elaboration, facilitative communication, consolidation and signaling pragmatic intentions at pre and post-treatment time intervals. The children were randomly assigned to the experimental treatment group (n=14) receiving the social communication intervention along with routine care, where the control group (n=14) received routine care from their families alone. The children were assessed using measures that tested various domains of outcome and used multiple approaches to data collection prior to intervention and once again at the twelve-month follow-up period.

Analysis of covariance (ANCOVA) was used to measure change between pre- and post-treatment ratings for each group. The children's symptom severity at baseline was measured using the Autism Diagnostic Observation Schedule (ADOS). The experimental treatment group as a whole demonstrated significantly greater scores than controls on ADOS scores ($p<.01$). More specifically, on the Reciprocal social interaction sub-domain of the ADOS, results revealed a significant treatment effect ($p<0.004$) by contrast no significant treatment effect was found in the Communication sub-domain. Further, the experimental group displayed significant progress with respect to expressive language skill development in comparison with the control group ($p<0.001$). The Vineland Adaptive Behavior Scales showed that there was no significant difference between the mean group scores for both groups ($p<121$). Parent-child interactions while engaged in free play using standardized toys were video recorded and analyzed and it was found that the experimental treatment group as compared to the control group showed a significantly better outcome in child communication acts ($p<0.41$) and an increase in child shared attention ($p<0.204$), although not significant.

This study showed gains in reciprocal social interaction and reciprocity, increased frequency and quality of child communication acts, and positive changes in social engagement. The strengths involved in this study include the wide spectrum of participants involved, broad range of methods used to measure outcomes and mediating variables in laboratory and everyday settings, all assessments were completed by blind raters, as well as randomization design. Limitations were also present including a small sample size, lack of diversity within the sample, and relatively short follow-up time. The authors provided fitting statistical analysis through appropriate measurement techniques and description of procedures. Therefore, this study provides compelling evidence that a DSP approach is beneficial in developing language skills in children with ASD.

Ingersoll, Dvortcsak, Whalen and Sikora (2005) used a single-subject multiple baseline design, level 1 evidence, to examine the effectiveness of a DSP language intervention approach on three young boys with ASD. The authors hypothesized that treatment outcomes would show increases in expressive language usage and generalization to interactions with the children's parents and maintenance of language skills acquired. Participants were randomly assigned to baseline lengths of two, four or six weeks in duration which consisted of free play with a therapist. After

baselines were completed, all participants recieved ten weeks of language therapy using DSP methods. Once per week during both baseline and treatment, generalization was assessed by observation during a ten-minute free play session with parents.

Visual analysis of participant scores were used to measure changes in the rates of spontaneous and appropriate language usage, as well as generalization and maintenance of skills using the Functional Emotional Assessment Scale (FEAS) at pretreatment, post-treatment and follow-up. Outcomes of this study showed that two of the children had made gains in their use of spontaneous language with generalization to novel settings and toys. The third child involved in the study made gains as well while participating in the study however due to his ascending baseline, it is unknown whether gains in his language skills were a result of the intervention, maturation, or some other factor. Two of the children involved exhibited increases in their rate of language usage with their parents during generalization sessions at the onset of treatment.

Strengths of this study include outcomes showing that nonverbal children with autism, who have been said to require a more structured approach to learning language and prerequisite skills, made gains in spontaneous language using DSP intervention. This study also showed meaningful outcomes by assessing the use of spontaneous functional communication, as recommended by the National Research Council (2001). Limitations include small sample size, lack of procedural fidelity and standardized assessment, and potential limitations in generalization data as two of the children's parents observed sessions and it is possible that they learned the treatment strategies through their observations. Other limitations include post-treatment data being taken one-month post treatment, and generalization of skills was not measured in the child's natural environment (i.e., home) therefore it is unknown whether changes in the children's language were reflective of true abilities or limited to the treatment environment. As a consequence of all of the limitations in this study, outcomes are equivocal in concluding that a DSP approach is beneficial in developing language and communication skills in children with ASD.

Ingersoll and Schreibman (2006) used a single-subject multiple baseline design, level 1 evidence, to examine the effectiveness of a naturalistic behavioural approach on five young children with ASD. The study aimed to increase reciprocal imitation which was hypothesized to lead to language, pretend play, and joint attention skill development. Baselines were systematically staggered every two weeks and lengths were randomly assigned and were between two and ten weeks in duration. Treatment consisted of five phases that lasted two weeks each.

One-way paired t-tests and visual analysis were used to measure treatment outcomes for the participants involved in the study. All of the children made significant gains in their spontaneous object imitation and maintained their skills after the removal of treatment and over a one-month delay as well as generalized skills to novel settings. The children also showed increases in pretend play, joint attention and language as a result of the intervention. Additionally, naïve observers rated the children as being significantly better in their social communication at post-treatment and seemed to appear more typical.

This study demonstrated some vital implications in using a naturalistic treatment approach in young children with ASD. However, study limitations were noted and include a small sample size, limited time interval to account for maintenance of skills acquired, variability in response to treatment, a lack of conclusive evidence that changes in imitation patterns lead to social-communicative behaviours, and behaviours were not tested in the children's natural environment or with age-matched peers. Due to the limitations of the study, there is only suggestive evidence indicating that a DSP approach is beneficial in developing language and communication skills in children with ASD.

Kasari, Freeman and Paparella (2006) used a RCT, level 1 evidence, to examine the effects of a DSP approach in teaching joint attention and symbolic play skills to 58 young children with autism. Participants were randomized to treatment conditions of joint attention (n=20), symbolic play (n=21) or the control group (n=17), with the control group receiving traditional behavioural therapy. The children were given a battery of assessments that measured play, language, communication and parent-child interaction at both the onset and completion of therapy.

Children in the joint attention group showed greater initiation of sharing their attentional perspectives as well as responding to others bids for joint attention, and children in the play group showed greater diversity of play types and more sophisticated play levels. Further, the effect sizes were large in both groups which supports efficacy of the treatment approach. Children were able to generalize newly learned skills as seen while playing with their caregivers. Both treatment groups were significantly different than the control group with large effect sizes. Notably, the control group did not make improvements despite six hours of 1:1 intervention per day.

This study has many strengths, particularly with respect to research design and methodology and the examination of treatment effects in areas considered to be the core deficits in ASD. There were limitations present as well including some variability in the amount

of treatment sessions each child received and a lack of follow-up data to evaluate long-term effects to determine maintenance of the children's social and communicative abilities. This study provides compelling evidence in using a DSP approach to develop joint attention and play skills in children with ASD, both of which are associated with later language and social abilities.

Koegel (1987) used a single-subject multiple baseline design, level 1 evidence, to directly compare behavioural and naturalistic approaches to language therapy in two young children with ASD. Data was collected within a traditional behavioural format (which served as the baseline condition) before the experimental natural language treatment condition. In-clinic data was taken to measure changes on imitative, deferred imitative, and spontaneous utterances.

Visual analysis by individual participant was used to display changes made in baseline and experimental treatment conditions. Data revealed that during baseline, the children made limited immediate imitative utterances, no deferred imitative utterances and no spontaneous utterances during all but one of the sessions. While receiving the experimental treatment condition, both children displayed increases in both immediate and deferred utterances, and large numbers of spontaneous utterances with an increase in verbal responding in terms of number and frequency of new words produced. Furthermore, the gains continued to be seen during a follow-up measure obtained thirty months post-treatment for Child 2.

Strengths of the study include a direct comparison of two treatment approaches in an area considered to be one of the core deficits in autism, selection of stimulus items that the child has access to in daily life, and task variation. Limitations of the study include small sample size and a lack procedural fidelity measures. Although outcomes documented in this study demonstrated beneficial outcomes in language acquisition as well as generalization and maintenance of skills as a result of the naturalistic approach, the limitations present provide for only suggestive validity.

Solomin, Necheles, Ferch and Bruckman (2007) used a case-series post test only research design, level 3 evidence, to examine the effectiveness of the PLAY Project Home Consultation (PPHC) program, which relies on the methodology of the DIR/Floortime intervention approach. Sixty-eight children with ASD received intervention which measured outcomes in self-regulation, shared interest, forming relationships, two-way purposeful communication, problem-solving, and behavioural organization
Results were gathered using the Functional Emotional Assessment Scale (FEAS), which is a broad measure of social/pragmatic skill development, and significant gains were realized. The authors of the study reported that 45.5% of the children made "good to very good functional developmental progress" at twelve months following the onset of therapy (p. 205).

Limitations of this study include the documentation of therapy gains as a general developmental score as opposed to specific language measures or communication functionality and no comparison or control group. Further, the FEAS is not an independent measure as the founders of DIR/Floortime created it, nor is it a standardized assessment tool. Although language and communication skill gains were documented for the participants in this study, outcomes from this study cannot be relied upon in evaluating whether a DSP approach is effective in improving language and communication skills in children with ASD.

Discussion

Each of the studies examined demonstrated beneficial outcomes on the language and/or communication skills in children with ASD; however findings from the studies were mostly inconsistent. The evidence from the studies examined provides a range in levels of validity in support of a DSP approach in developing language and communication skills in children with ASD. Although all of the studies with the exception of one were designed with level 1 evidence, the "gold standard" of research, the limitations in research design left only two studies deemed as having compelling evidence with respect to valid and reliable outcomes. This finding is not unexpected given the diverse implementation strategies, differences in intensity of treatment, broad range of assessment tools, breadth of outcome measures, and large spectra of language, communication skills and cognitive level in children with ASD; al of which makes for direct comparison difficult or even unfeasible. However, the majority of the studies were found to have either suggestive or compelling validity with respect to results, which offers preliminary promotion for the use of a DSP approach for its beneficial impact in developing language and communication skills in children with ASD.

Recommendations

While all of the reviewed studies provided a positive outcome on the language and communication skills of young children with ASD in using a DSP treatment approach, findings were inconsistent and there were limitations within studies. Future research would be beneficial to provide additional information to better answer the research question posed in this paper. In order to provide more compelling evidence to affect change in clinical practice, future research should focus

on addressing the following:

a) Further studies should use adequate sample sizes

b) Studies should attempt to control the intensity and location of speech-language therapy the children are receiving; that is fidelity was not always reported.

c) Examination and measurement of expressive and receptive aspects of language acquisition should be conducted and reported on separately as both facets do not always develop linearly in the ASD population.

d) Further research studies should include alternative and augmentative communication (AAC) methods in language outcome measures as sensory and motoric capacities may inhibit the use of a verbal communication system.

e) Research should attempt to distinguishing between the children who benefit most from DSP treatments and those who stand to gain minimal benefit from them.

f) Additional comparison studies between DSP treatment approaches and other notable treatments, using level 1 experimental design should be carried out to determine cost benefit and treatment effectiveness.

g) Experimental studies conducting treatment in the child's natural environment should be explored.

If future research accounts for the aforementioned recommendations, there will be improved identification and reporting of the characteristics of DSP approaches that are correlated with positive language and communication outcomes.

Clinical Implications

Despite limitations in the research and inconsistency in some of the studies examined in this review, positive outcomes in language and communication skill development were reported in all of the studies presented. Results are suggestive enough to convey that using a DSP approach could be beneficial in developing language and communication skills in children with ASD. However, it is recommended that clinician's be mindful of the shortcomings of the research available at the present time and continue to monitor future research as it becomes available. At present, there are no intervention methodologies that have been shown to be without limitation.

References

Aldred, C., Green, J., Adams, C. (2004). A new social communication intervention for children with autism: pilot randomised controlled treatment study suggesting effectiveness. *Journal of Child Psychology and Psychiatry, 45(8)*, 1420-1430.

Centers for Disease Control and Prevention (2009, December). *CDC Briefing on Autism Surveillance Summary*. Retrieved December 18, 2009, from http://www.cdc.gov/media/transcripts/2009/t091218.htm

Gerber, S (2003). A developmental perspective on language assessment and intervention for children on the autism spectrum. *Topics in Language Disorders*, *23 (2)*, 74-94.

Ingersoll, B., Dvortcsak, A., Whalen, C., & Sikora, D (2005). The effect of a developmental, social-pragmatic language intervention on rate of expressive language production in young children with autistic spectrum disorders. *Focus On Autism and Other Developmental Disabilities*, *20(4)*, 213-222.

Ingersoll, B., & Schreibman, L. (2006). Teaching reciprocal imitation skills to young children with autism using naturalistic behavioral approach: effects on language, pretend play, and joint attention. *Journal of Autism and Developmental Disorders, 36(4)*, 487-505.

Kasari, C., Freeman, S., & Paparella, T. (2006). Joint attention and symbolic play in young children with autism: a randomized controlled intervention study. *Journal of Child Psychology and Psychiatry. 47:6*; 611-620.

Koegel, R., O'Dell, M., & Koegel, L. (1987). A natural language teaching paradigm for nonverbal autistic children. *Journal of Autism and Developmental Disorders*, *17(2)*, 187-200.

National Research Council. (2001). *Educating children with autism.* Washington, DC: National Academy Press.

Solomon, R., Necheles, J., Ferch, C., & Bruckman, D. (2007). Pilot study of a parent training program for young children with autism: the PLAY project home consultation program. *Autism*, *11(3)*, 205-224.