Critical Review:
What is the evidence that social skills training programs are effective at improving pro-social skills in school-aged children with ADHD?*

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This critical review evaluates the effectiveness of social skills intervention programs at increasing the pro-social skills of school-aged children with attention deficit hyperactivity disorder (ADHD). Four studies were included in the review: two single group case series, one within groups (repeated measures) and one systematic review. Overall, the results of this review provide equivocal evidence that social skills training programs are effective at improving pro-social skills in children with ADHD. However, further research in this area is needed as these studies have shown emerging evidence for social skills training programs to change social competence on an individual basis. Recommendations for future research and clinical implications are also discussed.

Introduction

Attention deficit hyperactivity disorder (ADHD) is a common childhood neuro-behavioural disorder characterized by inappropriate levels of inattention, hyperactivity and impulsivity (Wilkes, Cordier, Bundy, Docking & Munro, 2011). ADHD has also been found to be significantly associated with language impairments (Mueller & Tomblin, 2012). Children diagnosed with ADHD often experience significant impairments in the areas of social play and pragmatic language, making it difficult for them to create and maintain relationships with their peers (Cordier, Munro, Wilkes-Gillan & Docking, 2013). Behavioural and social problems associated with ADHD may be intensified during transition periods, such as the beginning of elementary school; therefore intervention with school-aged children is critical (Houck, King, Tomlinson, Vrabel & Wecks, 2002).

Children with ADHD experience a variety of challenges in the school setting including difficulties with behaviour control, forming and maintaining interpersonal relationships, and academic achievement. (DuPaul & Weyandt, 2006). Due to the nature of these struggles, interventions for children with attention disorders are typically divided into three major types: behavioural, academic, and social. DuPaul and Weyandt (2006) reviewed current research studying each type of intervention. While they found strong empirical evidence to support the use of behavioural and academic intervention for children with ADHD, support for intervention targeting social skills was weaker. The authors suggested a need for studies of intervention programs that were mediated by more than just a classroom teacher; studies that incorporated parents, peers and the participants with ADHD themselves. They also posited that intervention might be more effective when delivered in a "real-world" setting, such as school, rather than in a clinic. This critical review takes those suggestions into account, and includes studies where social skills intervention is delivered in a natural context, and multiple mediators are included in the program.

The term "social skills" encompasses all socially acceptable learned behaviours that enable a person to effectively interact with others (Gresham & Elliot, 1990). The realm of social skills is divided into two areas: problem behaviours – those behaviours that hinder one's ability to interact socially, and pro-social skills – those traits that enable someone to effectively manage social interactions. The *Social Skills Rating System* (SSRS) is an assessment that is commonly used for identifying children who have difficulty with social skills (Gresham & Elliot, 1990). Examples of pro-social skills from the SSRS include: cooperating with peers, making friends easily and controlling your temper in conflict situations. Some pro-social skills require the use of language (introducing yourself to new people), while others may be less communicative (ignoring distractions when doing work). Pragmatic language, more recently termed social communication, falls as a subset of pro-social skills. Specifically those pro-social skills that represent whole events and require the use of language (such as conflict resolution) may be considered social communication.

As speech-language pathologists, we understand the importance and contribution of pro-social skills to effective communication (both verbal and non-verbal). As childhood disorders that impact social-pragmatic

**This paper was created as a required assignment for the CSD9639 Evidence Based Practice for Clinicians course at Western. While it has been evaluated by course instructors for elements of accuracy and style, it has not undergone formal peer-review.*

skills are further explored, it is important for us to understand the evidence for or against social skills training programs as an effective means of improving pro-social skills in a disordered population.

Objectives

The primary objective of this paper is to critically evaluate the existing literature on the effectiveness of social skills training programs at improving pro-social skills in school-age children who have been diagnosed with ADHD. The secondary objective is to propose recommendations on future practice and research of social skills training programs for school-aged children with attention disorders.

Methods

Search Strategy

A variety of computerized databases were searched, including but not limited to: CINAHL, PubMed, Scopus, EBSCO*Host* and Google Scholar. The following search terms were used:

"Attention Deficit Hyperactivity Disorder" OR "ADHD"

AND "Social Skills Training" OR "Social Intervention" AND "Social Behaviour" OR "Language" OR "Pragmatic Language".

Reference lists of the articles selected were also searched for further relevant articles.

Selection Criteria

Studies selected for this critical review were required to include school-aged children (between the ages of 5 and 12 years) who were diagnosed with ADHD. The studies needed to provide a social skills-based intervention program to participants and some form of the outcome measures needed to incorporate pro-social skills. Studies included in the systematic review were excluded from individual appraisal for the purpose of this review.

Data Collection

Results of the literature search yielded the following study types: three single-subject research designs, and one systematic review.

Results

Single-Group Case Series

Single-group case series are considered level 3 evidence. These studies utilize the same outcome measures to collect data pre- and post-intervention.

Houck, King, Tomlinson, Vrabel & Wecks (2002) evaluated two practice improvement projects that provided group experiences for children with ADHD, only one of which met inclusion criteria for this review. The project administered an intervention for developing social competence in school-aged children with ADHD based on a previously established comprehensive social/behavioural intervention program developed for children at risk of conduct problems (Conduct Problems Prevention Research Group, 1999). Three children (2 boys, 1 girl) participated in the program, which addressed four social skill domains: friendship, self-control, communication, and social problem solving. The program ran 30 minutes per week for a total of 16 sessions. Baseline measures were taken pre- and post-intervention and results indicated a decrease in problem behaviour for two of the three participants. An increase in social competence was noted for all three students.

Houck et al. (2002) provided a strong rationale for the study. They identified key elements to focus on during intervention (the four skill domains) and incorporated strategies identified by Barkley (1999) to facilitate the children's participation in the group sessions. Teachers identified three children who were behaviourally disruptive in the classroom. All three children were from different classes and were all diagnosed with ADHD. Missing from the study is any mention of criteria they provided to teachers to make this identification or whether any children were identified but subsequently eliminated from participation. Each child's classroom teacher completed the Conner's Teacher Rating Scale – Revised (S) (1997) before and at the conclusion of the intervention. The rating scale includes items that describe pro-social (e.g. has difficulty waiting his turn), problem (e.g. defiant), and academic (e.g. poor in arithmetic) behaviours that are rated from 0 to 3 ("Not true at all" to "Very much true") with increased scores reflecting greater attention difficulty. Teachers were not blinded; they had knowledge that the child in their classroom was participating in a social-behavioural intervention program. The authors make no mention of testing for inter-rater reliability or the potential of individual bias in teachers' ratings. The school nurse delivered the group intervention sessions, which included cooperative activities with an emphasis on those that were visual-tactile, creative, and active. The intervention program and materials were not described in sufficient detail for replication.

Results should be interpreted with caution as no statistical analysis of data was conducted, hence we do not know if increases in social competence might have occurred by chance. Two of the three students had improved scores on the Conner's Scale following intervention indicating a reduction in problem behaviour and anecdotal evidence from teachers indicated that social competence increased for all three

children. The authors offered some explanation for the variation in score changes but did not include any data or analysis of specific items from the rating scale in the study. Additionally, there was not sufficient experimental control to provide strong evidence for the results.

Houck et al. (2002) report this intervention project as being successful at promoting social competence and decreasing problem behaviours among children with ADHD. No limitations or suggestions for future research are included in the study. The validity of this study's methods and design is equivocal. Based on a number of limitations cited above, the study provides equivocal evidence for the effectiveness of social-behavioural programs on improving pro-social skills. However, anecdotal evidence of individual improvement of social competence in these children with ADHD suggests there is clinical importance to continuing to investigate the benefit of social skills training.

Cordier, Munro, Wilkes-Gillan & Docking (2013) investigated the effectiveness of a play-based social intervention involving peer-to-peer interactions for improving the pragmatic language abilities of children with ADHD. Fourteen children with ADHD between the ages of 5 and 11 participated in the group series design, along with their self-selected typically developing (TD) playmate. The play-based intervention was designed to facilitate improvements in social play within the child dyad (child with ADHD and their TD peer) and consisted of seven 40-minute weekly sessions led by a primary therapist. A secondary therapist worked closely with the parents of the child with ADHD. During intervention sessions, interpersonal empathy was promoted by using techniques such as self-modeling (video feed-forward and feedback techniques) and incorporating peer- and therapist-modeling during 20 minutes of play. Pragmatic language was assessed pre- and post-intervention using two outcome measures: the Pragmatic Protocol (PP) and the Structured Multidimensional Assessment Profiles (S-MAPs). Scores from these measures were subjected to Rasch analysis and data was appropriately tested for normal distribution (using the Kolmogorov-Smirnov test of normality). T-tests for dependent samples were calculated to compare pre- and post-intervention mean scores from both measures. Results demonstrated an overall improvement in pragmatic language from pre-post intervention (for both PP and S-MAPs).

This study by Cordier et al. (2013) demonstrated some strength in experimental design. They provided a strong rationale for choosing to provide intervention in the context of an unstructured play session and for including peer-to-peer interaction and modeling by citing limitations of previous studies where social skills of children were evaluated under non-naturalistic conditions and with inauthentic communication partners. The authors' choice to use two pragmatic language outcomes was supported by the differing domains each measure evaluated. Participants' demographic data was collected. Rating of pragmatic abilities was accomplished using video recordings. Video files were randomized and then rated by an SLP experienced in working with children with ADHD and LI who was blinded to the purpose of the study, the identification of which child had ADHD and whether the sample was pre- or post-intervention. Adequate reliability of ratings was established through a training program and inter-rater reliability between the blinded rater and an author of the study was calculated and found to be sufficient prior to the ratings of study files. All of the eleven demographic variables (e.g. sex, age, ethnicity, socio-economic status) were tested for potentially influencing the results. Data analysis indicated that none of the variables accounted for the observed changes.

Limitations of the study include a small sample size and a lack of control group. Suggestions for further research include a need for follow-up and testing of skill generalization to determine if the improvements in pragmatic language seen in this study will generalize to different environments and be sustained over time. Given the strengths and weaknesses of study design, this research provides equivocal merging on suggestive evidence that social skills intervention administered in an authentic context can improve pragmatic language and pro-social skills of children with ADHD.

Within Groups

Corkum, Corbin & Pike (2010) conducted a within-groups repeated measures study evaluating the efficacy of a school-based social skills program "*Working Together: Building Children's Social Skills Through Folk Literature"* for improving pro-social skills. The program was administered at three different schools to a total of 16 school-aged children, ranging in age from 8 to 11, over a 10-week period. The study used multiple standardized measures (Conner's Parent-Teacher Rating Scale, SSRS, Kaufman Brief Intelligence Test, Children's Communication Checklist) completed by parents, teachers, and student participants to gage outcomes. Data analysis reveals both parents and teachers rated the children's social skills as significantly higher post-treatment compared to pre-treatment. Students rated themselves within average range on the SSRS at pre- and post-intervention,

consistent with findings that children with ADHD typically overestimate their social competence.

Strengths of this study include the use of multiple outcome measures that appropriately assess social skills and have been found to be valid and reliable. Suitable data analysis (ANOVA) was conducted on the results to compare the participant groups at the three different schools and establish that groups did not differ so data could be collapsed across schools. The intervention program involved parents and teachers in an attempt to encourage further generalization of pro-social skills learned in *Working Together*.

Limitations include a small sample size without a control group, no mention of blinding, and no follow-up to investigate the maintenance of skills over time. Additionally, insufficient detail is provided regarding participant recruitment and criteria for inclusion. During data analysis there is no mention of controlling for confounding variables.

This level 2 study provides suggestive evidence that a social skills training program can improve pro-social skills in school-aged children, but lacks strength in the sample size so results should be interpreted with care.

Systematic Review

Storebo and colleagues (2011) conducted a systematic review of the effect of social skills training on social competence of children with ADHD. Eleven randomized controlled-trial studies were analyzed, with all participants being between 5 and 12 years of age. All of the articles are relevant to this review. Social skills training was considered to be any form of intervention program that focused on behavioural/cognitive-behavioural efforts to improve social and emotional competence. Primary outcomes of social skills and emotional competencies were recorded using reliable, validated measures (such as the SSRS). A high risk of detection bias was found in all studies as no blinding of outcome assessment was used. In addition, all trials were judged to have a high risk of bias due to systematic errors. Effect sizes were calculated as standardized mean differences (SMD) using an adequately precise confidence interval (CI 95%). Primary analyses of teacher-rated social competencies of participants after intervention did not show a significant treatment effect (SMD 0.16). Secondary analyses of parent- and participant-rated social competencies at the end of the intervention program indicated only parent-rated social skills competences showed significant differences. Parent ratings were considered more questionable than teacher rating outcomes due to the high risk of parental bias. The review concluded that there is insufficient evidence to support the use of social skills training programs for children with ADHD.

This systematic review by Storebo et al. (2011) displays many strengths in study design. The review was conducted in accordance with guidelines from the *Cochrane Handbook on Systematic Reviews of Intervention* (Higgins, 2011). The researchers allowed for efficient comparison between studies by presenting detailed information regarding the participants, interventions given, and measured outcomes in chart format. Their methodology, including selection criteria, data selection, and the process of SMD data analysis, was provided in sufficient detail. Furthermore, results were appropriately weighted by sample size; and forest plots were used to demonstrate findings across individual studies. A limitation of the review was the heterogeneity across studies. The variety of outcome measures included in the analysis might limit the external validity of this review. The review highlights the need for further research in the area of study. A priori and post-hoc analyses demonstrated the need for more participants in order to make a firm conclusion in the meta-analysis. In addition, all trials used in the review were deemed to have a high-risk of bias so results may not be reliable. This systematic review represents level 1 evidence. Considering the strengths and weaknesses discussed, this systematic review offers an equivocal level of evidence to support the effectiveness of social skills training for children with ADHD.

Discussion

Collectively, these studies provide equivocal evidence for the large-scale use of social skills training to improve pro-social skills in children with ADHD. Single group and within groups studies represent lower levels of evidence and although individual participants in the studies appeared to benefit from social skills training, the weak experimental designs limit the validity of the results. The systematic review by Storebo and colleagues (2011) of randomized controlled trials represents a high level of evidence, but appraised the trials as having high levels of bias, limiting the external validity of the review. Given the multitude of social skills training interventions, variability in the implementation and outcome measures of the intervention act as a limitation to generalizing results across studies.

The Corkum, Corbin, and Pike (2010), and the Cordier et al., (2013) studies incorporated teachers, parents, and peers into the social intervention in an attempt to help generalize the pro-social skills being taught into other environments. In addition, these interventions were

administered in a more "authentic" context – at school, or in a play-based scenario with a peer. These considerations may have contributed to the observed improvement in pro-social skills following social skills training.

While the use of social skills training programs to improve pro-social skills in children with ADHD is not supported by strong evidence at this time, these studies demonstrated emerging evidence for some positive change occurring on an individual basis.

It is important to consider the following limitations when summarizing the results of this study:

1) Many of the studies had relatively small sample sizes and small effect sizes revealed through the systematic review indicate a need for larger samples. Although difficulty in recruiting participants may be a common issue when dealing with specific populations, a small sample size is still a limitation to the evidence.
2) The reality of ADHD is that there are high rates of comorbid disorders, such as language impairments and Operational Defiance Disorders (ODD) among others (Mueller & Tomblin, 2012). These comorbidities contribute to the heterogenic nature of ADHD and may add confounding variables to research of this nature. All authors selected participants meeting the DSM-IV criteria of diagnosis of ADHD and reported on participants with comorbid disorders but did not necessarily account for these comorbidities in analysis of results.
3) Blinding of raters was not used frequently throughout the studies, contributing to higher levels of potential bias. While blinding of participants is difficult due to the nature of the intervention, it is possible to blind rater(s) (teachers or SLPs, but not parents), as was done in the study by Cordier et al., (2013). Doing this would increase the strength of the findings.
4) None of the studies included a follow-up condition where pro-social skills were rated in the weeks/months following the end of intervention. Lack of follow-up limits the conclusion that these social interventions not only improve social skills directly after intervention but that these skills are maintained over a period of time.

Conclusion and Recommendations

This critical literature review provides equivocal evidence for the efficacy of social skills training as a tool to improve pro-social skills in children with ADHD. The studies lack strength in experimental design and the variability in intervention programs and outcome measures used makes it difficult to state an unequivocal effect of social skills training. However, the small case studies reviewed have shown some emerging evidence for the effectiveness of social skills training at improving pro-social skills on an individual basis for children with ADHD. For this reason, continued investigation in this area is called for. Future research should move towards study designs with greater experimental control, such as single subject research designs (SSRDs). SSRDs are appropriate for research with a heterogeneous population, such as that found with ADHD (Logan, Hickman, Harris, & Heriza; 2008). To strengthen experimental design, studies should also include follow-up data to provide greater assurance of the intervention's effectiveness and maintenance of learned skills over time. Furthermore, studies should strive for a larger sample of participants, include control groups for comparison and ensure blind rating of skills post-intervention. Studies should continue to incorporate authentic contexts and a multitude of mediators (peers, parents, teachers) into the intervention procedure, as there is suggestive evidence that doing so can increase the impact and generalizability of learned pro-social skills. It might also be beneficial to investigate the impact of periodic "refresher" sessions where the skills learned in intervention are reviewed with participants at a later date.

Clinical Implications

The results from the four studies included in this critical review offer equivocal evidence for the use of a social skills training program as a means to increase pro-social skills of children with ADHD. Weakness of experimental design and high risk of biases found in these studies indicate the results should be implemented with caution. Despite this finding, these studies offered emerging evidence for the use of social skills training to improve social competence in individual children with ADHD. Further research into the area of social skills training for this heterogeneous population is needed in order to understand how children may benefit individually from social skills training. Study designs with greater experimental control must be completed before a speech-language pathologist could recommend this intervention with certainty to school-aged clients with ADHD experiencing social challenges.

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