The Impact of an Intervention on Social Skills of Young Children with Prenatal Alcohol Exposure

by

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A thesis submitted in partial fulfillment of the requirements for the degree of

Master of Education

in

Psychological Studies in Education

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Abstract

FASD is an umbrella term used to describe the continuum of effects that result from prenatal alcohol exposure (PAE) on the developing brain, which causes a multitude of behavioural impairments, including deficits in adaptive behaviours such as social skills. Although there are many interventions designed to help prevent the negative outcomes for children that result from impaired social skills for many clinical populations there is a dearth of intervention research for children with PAE or with an FASD. Therefore, the current study aimed to first, gather more information of the social profile of children with PAE or with an FASD, as well as factors that could impact social functioning and secondly, examine the effectiveness of a brief (10 half hour sessions) individualized social skills intervention for children with PAE or with an FASD. At pre-test, twenty-nine participants (14 male and 15 female; 17 with PAE and 11 with an FASD) aged 4 to 10 (M=7 years, 6 months) partook in the study (post-testing data was unavailable for one participant). Participant's social skills and problem behaviours were evaluated and then compared to demographic information. To examine the effectiveness of the social skills intervention children with PAE or with an FASD in the social skills (n=14) were compared to matched participants in a comparison intervention (n=14). The results suggest that on average participants had significant social skills impairments and problem behaviours with a specific pattern of social skills strengths (cooperation and reduced bullying) and weaknesses (responsibility and hyperactivity). These difficulties were not significantly related to factors such as number of home placements, IQ, age, SES, sex or diagnosis. Following the social skills intervention, children's problem behaviours decreased however, these effects when compared to the comparison intervention

approached significance. Knowledge of how their social skills profile differs from other clinical populations may aid in differentiating these children from other clinical populations as well as providing tailored interventions for this population. However, more intervention research needs to be conducted to determine how to support optimal development for this population.

Acknowledgements

I want to first thank my two supervisors, Dr. Jacqueline Pei and Dr. Carmen Rasmussen for their support both academically these past two years. They have spent many hours helping me prepare for conferences, reading thesis drafts and discussing research during lab meetings. I am fortunate to have had the opportunity to learn from both of them. I am also appreciative of the important work that both of them are doing, especially considering the impact their research has for many children and families. I would also like to thank everyone at Glenrose Rehabilitation Hospital for supporting this research with special thanks to Lauren Baugh for her uplifting spirit and her assistance with this research project.

Finally, I want to recognize my parents, Linda and Tim Regehr, and my sister and brother, Lindsey and Andrew Enns for their love and support through these past seven years of schooling. Thank you for celebrating accomplishments with me but also supporting me during the difficult times by flying me home or spending many hours with me on the phone. I dedicate my thesis to you, my family, because I can honestly say it would have not been possible without you. Much love and endless thanks to you all.

Table of Contents

List of Tables

CHAPTER ONE

Introduction

In recent years, there has been an increase of interest in fostering resilience in children, and in particular, social skills (Dusenbury, Zadrazil, Mart, & Weissberg, 2011) because children with strong social skills perform better in school, have more positive relationships with peers and adults, and have more positive emotional adjustment and mental health (High, 2008; Tompson & Goodman, 2009). Unfortunately, children with prenatal alcohol exposure (PAE) or with Fetal Alcohol Spectrum Disorder (FASD) may face the barrier of limited social functioning which may play a role in the challenges they face in their daily functioning including increased academic failure, mental health problems, and many conduct problems (Streissguth et al., 2004). Consequently, programs developed to increase social functioning may be especially valuable for children with PAE or with an FASD. Unfortunately, there is a dearth of research on the specific social profile together with programs that are designed to increase social functioning for these children.

PAE has been linked to a wide range of deficits that negatively impact the development of children. FASD is an umbrella term that is used to refer to a more specific set of diagnosis that result from PAE including Fetal Alcohol Syndrome (FAS), partial FAS (pFAS), Alcohol Related Neurodevelopmental Disorder (ARND) and Alcohol-Related Birth Defects (ARBD) (Chudley et al., 2005). Children with these alcohol-related brain injuries experience a variety of neuropsychological impairments in cognition including overall below average intellectual functioning (Mattson, Riley, Gramling, Delis, & Jones, 1997), learning and remembering verbal and visual material

(Wilford, Richardson & Leech, 2004), language abilities (Mattson et al., 1996), motor functioning (Wacha & Obrzut, 2007), executive functioning (Rasmussen, 2005), attention (Riley & McGee, 2005) and adaptive functioning, including social skills (for a review see, Kully-Martens et al., 2012). Of the many deleterious effects associated with PAE, social skills appear to be a particularly robust finding (Keil, Paley, Frankely & O'Conner, 2010; Steinhausen & Spohr, 1998).

Children with an FASD have been found to have lower levels of social functioning compared to their same age peers, even after controlling for differences in cognitive functioning (Mattson & Riley, 2000; Thomas et al., 1998; Whaley et al., 2001) and beyond what would be predicted for children with attention and behavior problems (Rasmussen et al., 2011). These impairments are life-long and typically become more evident, relative to peers their age (Clarren et al. 1995; Thomas et al. 1998; Streissguth & O'Malley, 2000; Whaley et al., 2001). Children with PAE have very sociable personalities (Duquette, et al., 2006; James et al., 2010; Streissguth et al., 1998) but unfortunately at times they are inappropriately too friendly or clingy (Mattson & Riley, 2000; Thomas et al., 1998). Additionally, they have other social impairments such as difficulty perceiving or responding to social cues (Mattson & Riley, 2000; Thomas et al. 1998), being socially inappropriate, showing consideration for others and forming and maintaining reciprocal friendships (Bishop et al., 2007; Carmichael Olson et al., 1998). The extent of their social deficits may in part explain reports of their experienced social withdrawal, teasing and bullying (Mattson & Riley, 2000). As one might expect, without critical support, the interactive effects of their social nature, increased levels of peer

rejection together with other life stressors often leads to a wide range of secondary disabilities.

Consistently across studies children with an FASD display numerous adverse outcomes related to mental health problems (Pei, Denys, Hughes & Rasmussen, 2011). These problems that emerge in childhood have been characterized as one of the greatest area of concern for adults with an FASD (Lemonie et al., 2003; Pei et al., 2011). Adolescents and adults with an FASD also have difficulties with inappropriate sexual conduct, substance abuse, difficulty in finding and maintaining stable housing, occupational problems, academic failure, high school dropout rates and trouble with the law (Streissguth et al., 2004). Specifically, it is estimated that 60% of adolescents or adults with an FASD diagnosis encounter trouble with the law (Streissguth, 2001). Given the considerable social impairments in children with PAE or with an FASD and the association with many adverse outcomes, programs to improve social functioning for children with PAE or with an FASD are critical. Unfortunately, there is only limited research on the distinct social profile of children with PAE or with an FASD as well as knowledge of the efficacy of social skills interventions tailored specifically for these children.

One successful social skills intervention, based on the Children's Friendship Training Procedure, reported significant improvements in knowledge of appropriate social skills, problem behaviour, and overall social skills among children (aged 6 to 12) with an FASD (Keil et al., 2010; O'Connor et al., 2006). Although the aforementioned study provides some preliminary support for the effectiveness of a social skills intervention in children with an FASD, it was fairly resource intensive intervention

requiring parental involvement despite the majority of this population being in foster care (Popova et al., 2012). Also, little is known about the distinct features of their social profile that require intervention. Additionally, it is unknown whether the social skill impairments of children with PAE or with an FASD result from a failure to acquire social skills or the impacts of underlying performance deficits that create social problems. Better understanding of specific areas of how their social functioning is impacted by an individualized intervention targeting social skill acquisition deficits may provide information of the nature of their social impairments and further enhance our ability to effectively foster optimal development.

Present Study

The intent of the present study was two fold; firstly, it was to characterize the social skills and problem behaviours of children with PAE and with an FASD. As well as examine whether number of home placements, SES, age, sex, PAE or an FASD diagnosis, IQ and affect recognition ability may be related to social skills and problem behaviours of participants. Secondly, it was to study how implementation of a social skills intervention -The Social Skills Improvement System Intervention Guide (SSIS-IG) (Gresham & Elliott, 2008) - affects the social skills and problem behaviours of these children. Specifically, I examined whether children aged 4 to 10 with PAE or with an FASD in the social skills intervention program improved in specific social skills. The results of the social skills intervention were compared to those of a math skills intervention to allow for the evaluation of the gains made between interventions while concurrently allowing for an intervention for all participants.

CHAPTER TWO

Literature Review

This literature review provides an overview of what characterizes social skills and the types of social skills deficits, how social skills are assessed and an overview of social skills interventions. This information is then tied to the current understanding of the social skills profile of children with PAE or with an FASD (i.e. social strengths, social impairments and competing behaviours) and the successful social skills interventions that have been use with this population.

Social Skills

Considerable evidence has been gathered indicating that deficits in social skills are critical to successful functioning in life, as they contribute to academic success, improved learning, and increased relationships (High, 2008; Tompson & Goodman, 2009). Conversely, poor social skills can lead to poor academic outcomes and may result in later social adjustment problems, employment difficulties and mental health problems (Gresham & Elliott, 2008; Gresham, Robichauz, York & O'Leary, 2012). As a result, there has been much research on characterizing what social skills are needed for positive social functioning.

Typically social skills are understood as adaptive behaviour that include the specific behaviours needed to successfully interact socially and get along with others, including expressing affection, having friends, showing and recognizing emotions, assisting others, using manners etc. (Harrison & Oackland, 2010) as well as simultaneously discouraging inappropriate behavior (Welsh & Bierman, 2001). The concept of social skills can be distinguished from similar terms such as, social

competence and social tasks. Social tasks are tasks that require the successful use of a social skill, such as peer group entry, or having a conversation (Gresham, 2012). Social competence is an evaluative term based on judgments by social agents that an individual adequately performs social tasks (Gresham, 2012). Considering these conceptualizations, social skills can be understood as the specific behaviours exhibited in certain situations that lead to the perception of others that the behaviours are successful in accomplishing social tasks (Gresham, 2012; McFall, 1982; Spence, 1995).

Bellack and colleagues (2004) outlined and defined specific components of social skills that are highly important in determining social competence. Specifically, they determined that children need expressive skills, which are the verbal behaviors (e.g. verbal content, form, structure, appropriate vocabulary and amount of speech), paralinguistic behaviours (e.g. volume, pace, intonation and pitch of speech), and nonverbal behaviors (e.g. appropriate facial expression, eye contact, body language, and proxemics). Additionally, they require receptive skills, the ability to attend to the person with whom you are engaging (e.g. listening, getting clarification, relevance, timing), as well as the ability to accurately perceive the emotions of the person to whom you are attending. Lastly, the conversational skills that they require include the ability to initiate, maintain, and appropriately end a conversation, as well as building upon receptive skills (Bellack et al., 2004). The ability to perform many of these social skills is necessary for social functioning however, it is likely an insufficient determinant of whether a child is socially competent (Bellack et al., 2004; Spence, 2003).

The social situations (or social tasks) that children encounter require the complex interaction between many social skill components, in order to have successful

interpersonal interaction or be considered socially competent by others (Bellack et al., 2004; Gresham et al., 2012; McFall, 1982; Spence, 2003). Given this complexity it can make it difficult to assess the significant and socially valid components of social skills. And it may provide insight as to why, despite the amount of attention has been given to defining social skills, there has been relatively little attention paid to the development of tools measuring socials skills; specifically tools that are content-sensitive, sensitive to changes in social behavior, and tools that have normative data to aid in interpretation (Spence, 2003).

Assessing Social Skills. Information relating to social skills can be gathered though various forms of assessment including interviews, behavior rating scales (self-reports, parent, teacher or peer report), and direct behavioural observation. Behavioural observations are considered to be a very valid and important assessment procedure however, due to the extensive training and time required for behavioural observations as well as the limited published observational procedures from which to choose, this type of assessment is typically not used (Spence, 2003). Therefore there is typically more reliance upon using interviews or rating scales for information about a child's social skills.

Interviews can provide useful and detailed information relating to the quality of relationships children have with others and the environments where difficulties take place. Interviews can be either semi-structured or structured. An example of a structured interview is the Social Adjustment Inventory of children and Adolescents (SAICA; John et al., 1987), which provides general aspects of social functioning and quality of relationships. The limitation of using interviews is that they do not allow for screening

large numbers of children nor does it allow for evaluation of programs and examination of differences between participants, unlike behavioural rating scales.

The first types of behavioural rating scales were used to evaluate global social skills functioning contained subscales of social functioning but also included the assessment of emotional, behavioural and academic problems (Kully-Martens, et al. 2011; Spence, 2003). Examples of two measures are the Child Behaviour Checklist (CBCL) and the Vineland Adaptive Behavior Scale (VABS). It was not until the development of the Social Skills Questionnaires (Spence, 1995) and Social Skills Rating System (SSRS; Gresham & Elliott, 1990) that more precise measures of social skills could be evaluated. Of the two measures the SSIS-RS (and the recent revision the Social Skills Improvement System-Rating Scales (SSIS-RS); Gresham & Elliott 2008) is the most widely used (Spence, 2003).

The SSIS-RS measures both social skills (on dimensions relating to self-control, responsibility, cooperation, empathy and assertion) and competing problem behaviours that may interfere with a child's ability to acquire or perform social skills (i.e. externalizing, bullying, internalizing etc.) (Gresham & Elliott, 2008) allowing for a detailed understanding of a child's social profile. The assessment tool provides composite scores of the social skills and problem behaviours that are based on national norms (Gresham & Elliott, 2008). Of the current tools available the SSIS-RS is the most feasible and provides the most valuable information of the social skills of children to direct interventions, and consequently it is the assessment tool used for the current study.

Social Skills Acquisition versus Performance Deficits

Knowledge of a child's specific social skills is necessary in designing effective interventions, however another important consideration is whether the social skill impairments result from a failure to acquire social skills or underlying performance deficits that create social problems. The distinction between social skill acquisition versus performance deficits is important because it provides a framework for understanding the contributing factors of a child's social skills difficulties and different interventions that target either one or both of these deficits (Gresham et al., 2012; Spence, 2003).

The current conceptualization of acquisition versus performance difficulties as defined by Gresham (Gresham, 1981, 2002, 2010) stems from Bandura's (1977) differentiation of acquisition versus performance behavior. Specifically, Gresham (1997; 2008) indicates that social skill acquisition deficits refer to children who either do not have particular social skills in their behavioural repertoire to interact appropriately with others or who have not acquired a critical step in the performance of a given skill. This deficit can result from deficits in social-cognitive abilities (facial affect recognition), difficulties in integrating fluent behaviour patters, and/or deficits in appropriate discrimination of social situation (e.g. social information processing) (Gresham et al., 2012).

Alternatively, if a child has performance deficits they may have the skills (or understanding) to behave in socially skilled manner, yet fail to demonstrate these skills at appropriate times or settings. This type of deficit may be due to motivational factors or performance problems rather than learning or acquisition problems. Therefore, coming from more of a behavioural perspective Gresham and colleagues (2012), suggest these types of deficits require adjustments to the antecedents and consequences of behaviours

in naturalistic settings to increase the occurrence of these behaviours. Gresham et al. (2010) found that social skills performance deficits are more common than acquisition deficits, and most often characterize children with or at risk for emotional and behavioral disorders.

Social skill acquisition and performance deficits can be further parsed into deficits with or without competing problem behaviours. Children with problem behaviours might describe children with emotional (e.g. anxiety, sadness, impulsivity) and/or overt behavior (e.g. verbal or physical aggression, hyperactivity) responses that compete or interfere with skill acquisition. Children with social skills performance deficits accompanied by competing problem behaviours have acquired necessary social skills, but performance of the skill is hindered by emotional or behavioral responses (Gresham & Elliott, 2008).

Conceptualization of a child's specific social skill difficulties, together with understanding of whether these difficulties are acquisition and/or performance deficits can lend towards more targeted treatment of a child's social skills difficulties. For example, a child with may require treatment aimed at reducing the factors maintaining performance deficits (e.g. impulse control, contingency management, cognitive restructuring), which can result from cognitive deficits, or support for social skills acquisition that can be impacted by factors such as limited exposure to positive social role modeling (Gresham et al., 2012). Researchers typically do not specifically make the distinction between difficulties with social skills acquisition deficits or performance deficits however many interventions that have been developed indirectly target these specific deficits. Whether an intervention that targets one of both of these deficits (and or

competing behaviours) is successful or not may reflect the match between the nature of a child's deficit(s) and the intervention used (Gresham et al., 2012). Therefore, knowledge of a child's social difficulties as well as information about which types of deficits a specific intervention targets is valuable.

Social Skills Interventions

Over the last 40 years, due to the increased understanding of the nature of social skills, developments have been made in social skills interventions. Traditional social skills interventions were psychoeducational in nature providing instruction and practice regarding social skills targeted toward poorly accepted or rejected children (Cappadocia & Weiss, 2011; Parker & Asher, 1987; Spence, 2003). However, there was some concern about whether these programs lead to the generalization of social skills across environments (Pelham & Fabiano, 2008; Spence, 2003; Tse et al., 2007). This precipitated the development of more integrated or multi-modal approaches, which involved training or support for caregivers and/or teachers, homework or interventions that included components of other more formal psychotherapeutic interventions such as Cognitive Behavioural Therapy (Mattson, 2009; Spence, 2003). These intervention programs were later tailored for specific clinical populations with different types of social profiles such as those with Autism, ADHD, intellectual disabilities and Schizophrenia (Gresham, 2012; Mattson, 2009; Spence, 2003).

Traditional Social Skills Interventions. Traditional social skills interventions typically attempt to break down the complex behaviours required for social interactions into more feasible steps, varying depending on a child's chronological age or developmental level. Tasks can include getting acquainted, making friends and

conversation, play skills, empathy, self-regulation, and conflict management (Baker, 2003; Barket, 2006). The teaching techniques used range from, direct instruction, modeling (e.g. by video), role-playing, shaping, to feedback and reinforcing of positive interactions. These types of tasks target more social skill acquisition deficits and were designed based on Bandera's social learning theory that social skills are generally learned (often unconsciously) however, due to various factors such as a cognitive inability to learn these skills or limited modeling opportunities some children are unable to do so (Avcioglu, 2013). Therefore, it is believed that these children require more systematic teaching through traditional social skills interventions.

The most appealing feature of traditional social skills interventions is its feasibility. The programs typically average between 8 to 13 sessions across 6 to 12 weeks (Cappadocia & Weiss, 2011) and they can be administered groups of children or individually. Despite these beneficial factors, traditional interventions are no longer as widely used due to the mixed empirical support for their effectiveness (Antshel & Barkley, 2008; Pelham & Fabiano, 2008; Spence, 2003; Tse et al. 2007). It is often argued that the gains made in social skills during traditional interventions do not readily generalize to natural settings (DuPaul & Weyandt, 2006; Pfiffner, Calzada, & McBurnett, 2000). However, the success of this type of intervention may also depend on the type of population with which it is used and a childs corresponding social deficits (acquisition versus performance).

Traditional interventions appear to be more successful for children with Autism (Cappadocia & Weiss) or an intellectual delay (Avcioglu, 2013), in contrast to children with internalizing problems (i.e. depression and anxiety) (David-Ferdon & Kaslow; 2008)

or problem behaviours (e.g. ADHD) (Matson, 2009; Pelham & Fabiano, 2008). Parents and caregivers rate children at risk for emotional and behavioural problems as having higher rates of performance deficits versus acquisition deficits (Gresham et al., 2010) and therefore the limited success of traditional training program with these children may be due to the mismatch between symptomology and the training used (Matson, 2009).

Social Skills Interventions with Parental Involvement. Programs that incorporate a parental component either include psycho-educational parent training, parent support groups, or information presented to parents to supplement the child's skill development at home (Cappadocia & Weiss, 2011). Parental training may more likely lead to continuity of social behaviours across social contexts. Also, the inclusion of parent training likely help to address both social skills acquisition and/or performance which could be due to poor modeling or negative reinforcement.

An example of a traditional social skills training program that includes a parental component is the Social Skills Improvement System-Intervention Guide (SSIS-IG) developed by Gresham and Elliott (2008) and preliminary evidence suggests it may be beneficial for children with acquisition deficits. In an intense (60 hour versus 30 hour) SSIS-IG intervention with 4 children (6 to 7 years) who had social skills acquisition deficits and children showed decreases in competing problem behaviours as rated by parents and both social skills and completing problem behaviours as rated by teachers (Gresham, Van, & Cook, 2006).

Other traditional training programs that include parent training for children with Autism (Cappadocia & Weiss, 2011), ADHD (Pelham & Fabiano, 2008) and mental health concerns (externalizing problems in particular) (Lundahl, Risser, & Lovejoy,

2006; Sofronoff, Leslie, & Brown, 2004) has also shown to contribute to positive change. Based on a review of four intervention programs for children with Autism that included parent involvement three reported positive outcomes (Cappadocia & Weiss, 2011). The intervention programs that provided parent training along with traditional social skills training indicated positive outcomes versus an intervention program that did not provide reinforcement of child behaviour through parental training and only provided support for parents via a parent support group.

For children with ADHD or behavioural difficulties traditional programs are generally not effective unless the program involves a parental component to provide reinforcements of a child's behaviour outside of the training session (Boo & Prins, 2007; Corkum, Corbin, & Pike, 2010; Gresham, Van & Cook, 2006; Pelham and Fabiano, 2008). The social skill performance deficits, specifically the attentional, executive functioning and behavioural difficulties that often characterize these population may limit the effectiveness of social skills training alone (Matson, 2009). The addition of a parent component likely provides more operant conditioning to address performance deficits (Gresham, Van & Cook, 2006; Matson, 2009). Although the involvement of parents in social skills training has many benefits, it requires more resources and it can be a challenge to get parental involvement particularly for more transient children such as those in foster care.

Social Skill Interventions with Cognitive Behavioural Therapy. Social skills training with cognitive behavioural therapy (CBT) programs are similar to traditional programs that include child-focused support for understanding and practicing these skills. However, CBT often focuses more on targeting cognitive deficits and distortions in an

attempt to improve social skills (Matson, 2009). There does not appear to be distinct tasks for these interventions but often they include features such as identifying feelings and/or self-talk, practicing self-evaluation, relaxation techniques etc. (Cappadocia & Weiss, 2011; Matson, 2009; Spence, 2003). The total number of intervention hours for these programs range from 50 to 180, compared to a maximum of 18 hours among the traditional programs (Cappadocia & Weiss, 2011). The inclusion of CBT components within interventions has been beneficial for mental health concerns such as anger and anxiety (Cartwright-Hatton, Roberts, Chitsabesan, Fothergill, & Harrington, 2004; Sukhodolsky, Kassinove, & Gorman, 2004), impulse behaviour (Winer et al., 1982) as well as youth with Autism (Bauminger, 2007; Lopata et al., 2006; Lopata et al., 2008). However, due to their level of intensity and large sample size any apparent advantage reported of the social skills in the cognitive behavioural studies may reflect the intensity, power, and/or the addition of cognitive behavioural components (Cappadocia & Weiss, 2011).

A narrative review of 12 social skills interventions using other group and single case experimental design reached the conclusion that evidence for CBT approaches produced weaker effects, as compared more traditional interventions with parental involvement that included modeling, coaching behavioural rehearsal and procedures derived from applied behavioural analysis (Gresham, 2012). The CBT programs are also often more costly, require more resources and training, and they may not be appropriate for younger children or children with limited intellectual abilities (Matson, 2009).

Overall, empirical evidence for the effectiveness of the various social skills interventions is mixed (Antshel & Barkely, 2008) and more controlled methodological

designs are required to properly determine the most effective teaching techniques for various social skills impairments. However, generally more support is given for more multi-model approaches which include parent training or additional therapies such as cognitive behavioural training that likely target both acquisition and performance deficits. They have been the most successful for children with autism, ADHD or behavioural difficulties. However, these programs demand more resources due to the length of treatment and training required in comparison to traditional social skills training programs. Traditional training programs targeting more social skills acquisition deficits have been successful for children with Autism or with an intellectual disability and when effective, they are the most efficacious type of intervention.

Despite the significant social impartments of the children with PAE or with an FASD there is a dearth of research on the specific social skills and interventions with this population to direct future practice. Considering the many advantages with traditional social skills interventions research on whether this type of program is effective with these children with PAE or with an FASD is warranted.

PAE and FASD

Alcohol is the most commonly ingested teratogen in the world (Streissguth, 1997) and the impact of PAE on the developing brain can result in a variety of behavioural, cognitive, physical and psychosocial impairments (Chudley et al., 2005). PAE is used here to describe children who have confirmed prenatal exposure of alcohol without a formal diagnosis of an FASD whereas FASD is an umbrella term used to refer to a more specific set of diagnostic categories. The disorders subsumed under an FASD are Fetal Alcohol Syndrome (FAS), partial FAS (pFAS), Alcohol Related Neurodevelopmental

Disorder (ARND) and fetal alcohol effects (FAE). FAS lies towards the more extreme end of the disorders with the most visible presentation of PAE (Riley, Infante and Warren, 2011) and characterizes individuals with facial phenotype, growth deficiency, and central nervous system damage. FAS is distinguished from the terms pFAS, ARND and FAE which refer to individuals who lack some of all of the facial features and growth deficiency but still display notable neurobehavioural deficits (Chudley et al., 2005). Currently, there is no single, universal diagnostic test or a definite screening tool for the diagnosis that fall under FASD. As a way to aid standardization of the diagnosis of an FASD in Canada the *4-Digit Diagnostic Code* is used in combination with the Institute of Medicine (Chudley, Conry, Loock & LeBlanc, 2005). In Canada the estimated rate of FASD is unknown, but in United States the rate is approximately 2-5/100 (May & Gossage 2001; May et al., 2009), and the rate of children with PAE without a formal FASD diagnosis is presumably much higher. Not surprisingly, in the United States the prevalence rate of foster children with PAE is greater than 15 times that of the general population (Astley, Stachowiak, Clarren & Clausen, 2002).

The prevalence rate of an FASD is very concerning considering these children as well as children PAE often experience a variety of neuropsychological impairments in cognition including overall below average intellectual functioning with markedly uneven cognitive profiles (Mattson, Riley, Gramling, Delis & Jones, 1997), learning and remembering verbal and visual material (Wilford, Richardson & Leech, 2004), language abilities (Mattson et al., 1996), motor functioning (Wacha & Obrzut, 2007), executive functioning (Rasmussen, 2005), attention (Riley & McGee, 2005) and adaptive functioning, including social skills (for a review see Kully-Martens et al., 2012). Of the

many deleterious effects associated with PAE, social skills appear to be a particularly robust finding (Keil, Paley, Frankely & O'Conner, 2010; Steinhausen & Spohr, 1998).

Social Profile of Children with PAE or with an FASD

Children with PAE and an FASD have often been described as being gregarious and caring (Duquette, et al., 2006; James et al., 2010) however, despite their social personality the social difficulties of school-aged children with PAE are believed to be the second most frequent deficit, only after attention deficits (Steinhausen & Spohr, 1998). They have significant difficulty forming and maintaining interpersonal relationships (Coggins et al., 2003: Thomas et al., 1998). Their social impairments are attributable to their limited social skills and many competing problem behaviours (Kully-Martens et al., 2012). Knowledge of their distinct social profile is still emerging as more focus is given to evaluating social strengths, more detailed measures are used to assess social skills and as research is directed for the purpose of tailoring social skills interventions for this population (Kully-Martens et al., 2012; Rasmussen et al., 2011).

Social impairments. Thomas and colleagues (1998) and Mattson and Riley (2000) conducted some of the earliest research studies on the social skills of those with PAE and FAS. They found that children with FAS (age 5 to 12 years) ratings on the Adaptive Behaviour Scales (VABS), were significantly more impaired in the general social skills domain than compared to non-exposed children, with deficits most apparent on ratings of interpersonal relationships, coping skills as well as use of play and leisure time (Thomas et al., 1998). Furthermore, children with PAE (4 to 17 years) PAE had significantly more social competence and social problems, specifically clinginess, not getting along with others and being teased and these differences in social problems were

likely not attributable to severity of the effects of PAE exposure (i.e. FAS diagnosis) (Mattson & Riley, 2000). In both studies (Mattson & Riley, 2000; Thomas et al., 1998) groups were matched on IQ, indicating that the social skills deficits in children with PAE or FAS are beyond what would be expected based on IQ. Additionally, they also found that a negative correlation between social skills scores and age among children, suggesting that social skills deficits may become more pronounced with age (Mattson & Riley, 2000; Thomas et al., 1998).

The finding that the social functioning of children with PAE becomes more pronounced with increasing age has been consistent throughout the research (Carmichael Olson et al., 1997; Mattson & Riley, 2000; Thomas et al., 199; Streissguth et al., 1991). Whaley and colleagues (2001) found that the social impairments of children with PAE (age 22 months to 11 years) were more pronounced with age, in comparison to children with psychiatric problems. Furthermore, longitudinal studies found that relative to peers the social functioning impairments of individuals with PAE increase throughout adolescence and adulthood. These findings may be due to greater demands placed on their social functioning within the school, or work setting as they age (Carmichael Olsen et al., 1997; Stressguth et al., 1991).

Early research also evaluated whether possible negative life experiences impacted the adaptive functioning, including social functioning of children with an FASD (Thomas et al., 1998; Whaley et al., 2001). This was especially important considering the vast majority of children with PAE are not raised by their birth parent (National Organization on Fetal Alcohol Syndrome, 2002). Once in foster care, alcohol-affected children are more often subjected to both maltreatment and multiple placements (Habbidck, Nanson,

Snydre, Casey & Schulamn, 1996; Smith et al., 2007). Thus, children with PAE often experience multiple risks early on, which may impact their social development. However, type home placement, SES, caregiver marital status and number of home placements were not been found to significantly impact social functioning in young children with PAE (Whaley et al., 2001) or social skills (Thomas et al., 1998). Social knowledge also failed to significantly correlate with home placement (O'Conner et al., 2006). It may be that environmental factors may exacerbate the social skills difficulties of children with PAE or with an FASD however, these environmental influences alone do not appear to account for the degree of their social impairments (Kully-Martens et al., 2012).

O'Conner and colleagues (2006) and Schonfeld and colleagues (2006) evaluated the social skills of children with PAE with PAE (using the SSRS) and found children with PAE (age 6 to 12 years) had general impairments in social skills and problem behaviours (O'Conner et al., 2006) regardless of severity of an FASD impairment (FAS, pFAS, and ARND) (Schonfeld et al., 2006). Also, SSRS ratings failed to correlate with home placement or maternal education (Schonfeld et al., 2006). A limitation of these studies was that the subscales of the SSRS were not included in the analyses, thereby limiting our knowledge of whether children with PAE display a distinct profile of social skills.

In a study by Rasmussen and colleagues (2011) children with PAE were compared with non-exposed children (aged 3 to 8) both referred to a respite program for behavioural concerns. The two groups had similarly poor parental ratings of problem behaviours but children with PAE were more impaired on the overall social skills composite, as well as on subtest scores of responsibility, hyperactivity, and internalizing

problems. Theses results may reflect that social skills impairments of children with PAE or with an FASD are distinct and may be beyond what might be expected based on behavioural issues alone.

Children with PAE have notable social impairments and seminal research using more broad measures of social functioning indicates that their social impairments become more pronounced with age (Carmichael Olson et al., 1997; Streissguth et al., 1991; Whaley et al., 2001), are not impacted by home placement, are beyond what is expected based on differences of IQ (Mattson & Riley, 2001) or behavioural difficulties (Rasmussen et al., 2011) and are present regardless of a specific (and possibly more severe) FASD (Mattson & Riley, 2000). More recent research used more detailed measures of social skills however, there still little information of whether children with PAE display a distinct profile of social skills, which is important for developing tailored interventions.

Contrary findings. Despite the well-documented social skills impairments in PAE or with an FASD there are some contrary findings, as well as reports of social strengths of children with PAE. Brown and colleagues (1991) evaluated the social skills among children with PAE (aged 5 to 8) from primarily African-American, low-SES families using the VABS measure of adaptive behaviour failed to find differences between PAE children and controls. When this sample was retested in their adolescents similar results were found (Howell et al., 2006). However, these results should be interpreted with caution since several factors could have influenced the results (e.g. maternal reporting and sample group).

Overall, from the studies using the SSRS (O'Conner et al., 2006; Rasmussen et al., 2011; Schonfeld et al., 2006) respite workers and teachers tended to rate children's social skills and problem behaviours within the average ranges (Schonfeld et al., 2006). Researchers theorized that the differences between the SSRS parent and teacher ratings of children with PAE or with an FASD might reflect teachers' tendency to focus less on children's social skills than on behaviours or abilities related to successful classroom functioning (O'Conner et al., 2006; Schonfeld et al., 2006). This is supported by the results of an intervention study that found a positive association was found between child IQ and teacher-rated social skills, suggesting that teachers rated more intelligent children as making more significant social skills gains regardless of treatment condition (O'Conner et al., 2006). Similarly, teacher's reports indicated that metacognition (i.e. the child's ability to plan, problem solve and self manage and monitor tasks) was the most important indicator of social competence (Schonfeld et al., 2006). It is also important to consider that children with an FASD have been reported to demonstrate some prosocial behaviours (determination, tenacity, and eagerness to do well despite when things are difficult for them) and social strengths (Breen & Burns, 2012; Dunquette et al. 2006; Malbin, 2004) that are likely valued by teachers. Further evaluation of children's social skill strengths on the SSIS-RS may help to provide understanding of these findings.

Social Strengths. Stressguth and Giunta (1988) described children with an FASD as, "children with butterfly like movements who are hyperactive and/or excessively friendly and fearless (p 38)." Others have poignantly described these children as having similar endearing social behaviours and the most frequently noted positive characteristics reported of children with PAE or with an FASD is their interest in others and their

sociable personality, a distinction from other children with social impairments (Beer, Kritzinger, & Zsilavecz, 2010; Breen & Burns, 2012; James et al., 2010; Malbin, 2004; Streissguth et al., 1998). Caregivers described the two main joys of parenting children affected by an FASD were their children's loving and caring personality, as well as their determination and energy (Breen & Burns, 2012). Caregivers have also described their children with an FASD as being friendly, talkative, cooperative and charming (James et. al., 2010).

The social personality of individuals with an FASD also appears to continue into adulthood. In a qualitative review of adolescents with an FASD lived experiences they indicated that they enjoy being social, with some adolescents noting that their favorite aspect of school was spending time with their friends (Duquette et al., 2006). They also indicated that they have many friends, however parents of these adolescents commented that their child's purported friends were only acquaintances. Despite the reports of their social strengths, since traditionally there is more focus on the social deficits of children to guide assessments, interventions, and research (Chafouleas & Bray, 2004) there is limited documented research on the social strengths of children with PAE or with an FASD. Knowledge of the social strengths of children with PAE and an FASD can aid in tailoring interventions that are more likely to be acceptable to these children however, more research is clearly needed in this area.

Factors Impacting the Social Skills of Children with PAE or with an FASD

An important consideration when conceptualizing the social profile of children and designing interventions is whether observed difficulties reflect the acquisition and performance of social skills, the presence of problem behaviours that interfere with

positive social interactions, or a combination of the two that impact their social functioning (Gresham, 2006). The distinction provides a framework for understanding the contributing factors of a child's social skills impairments and whether interventions should target either one or both of these deficits (Gresham et al., 2012; Spence, 2003).

Acquisition Deficits and Performance Deficits. Children with PAE or with an FASD may not have particular social skills in their behavioural repertoire to interact appropriately with others or have not acquired a critical step in the performance of a given skill. For example, preliminary studies indicate that children with an FASD have reduced capacity to appreciate that others have beliefs and thoughts of their own (as measured by theory of mind (ToM) (Rasmussen et al., 2009) and deficits in appropriate discrimination of social situation (e.g. social information processing) (Gresham et al., 2012; Kully-Martens et al., 2012). Interventions that have addressed children with PAE social information processing (i.e., hostile attribution bias) helped them overcome social skills deficits (Keil, et al., 2010), indicating the relationship between the social difficulties of these children and their social information processing deficits. Furthermore, individuals with PAE also have social problem solving problems, in a study by McGee and colleagues (2008) adolescents with PAE had difficulty identifying social problems and strategies to resolve them than non-exposed controls. Lastly, preliminary research also indicates that they may have social-cognitive difficulties, specifically trouble recognizing emotion from adult facial expressions (Greenbaum et al., 2009) however, these findings are mixed (Rasmussen et al., 2013). To further examine their social profile, specifically their acquisition deficits, the current study included a subtest measuring facial affect recognition from the NEPSY-II.

Children with PAE or with an FASD also likely have some of the skills (or understanding) to behave in socially skilled manner, yet sometimes fail to demonstrate these skills at appropriate times or settings due to motivational factors or performance problems. The difficulty of children with PAE or with an FASD acting in a social skilled manner is likely due to the relationship between performance deficits and competing problem behaviours.

Problem behaviours. It is well documented that children with PAE display many behaviours that could impede, or "block" the acquisition or performance of a given social skill. Both caregivers and teachers indicate that children with PAE have many difficulties related to externalizing behaviours problems such as attention (Mattson et al., 2012; Mattson & Riley, 2011; Steinhausen & Spohr, 1998), aggression (Mattson & Riley, 2001), and delinquency (Mattson & Riley, 2001). These emotional processing difficulties of children with PAE have predicted their social skills abilities (Greenbaum et al., 2009). Children with an FASD also have pervasive executive functioning deficits (Rasmussen, 2005; Schonfeld et al., 2006), and behavioural regulation (Schonfeld et al., 2006), which are important indicators of social competence (Crick & Dodge, 1994). In single study available comparing this relationship, executive functioning was predictive of parent reports of poorer social skills of children (aged 6 to 11 years) with PAE (FAS, partial FAS, and ARND) (Schonfeld et al., 2006). These results were expected considering researches belief that executive functioning is involved in a child's social skills for example, a child's ability to take turns, share, or manage social conflict (Schonfeld et al., 2006).

Regarding internalizing behaviours, high levels of depression and anxiety can inhibit the use of appropriate social skills (Spence, 2003). If a child is overly depressed they may find it difficult to listen to their peers due to possible reduced energy levels or distracting thoughts leading them to respond inappropriately to others (Spence, 2003). Also, depressed children are also correlated with faulty interpretation of social events and consequently poor social competence (Garber, Weiss & Shanley, 1993). Similarly, issues with anxiety can trigger avoidance of social situations and they have been found to produce less positive outcomes from peers during social interactions (Spence et al., 1999). Children with an FASD have high levels of emotional disturbances with particularly high rates of depression and anxiety (Pei et al., 2011).

It should be recognized that the presence of externalizing or internalizing behavioural problems does not necessarily rule out the presence of an acquisition or performance deficits. Rather, the social skills impairments deficits may serve to maintain or exacerbate externalizing and internalizing problems (High, 2008; Gresham & Elliott, 2008; Tompson & Goodman, 2009). In children with PAE (6 to 16 years) greater social skills deficits have been shown to put them at greater risk of negative behavioural outcomes and delinquency (Roebuck et al., 1999). Alternatively, increased social skills in children with an FASD have ameliorated some of the effects of anxiety and mood disorders (Wlathall et al., 2008). Taken together, children with PAE have many problem behaviours impacting their social functioning however, the extent of these behavioural difficulties are also likely exacerbated by social skills impairments.

Conceptualization of a child's specific social skills, together with understanding of whether these difficulties are acquisition and/or performance deficits can lend towards

more targeted treatment of a child's social skills difficulties. Whether an intervention that targets one of both of these deficits (and or competing behaviours) is successful or not may reflect the match between the nature of a child's deficit(s) and the intervention used (Gresham et al., 2012). Unfortunately, there is only limited understanding of the distinct social profile or knowledge of the efficacy of social skills interventions tailored specifically for these children to guide practice.

Interventions for Children with PAE or with an FASD

Presently, there is only one successful social skills intervention published on children with an FASD, discussed in two separate papers by O'Conner and colleagues (2006) and Keil and colleagues (2010). The intervention studied is based on the Children's Friendship Training Procedure (Frankel, 2005; Frankel & Myatte, 2003) to improve social skills and decrease problems behaviours by targeting their hostile attribution bias (interpreting the intent of others as hostile). It included aspects of a more traditional social skills intervention; 12- 90 minute sessions over 12 weeks, where they received instruction, modeling, rehearsal and performance feedback. It also included aspects of a more multi-model approach that included homework assignments, as well as coaching by parents during social play. Parents also attended separate concurrent sessions where they were informed about the key social skills being taught to their children. The study was conducted for children with an FASD (aged 6 to 12 years, $n = 100$) and groups of approximately 7 to 8 children were either in the children's friendship training (CFT) group or in the delayed treatment control (DTC) group.

The CFT group significantly improved in their knowledge of appropriate social skills, overall social skills, and problem behaviours compared with the DTC group, and

these improvements were maintained at 3-month follow-up (Keil et al., 2010). However, teachers did not report significant changes in child behaviour or social skills ratings. Furthermore, the CFT group significantly improved on a hostile attribution measures in peer group entry, but not peer provocation (Keil et al., 2010). These results were consistent with the results of the DTC group once they also received interventions.

The aforementioned studies provides some preliminary support for the effectiveness of a social skills intervention in children with an FASD, however the interventions were fairly resource intensive requiring parental involvement despite the majority of this population being in foster care and the researchers did not report on the SSRS subtests (Popova et al., 2012). Also, considering that children with PAE and with an FASD have variety of social skills deficits, with markedly uneven and varied cognitive profiles these children may especially benefit from more individualized social skills training. Therefore, evaluating the specific social profile and effectiveness of a social skills program that requires few resources and is individualized for children with PAE or with an FASD is warranted.

Present Study

There is evidence that children with PAE or with an FASD have considerable social impairments, however there is a dearth of research on the detailed pattern of social skills and problem behaviours as they might impact effective social functioning. Therefore the first aim of the present study was to characterize the social profile (specific social skills strengths and weaknesses, problem behaviours and affect recognition) of young children with PAE or with an FASD. Both children with a diagnosis of an FASD and without a diagnosis but with PAE (confirmed through affidavit) were included in the

study because children with PAE also have many social skills deficits, and many children with PAE are not able to get diagnosed for an FASD until age 6 or 7 years.

Another aim of the study was to examine whether the social characteristics of children with PAE and with an FASD are related to various factors such as number of home placements, IQ, age, diagnosis etc., which may provide further understanding of the contributing factors of their social functioning. If their social skills and problem behaviours are not related to other variables it may be that children's primary social impairments are the result of primarily the brain damage related to PAE. Conversely, if they are related, it may be that stressful early life experiences may also have a significant impact on the social functioning of children with PAE or with an FASD. Together, the results of their social profile and its relationship with other variables will help to identify areas of weakness, and thereby provide preliminary information as to how children with PAE or with an FASD have a distinct social profile. In the future this information could aid in helping differentiate children with PAE or with an FASD from other clinical populations. Furthermore, it would provide crucial information for designing tailored social skills interventions for this population.

The second primary aim of the study was to examine the impact of a social skills intervention -The Social Skills Improvement System Intervention Guide (SSIS-IG) (Gresham & Elliott, 2008) – on the functioning of children with PAE or an FASD. The SSIS-IG is a traditional social skills program that focus on instruction, modeling, rehearsal and performance feedback. It has been successful with children who have social skills acquisition deficits (e.g. Autism and intellectual delays) and may be beneficial in addressing acquisition deficits of children with PAE or with an FASD. The main

advantages of this program are that is less resource intensive, (i.e., it does not necessarily require parental involvement, and is short in duration) and it allows for a tailored intervention based on their specific areas of need. If successful, the intervention program could increase their social skills and reduce competing problem behaviours, which could help to foster academic success, increased relationships, and reduce many secondary disabilities in addictions and mental health. This could lead to overall better outcomes for children with PAE or with an FASD, their families and society.

Research Questions. 1a. What is the social skills profile (including social skills strengths and weaknesses and affect recognition ability) and competing problem behaviours of children with PAE or with an FASD as rated by caregivers?

Hypothesis: Caregivers will rate children with PAE or an FASD as having a range of social skills and problem behaviours with particular strengths in engagement and cooperation due to their sociable personality and general desire to be well liked. I hypothesize they would have more difficulty with social skills and problem behaviours related to impulsivity (bullying, responsibility etc.) and hyperactivity. Furthermore, consistent with some previous research findings, I expect that participants will have difficulties with facial affect recognition.

1b. Do demographic factors such as number of home placements, SES, age, sex, PAE or an FASD diagnosis, or IQ were relate to social skills and problem behaviours in children with PAE or with an FASD?

Hypothesis: Similar to the majority of the previous research findings, participant's social skills and problem behaviours will not be related to environmental factors (i.e., number of home placements and SES) (Thomas et al., 1998) or factors such

as sex or IQ (Mattson & Riley, 2000). Conversely, I expect age effects with more social skills impairments and competing problem behaviours with older participants.

2. Does a social skills intervention program targeted at acquisition deficits increase social skills and reduce problem behaviours of children with PAE or with an FASD?

Hypothesis: Children with PAE or with an FASD in the social skills intervention will exhibit increased social skills and fewer problem behaviours due to the individualized intervention program targeting specific areas of need compared to a comparison group.

CHAPTER THREE

Methods and Materials

Participants

Participants were recruited using convenience sampling through the Glenrose Rehabilitation Hospital FASD clinic, and local schools and community agencies. Children were eligible to take part in study if they were between 4 to 10 years of age and had a diagnosis of an FASD in concordance with the 4-digit diagnostic code (Astley, 2004) and the Canadian Guidelines (Chudley et al., 2005). Additionally, children without an FASD diagnosis but with prenatal alcohol exposure (confirmed through affidavit) were also eligible and labeled as 'PAE' because social skills deficits are also common among this children (Rasmussen et al., 2011). Additionally, children do not often receive an FASD assessment until age 6 or 7 years a diagnosis of an FASD because of the inability to assess all domains of brain functioning (e.g. executive functioning) with objective standardized testing measures when a child is too young. Children with diagnostic comorbidities, like ADHD or ODD were also included in the study since it is common for children parentally exposed to alcohol to exhibit such comorbidities (e.g. Fryer, McGee, Matt, Riley, & Mattson, 2007). However, children who had a significant neurological or medical condition that would prevent them from benefitting from the interventions (e.g., autism) were excluded.

Twenty-nine participants (14 male and 15 female; 17 with PAE and 11 with an FASD) aged 4 to 10 (M=7 years, 6 months) partook in the study. The majority of participants were adopted (n= 19) while the remainder were either in foster care (n=8) or with a biological family member/kinship (n=2). Participants were assigned with

matching to either the social skills intervention (*n*=14) or the math skills intervention (*n*=15) first matching on age, then diagnosis, IQ and gender when possible (Table 1). Post-testing data was not available for one participant (a 9 year old female with FASD) in the math skills intervention and therefore was not included in the intervention data analyses.

Table 1 *Participant Characteristics*

Participant Characteristic	Social Skills Group (n=14)	Comparison Group (n=14)	*p*
Age in years (M [SD])	7.5 (1.4)	7.3 (1.5)	.82[a]
Gender (n female %)	8 (57.1%)	6 (42.9%)	.35[b]
Diagnosis (n FASD [%])	4 (30.8%)	7(46.7%)	.35[b]
Full-Scale IQ (M [SD])	93.7 (18.5)	88.3 (12.5)	.38[a]
Living arrangements (N [%])			.62[b]
Adoptive parents	8 (66.7%)	10 (66.7%)	
Foster care	4 (33.3%)	4 (26.7%)	
Lifetime number of living situations (M [range])	3.46 (1-6)	2.79 (1-6)	.33[a]
Current caregiver characteristics			
Social Economic Status (SES)	37.9 (8.9)	40.6 (14.9)	.62[a]
Education (N [%] one parent graduated high school)	5 (36%)	9 (64%)	.37[b]

Note. SES was obtained from the primarily caregiver using the Hollingshead Four Factor Index of Social Status. Possible scores range from 8 to 66. Full-Scale IQ reported as a standard score using the Wide Range Intelligence Test (WRIT).
[a]Analyzed with ANOVA; [b] Analyzed with chi-square

Procedures

The study was an experimental design and before conducting research, ethics approval was obtained from the Human Research Ethics Board at the University of Alberta, and informed consent was obtained from individual schools, the Edmonton Public School Board and Edmonton Catholic Schools, and parents. Participants then underwent a two to two and a half hour pre-test battery that consisted of an assessment of IQ, social skills, mathematical achievement, and other related cognitive abilities. After

each child completed all pretreatment assessments, the children were assigned to the social skills or math skills, with an attempt to equate groups on age, gender, socio-economic status and IQ. In addition, families who had two children in the study were allowed to have both children in the same condition (sibling pairs *n*= 2).

The intervention was conducted within four weeks of pre-testing at either the participant's school (*n*= 21), in the home setting (*n*=6) or at the Gelnrose clinic (*n*=1). Intervention sessions were scheduled once or twice a week over a five to seven week period for a total of ten half-hour individualized intervention sessions. All participants received a total of 5 hours of intervention. Post-testing occurred within ten days of the last intervention. The same measures were used at post-test, with the exception of IQ testing. The post-test battery took approximately two and a half hours to complete, and was conducted by a research assistant who was generally blind to the child's treatment condition.

The pre/post testing and interventions were conducted by one of four research assistants (RA). All RA's had a least a degree in psychology and previous experience working with children with PAE or with an FASD. In an effort to reduce bias, generally one RA would conduct a participant's pre-testing and intervention, while a different interventionist would conduct the participant's post-testing. To ensure consistency between administration procedures interventionists observed each other's sessions and discussed particular details on conducting the interventions.

Social Skills Intervention. The social skills intervention was based on the Social Skills Improvement System-Intervention Guide (SSIS-IG) developed by Gresham and Elliott (2008). SSIS-IG is a manualized, level B intervention for children between 3 and

18 years of age. It is designed to be administered with a group of children but for the present study it was administered individually. One of the key features of the SSIS-IG is its ability to be used in conjunction with the SSIS rating scales to enable for pre and post-intervention assessments. This allows for tailored interventions based specifically on the needs of each child and for evaluation of progress on targeted skills after intervention. Caregivers and teachers report on a wide range of behaviours pre and post testing. These reports were entered into the SSIS-RS scoring program, which in turn produces a computerized profile of a child highlighting specific areas social skills strengths, acquisition deficits, performance deficits and competing problem behaviours. Depending upon participant's profile as determined by the SSIS-RS printout, they received an individualized social/behavioral intervention that focuses on several key areas of social skills difficulties (communication, cooperation, assertion, responsibility, empathy, engagement, and self-control) and problem behaviors (externalizing, bullying, hyperactivity/inattention and internalizing), which often manifest in the school setting. Together, the SSIS Rating Scales assesses 46 separate behaviours subsumed into 20 keystone behaviours that may be targeted for intervention in the SSIS-IG. The 20 keystone behaviours correspond with 1 of 20 SSIS-IG units.

The intervention units feature a 6 phase instructional approach: *Tell, Show, Do, Practice, Monitor Progress,* and *Generalize.* The *Tell* phase uses coaching techniques to preset social rules or concepts and introduces the skill in a discussion format. It included skill steps for children to follow. The following is an example of the skill steps for the teaching unit *Doing the Right Thing* (Gresham & Elliott, 2008):

> Step 1: Think- think about what the responsible thing is for you to do.
> Step 2: Ask- Ask what happens if you don't act responsibly.

Step 3: Find- Find examples of acting responsibly when with others.
Step 4: Talk- Talk with others about what the responsible thing is to do.
Step 5: Do- Act responsibly when with others. Do the right thing.

This phase is based on the theory that coaching is an instructional teaching strategy derived from social learning theory that uses verbal instruction and receptive language skills to teach social behaviour. The *Show* phase is also based on social learning theory but uses modeling techniques, in which a behaviour sequence is presented for a given social skill. The intent of this phase is to teach children, through video modeling, how to integrate specific behavioural actions into a complete behaviour pattern. The video clips depict children modeling positive and negative social behaviours in more realistic social situations and school settings (Gresham & Elliott, 2008).

In the *Do* phase children have the opportunity to demonstrate their knowledge of the specific steps they have learned in the *Tell* and *Show* phases by role-playing. The SSIS-IG provides role-play scenarios where children can practice doing the correct or incorrect thing in a specific situation. These phases are followed by the *Practice* phase, which involves having children think of a specific example of when it is easy or difficult to do the correct thing and role-playing these scenarios. Children are encouraged to share ideas of how to improve their ability to do the right thing. Typically this phase also includes assigning homework however, this part of the intervention was removed from this study. The *Monitor Progress* phase includes providing feedback to the child of their social skills performance demonstrated in the *Do* and *Practice* phases. Children are also asked to provide feedback on their understanding of their ability to perform the targeted behaviour. Lastly, the *Generalize* phase includes encouraging the child to use their learned social skill in a variety of situations and influence their peer's behaviours to do

the right thing. It also includes, brainstorming with the child places where the child might do the right thing (e.g. home, school etc.) and people that the child might do the right things for (e.g. caregivers or siblings).

The goal of the intervention described is to provide children with direct instruction, modeling and practice on needed social skills until the child is able to generalize and use their skills in other settings. Gresham and Elliott (1991; 2008) indicate that this intervention design is most effective with children who have social skills acquisition deficits. The intervention also includes additional strategies that can be used to remediate social skills performance deficits and reduce problem behaviours, such as the use of parent involvement and other techniques based on applied behavioural analysis. However, these components are not a requirement for the social skills training and were not incorporated into the present study. The methods used in the SSIS-IG are based on the years of research conducted on social development and social behaviour by Gresham and Elliot (Elliot & Gresham, 1991; Gresham, 1981, 1985; Gresham & Elliott, 1990) and preliminary research may indicate that it is successful with children with social skill acquisition deficits (Gresham, Van, & Cook, 2006). Specifically, an intense (60 hour versus 30 hour) SSIS-IG was implemented with 4 students who had social skills acquisition deficits and children showed decreases in competing problem behaviours as rated by parents and both social skills and completing problem behaviours by teachers (Gresham, Van, & Cook, 2006).

Social Skills Intervention Process. The intervention sessions were conducted at different times of the day depending on a family's or school's schedule. Before a session, the interventionist would retrieve the participant from the classroom and bring them to a

quite room without distractions. The intervention was conducted in a flexible but consistent manner. More time was provided for different lessons depending on rate of learning acquisition. Also, more praise and stickers were given when children showed increased attention and correct responses. At the end of each session participants were able to choose a small prize (such as a sheet of stickers, hair clips etc.).

Math Skills Comparison Intervention. The math intervention used was the Math Interactive Learning Experience (MILE) (Coles, Kable & Taddeo, 2009; Kable, Coles, & Taddeo, 2007) which was created to address the mathematic difficulties often associated with PAE or with an FASD. It chosen as a comparison intervention because social skills were not taught in the math intervention, and partly due to the significant math difficulties of children with PAE and with an FASD (Coles, Kable & Taddeo, 2009). To ensure consistency between the social skills and math interventions, the math intervention was also individualized based on the specific math deficits and learning needs of a child, it was conducted one-on-one allowing administration to be altered to compensate for those with slow information processing, and it was conducted in the school or home setting. This allowed for the evaluation of the changes in social skills and problem abilities between groups while concurrently allowing for an intervention for all participants.

Measures

Demographic Questionnaire. At pre-test caregivers completed a short demographic form that consisted of information about the child's age, grade, placement history and current living situation, and information about the caregiver (such as, marital status,

highest level of education received, occupation and household income bracket using the Hollingshead Four Factor Index of Social Status; Hollingshead, 1975).

Social Skills and Problem Behaviours. *Social Skills Improvement System (SSIS) Rating System*. The SSIS-RS is a revision of the widely used Social Skills Rating System (SSRS; Gresham & Elliott, 1990). These scales measure social skills in terms of frequency of occurrence (for example, how often a child is helpful or polite) and behaviours that are proposed to influence the quality of relationships with others on dimensions relating to self-control, responsibility, cooperation, empathy and assertion (Gresham & Elliott, 2008). This allows the evaluation of a child's social strengths and weaknesses with information provided about whether the weaknesses are due to social skills acquisition or performance difficulties. It also includes a brief assessment of problem behaviours that may interfere with a student's ability to acquire or perform social skills (i.e. externalizing, bullying, hyperactivity/inattention, internalizing etc.). To allow for information of a child's behaviour to be evaluated in different settings there are parent, teacher and child versions of the measure with separate scales for preschool, elementary and Grades 7-12. These measures allow for composite scores (with a mean of 100 and a standard deviation of 15) based on national norms of social skills problems and competing problem behaviours (Gresham & Elliott, 2008). Research indicates that the SSIS-RS has strong psychometric properties (Demaray et al., 1995; Gresham & Elliott, 2008).

NEPSY-II. The NEPSY–II (Davis & Matthews, 2010) is a standardized neuropsychological battery for children aged 3 to 16 years. It is designed to assess functioning across a number of domains; however, only the Affect Recognition subtest

from the NEPSY-II was used as cognitive measures of social perception. The Affect Recognition subtest is designed to assess the ability to recognize affect (happy, sad, anger, fear, disgust, and neutral) from photographs of children's faces in four different tasks. Facial affect recognition is related to children's social abilities.

Child Behavior Checklist (CBCL). The CBCL (Achenbach, 2001) measures the social, emotional and behavioural problem areas of children as reported by caregivers and teachers. Based on the item responses a score of eight problem scales is provided: Withdrawn, Anxious/Depressed, Somatic Complaints, Social Problems, Thought Problems, Attention Problems, Delinquent Behavior, and Aggressive Behavior (T scores in the clinical range were scores > 67.5). These scales can be summarized into three broader scales: Externalizing problems (Aggressive Behavior, Delinquent Behavior), Internalizing problems (Withdrawn, Somatic Complaints, Anxious/Depressed) and Total Problems (T scores > 62.5 were in the clinical range). Children aged 6 to 18 years are also given scores in three competence areas: social settings, activities, and school settings (T scores < 32.5 were in the clinical range).

Intelligence (Pre-measure only). 1. *Wide Range Intelligence Test* (WRIT; Glutting, Adams & Shelow, 2000) is a brief measure of verbal and nonverbal cognitive abilities designed for individuals between ages 4 to 85 years. The WRIT provides verbal (crystallized) IQ and visual (fluid) IQ scores, which together yield a measure of general IQ (normative mean of 100 and standard score of 15). Although the WRIT is a brief test of IQ, it is highly correlated with much lengthier IQ tests such as the Wechsler Intelligence Scale for Children (WISC-III, 0.90).

Data Analysis

To answer the first research question we analyzed the SSIS-RS, NEPSY-II and CBCL scores. All analyses for the first research question included data from the full sample (*n*=29) baseline data. Participant's standard scores were compared to the normative mean score using a one-sample t-test. Correlational or ANOVA analyses were then run to determine whether standard scores from the SSIS-RS were related to various demographic features of our sample.

Before addressing the second research an ANOVA for continuous data and chi-square for categorical data was run to ensure the two intervention groups were matched on demographic variables. Then, to examine whether the 'change scores' (pre- and post-test standard scores) were significantly different between intervention groups an ANOVA was run. Lastly, a paired-sample t-test was used to examine changes in pre- and post-testing scores for each of the relevant CBCL and SSIS-RS measures within each of the intervention groups.

CHAPTER FOUR

Results

Research Question 1a: Social Profile

Social Skills & Problem Behaviours. An evaluation of the parent SSIS-RS output reveals that our sample exhibited scores that were in the clinical range and the mean scores were 1 standard deviation (SD) or more below the normative mean and significantly different than the normative mean of 100 on social skills, $t(28) = 26.1$, $p < 0.00$, and on problem behaviours, $t(28)=38.3$, $p<0.00$, indicating that our sample had significant social skills impairments and problem behaviours (Table 3). The SSIS-RS does not provide standard scores for the various subtests but rather uses the raw scores to determine how children fall within each of the clinical ranges. Participants received the least ratings in the clinically significant range on the Cooperation social skills subtest (41.1%) and the most ratings on the Responsibility (62.1%) subtest (Table 2). Regarding problem behaviours, the sample received the least ratings in clinically significant range on the Bullying problem behaviours subtest (41.1%) and the most ratings in on the Hyperactivity/Inattention (69.0%) subtest (Table 2).

Table 2 *Performance of children with PAE or an FASD on the SSIS-RS*

Scale	Mean (SD)	% rated in the Clinically Significant range
Social Skills[a]	76.2* (15.8)	48.2*
Empathy	9.5 (4.2)	55.2
Communication	13.6 (5.6)	48.3
Cooperation	9.6 (3.0)	41.4
Assertion	10.2 (4.7)	55.2
Responsibility	8.3 (3.4)	62.1
Self-Control	7.6 (3.8)	48.3
Engagement	11.0 (4.6)	55.2
Problem Behaviours[b]	124.9* (17.8)	78.9*
Externalizing	15.4 (6.6)	65.5
Bullying	3.6 (2.9)	41.4
Hyperactivity/Inattention	11.8 (3.6)	69.0

Internalizing	9.5 (5.3)	55.2
Autism Spectrum	15.1 (8.4)	55.2

Note: Mean standard scores on the Social Skills and Problem Behaviours subscales fell within the clinically significant range (i.e. below 1 SD on the social skills subscale and above 1 SD on the Problem Behaviours subscale). All scores are raw scores, except total social skills and total problem behaviours that are standard scores.
[a]Lower scores indicate poorer social functioning.
[b]Higher scores indicate more problem behaviour.
*Significantly different from the normative standard score mean of 100, $p < .05$.

On all of the relevant CBCL measures all *t* scores were on average 1 standard deviation (SD) or more below the normative mean and significantly different than the average normative *t* score of 50 (Table 3). However, on average participant's ratings fell within the normal range relative to the normative sample except on the Externalizing and Total Problems scale participants *t* scores fell within the clinically significant range (Table 3).

Table 3 *Performance on the CBCL broad scales and social subtests*

Scale	Mean *t* score (SD)	The *t* value results comparing participant mean *t* scores and normative mean *t* scores
Broad Scales		
Internalizing Problems[a]	62.3 (12.2)	5.40*
Externalizing Problems[a]	62.6 (11.7)	5.80*
Total Problems[a]	66.1 (9.5)	8.03*
Social Subtests		
Social[b]	36.5 (9.9)	-8.8*
Social Problems[a]	64.9 (8.2)	-6.7*

Note: Broad scales *t* scores <62.5, Social subtest *t* scores >32.5 and Social Problems subtest *t* scores <67.5 were within the Normal range. The Social and Social Problem subtest scores were only available for participants aged 5 and older (*n*=24).
[a]Higher *t* scores indicate poorer behavioural ratings. [b]Lower *t* scores indicate poorer behavioural ratings.
*Significantly different from the normative *t* score mean of 50, $p < .05$.

Facial Affect Recognition. The results from the cognitive measure of social perception using the NEPSY-II indicates that on the affect recognition subtest the sample's mean scaled score of 8.6 compared to the normative mean of 10 approached

significance, $t(28)=-1.98$, $p=0.06$. Participants overall mean for Affect Recognition was within 1 standard deviation (SD) of the normative mean, with overall percentile scores on each of the various affects (happy, sad, anger, fear, disgust, and neutral) measured also within the average range (Table 4). Regarding the ability to recognize specific faces, participants were significantly better at correctly identifying happy faces (24.1% of participants were below the expected ability level) compared to having the most difficulty recognizing fearful faces (58.6% of participants were below the expected ability level) $t(28)= -3.26$, $p= 0.04$ (table 3).

Table 4 *Performance of children with PAE or with an FASD on affect recognition*

Scale	Mean (SD)	% below the expected level
Affect Recognition	8.6 (3.8)	
Happy	.52 (.98)	24.1
Sad	2.9 (1.5)	37.9
Neutral	1.7 (.97)	44.8
Fear	1.3 (.86)	58.6
Angry	2.3 (.57)	48.3
Disgust	1.8 (.86)	48.2

All scores are reported as raw scores except for the Affect Recognition total score that is a standard score.

Research Question 1b

Social Skills and Demographic Variables.

I was also interested in whether participant characteristics such as number of home placements, SES, age, sex, PAE or an FASD diagnosis, IQ or were related to overall social skills or problem behaviours, all p values were > .27 (Table 5).

Table 5 *Correlation Between Demographic Characteristics with Social Skills and Problem behaviours.*

	Demographics				
Number of Home Placements	SES	Sex	Diagnosis	IQ	Age

Social Skills Composite	-0.01	0.25	0.11	-0.11	0.13	-0.14
Problem Behaviours Composite	0.13	0.13	0.03	0.13	0.07	0.14

No significant *p* values at the 0.05 level.

Research Question 2

To ensure that the intervention groups (*N*=28) did not significantly differ on any demographic variables chi square, ANOVA or *t* tests were run (Table 1). As anticipated, both groups did not differ on any major demographic variables. Regarding the second research question, I hypothesized that children in the social skills group would exhibit significantly greater standard score gains on the SSIS-RS and CBCL social and social problem subtest than children in the math intervention. Overall the two ANOVA's 2 (Group: social skills intervention and math intervention) x 1 (change scores) indicated that the social skills intervention did not significantly impact the SSIS-RS composite scores social skills $F(1, 26)= .016$, $p =0.90$; problem behaviours $F(1, 26)= 2.81$, $p= 0.12$ (Table 6) relative to the math intervention. Differences between the two intervention groups change scores on the CBCL Social composite approached significance $F(1, 21) = 3.4$, $p= 0.08$; however it did not approach significance for the social problems subtest $F(1, 21)= 0.54$, $p= 0.47$. However, when differences between participants pre- and post-test SSIS-RS scores were evaluated separately within each intervention using paired-sample *t* tests, participants scores in the social skills intervention on problem behaviour scale score significantly decreased by 8.6 standard points $t(13)= 2.52$, $p= 0.03$ versus the math skills intervention which only decreased by 1.7 $t(13)= 0.76$, $p= 0.46$. No other significant changes were found between pre- and post-test scores for participants within

each intervention on SSIS-RS social skills or CBCL social composite or social problems subtest (all *p* values were > .05) (Table 6).

Table 6 *SSIS-RS and CBCL change scores by Intervention*

	Social Skills (n=14)			Math Skills (n=14)		
	Pre	Post	Diff	Pre	Post	Diff
SSIS-RS Social Skills composite [a]	74.2	74.1	0.09	80.0	78.8	1.2
SSIS-RS Problem Behaviours composite[b]	129.9	121.3	**8.6***	119.9	118.1	1.7
CBCL Social Composite[a]	37.8	34.5	3.3	35.2	39.0	-3.8
CBCL Social Problems subtest[b]	66.5	70.2	-3.7	61.8	62.2	-0.36

Note. CBCL social scales were only available for participants 5 and older (n for each group= 12).

[a]Higher scores indicate poorer behavioural ratings. [b]Lower scores indicate poorer behavioural ratings.

*$p < 0.05$

CHAPTER 5

Discussion

The purpose of this study was to characterize the social profile of children with PAE or an FASD as well as examine the effectiveness of an individualized intervention program that targeted each child's specific social skills impairments. Specifically, to gather information about participant's specific social skills strengths and weakness, and competing problem behaviours that impact effective social functioning I used the SSIS-RS and CBCL. This was followed by analyzing the possible contributing factors of participants social impairments by measuring participants affect recognition ability and analyzing whether there was a relationship between social skills and problem behaviours with demographic variables (environmental factors, and other variables such as age, diagnosis and IQ). Together, knowledge of the social profile of children with PAE or with an FASD, possible contributing factors to the participant's functioning, and information about the effectiveness of a social skills intervention could help identify specific strengths as well as the areas of need to guide future research and practice.

Social Profile

Social Skills. Our sample exhibited social skills impairments in the clinical range with scaled scores that were significantly lower than the normative mean and more than one standard deviation below the normative average tested pre-intervention as measured by the SSIS-RS. Participant's ratings on the CBCL Social Problems measure were also significantly lower compared to the norm (however, ratings were still marginally within the normal range). These findings are not surprising considering the large body of research attesting to their social impairments (Kully-Martens et al., 2012). Furthermore,

consistent with the specific strengths and weaknesses found in Rasmussen and colleagues study (2011) participants received better ratings on the measure of cooperation with poorer ratings on a measure of responsibility. These results were expected considering the friendly and caring nature of children with PAE or with an FASD (Duquette et al., 2006) and may indicate a relative cognitive strength of children with PAE or with an FASD. Children's weaknesses in responsibility are similar to reports of children with PAE or with an FASD difficulty with impulsivity and planning ahead due to cognitive impairments in executive functioning (Schonfeld et al., 2006). These aspects may begin to provide some understanding as to what may make the social profile of children with PAE or with an FASD distinct.

Regarding social behaviour as measured by the CBCL Social composite, caregivers reported that participants were significantly less social (i.e. on average was involved in fewer extracurricular activities, had reduced number of contact with friends and had fewer friends) compared to the normative sample; however on average participants score on the Social composite was still within the normal range. A possible explanation for why these children's level on the social composite was still within the average range may be due to the nature of community involvement of participant's families. Caregivers who are able to have their child participate in a study may also be more likely to connect their children with various social activities. Also, the results may be due to the desire of children with PAE or with an FASD to interact with others (Duquette et al., 2006) and therefore seek out social opportunities. It is important to acknowledge that although participant's level of social involvement was is in the normal range they may have a poor quality of relationships with those they interact with

(Duquette et al., 2006). Future research should not only continue to examine the social involvement of children with PAE or with an FASD but also examine children's quality of the relationships of those they interact with.

In terms of facial affect recognition, overall participants were found to have no impairments relative to the normative sample. There are conflicting results between the two known studies documenting the affect recognition ability of children with an FASD (Greenbaum et al., 2009; Rasmussen et al., 2013). It may be that children with PAE or with an FASD have difficulties with only recognizing specific affects. Although participants were found to perform as expected, closer examination of the results revealed that participants had significantly less difficulty identifying happy faces versus fearful faces. Interestingly, children with ADHD and conduct disorder often have particular impairments with the fear recognition relative to the normative population (Costello et al., 2003). Further, children with psychopathic traits and conduct disorder have been described as having "fear blindness", an impairment that is related to social behaviour and has been a target of therapeutic interventions for early signs of anti-social development (Dadds et al., 2012). Considering ADHD and conduct disorder are the most prevalent comorbid conditions of children with PAE or with an FASD (Fryer et al., 2007) the fear recognition ability of children with PAE or with an FASD should be explored further. If children have a particular weakness in the ability to recognize fearful faces, interventions addressing this difficulty may be beneficial for the social functioning of children with PAE or with an FASD.

Problem Behaviours. As hypothesized, our sample also exhibited problem behaviour scaled scores and *t* scores that were on average significantly different from the

normative mean and in the clinically significant range on the SSIS-RS, Externalizing problems CBCL scales and Total Problems CBCL scale tested pre-intervention (on the SSIS-RS) indicating they have many behaviours that likely compete with participant's social performance. On the SSIS-RS participant's problem behaviour weakness was in hyperactivity, which is consistent with the SSRS problem behaviour results found in Rasmussen and colleagues study (2011) and with reports of their impulsive and hyperactive tendencies (Schonfel et al., 2006). Participants performed best on a measure of bullying behaviours (e.g. do things to make people scared or keeps others out of social circles) compared to other problem behaviours. Carmen and colleagues study (2011) using the previous version of the SSIS-RS (SSRS; Gresham & Elliott, 1990) did not include a bullying measure therefore it is unknown whether these results are consistent with previous reports. However, these results are in line with reports of their loving and caring personalities (Breen & Burns, 2012) and their social skills strength (cooperation) but these results deviate from the high rate of children with PAE or with an FASD who have a comorbid diagnosis of conduct disorder (Larkby et al., 2011). It may be that the cooperative and reduced bullying behaviours of children with PAE or with an FASD may distinguish them from children with a primary diagnosis of conduct disorder (which is generally defined as children who have difficulties in some or all of the following areas: aggression towards people and animals, destruction of property, deceitfulness or theft and violations of rules). However, more information is clearly needed on whether children with PAE or with an FASD have fewer bullying behaviours relative to other problem behaviours and how information about children's bullying behaviours compare to other clinical samples to distinguish the social profile of children with PAE or with an FASD.

The mean scores at pre-testing on the CBCL Externalizing subtest were within the clinically significant range, and the overall score on the internalizing subtest was only marginally within the normal range. However, on average participant's scores on both measures were significantly different than the mean of the normative sample. These results are unsurprising considering the many reports of externalizing (Kully-Martens et al., 2012) and internalizing difficulties (Pei et al., 2011). The externalizing and internalizing difficulties of children with PAE or with an FASD appropriate social skills likely inhibit the use of appropriate social skills (e.g. due to issues with behavioural regulation or faulty interpretation of social exchanges) (Spence, 2003) alternatively, these impairments also may be exacerbated by the social skills impairments (Roebuck et al., 1999; Wlathall et al., 2008). Interventions designed to support social emotional development which addresses both social functioning as well as externalizing and internalizing difficulties have been widely successful with typically developing children and clinical populations (Durlak et al., 2011), and they also may be helpful for children with PAE or with an FASD. Social emotional development programs may be another option to improve the social functioning and lives of children with PAE or with an FASD.

Social Skills and Demographic Characteristics. A large proportion of children with PAE and with an FASD are placed in foster care and have been reported to be subjected to multiple placements and maltreatment which can impact social development (Habbidck, Nanson, Snydre, Casey & Schulamn, 1996; National Organization on Fetal Alcohol Syndrome, 2002; Smith et al., 2007). However**,** consistent with existing research (Rasmussen et al., 2011; Thomas et al., 1998; Whaley et al., 2001), number of home

placements and SES were not related to overall social skills or problem behaviours of children with PAE or with an FASD. These results may highlight that some environmental influences relevant to social functioning alone may not account for the degree of participant's social skills and problem behaviours. Therefore, it may be that their social difficulties are due to other cognitive factors that result from PAE.

Generally older children with PAE or with an FASD have fewer social skills and more problem behaviours relative to their peers (Kully-Martens et al., 2012). However, the data from the present study indicates that there were no age related differences for social skills or problem behaviours found. It may be that the age range (5-10 years) of participants was not large enough to be sensitive to behavioural differences between the ages included in the study. Other demographic factors such as sex, PAE or an FASD diagnosis, and IQ were also unrelated to SSIS-RS scores, which is consistent with the majority of the research (Kully-Martens et al., 2012). These results provide more evidence that the presence of social difficulties in children with PAE cannot be entirely explained by sex, the severity of delays associated with PAE exposure or differences in IQ.

Social Skills Intervention

The brief (10 half hour sessions over 5-10 weeks) individualized intervention targeting the acquisition of social skills failed to have a significant impact on participant's social skills but fortunately it may have improved problem behaviours. Children in the social skills intervention demonstrated an average improvement of 8.6 problem behaviour standard score points whereas children in the math skills intervention demonstrated an average improvement of 1.8. Children with PAE or with an FASD have

social skills acquisition deficits specifically with social information processing (O'Conner et al., 2006) and problem solving difficulties (McGee et al., 2008) that may have been addressed in the social skills intervention. For example, the individualized teaching, modeling and role-playing provided children information on how to interpret hostile interactions and alternatives ways to handle altercations with others which may have lead to the changes in problem behaviours (e.g. fighting with others, being withdrawn from others, having temper tantrums etc.). Another intervention addressing social information processing of children with PAE or with an FASD through teaching and modeling methods also significantly improved problem behaviour and social skills (O'Conner et al., 2006). This research may provide some support for the possible utility of the social skills intervention used in the present study for social skills acquisition deficit for children with PAE or with an FASD.

Although the social skills intervention had a positive impact on problem behaviours it failed to affect problem behaviours significantly more than the problem behaviours of participants in the math intervention. Therefore, the change in problem behaviours of participants in the social skills intervention cannot be exclusively attributed to the training participants received. Part of the impact of the social skills intervention may be due to variables that reduced problem behaviours within both interventions. It is plausible that the individualized attention from researchers within both interventions may have positively impacted all participants, thereby reducing problem behaviours. The lack of significant effect overall, may also be due to the study's limitations.

Limitations and Additional Future Directions

The study provided valuable information to direct future research but there were a number of limitations and still many unanswered questions. First, we do not know the long-term effects of the social skills intervention (this is being answered in a later phase of a larger project). It could be plausible that there were delayed treatment effects, which could not be measured by the immediate post-testing. Alternatively, the treatment effect on problem behaviours may not be maintained in the future. There are also several inherent design limitations, specifically the participant sample and control group. Firstly, the study had a small sample size and it may have reduced the power to detect differences in the scores pre and post intervention. Secondly, it is also difficult to control for individual participant factors that may contribute to potential treatment effects, such as qualities related to a participant's caregiver, teacher, programming, school and family. Some parents or teachers may have existing strategies in place to help foster social skills. In terms of the comparison intervention, the math intervention partially aimed at improving participant's executive functioning. Executive functioning has been predictive of social skills and problem behaviours for children with PAE or with an FASD (Schonfeld et al., 2006). Therefore, improvements in the executive functioning of participants in the math intervention may have mitigated participant's problem behaviours making the overall changes for children in the social skills intervention no longer significant when compared to the math intervention. Future research could ensure that the comparison group has no overlapping factors that could potentially impact SSIS-RS results. Future research could also include a comparison group of age-matched peers without PAE, which would allow for comparison between specific social skills with a normative sample.

There were also several limitations related to program implementation. The lack of significant effects of the social skills intervention on social skills compared to the comparison intervention may be due to a few primary problems. Firstly, it might be due to the mismatch between the degree of each type of deficit targeted within the social skills intervention and children's social skills impairments. Children with PAE or with an FASD have cognitive deficits affecting their acquired social skills (e.g. limitation on ToM, social processing difficulties, social problem solving; Kully-Martens et al., 2012) and theoretically, these deficits could have been impacted by the social skills intervention that focused on teaching, modeling, and role-playing. However, children with PAE or with an FASD also have many difficulties that impede their social functioning (sometimes despite possible knowledge of proper social skills) that were not specifically addressed in the intervention like difficulties with hyperactivity, poor emotional or executive functioning. Future research could examine more of the contributing factors to the social skills impairments and how addressing those factors through other types of interventions impacts the social skills of children with PAE or with an FASD.

Secondly, the intervention was brief in duration (5-8 weeks) and did not include parental involvement. These were two of the reported advantages with this program because it required fewer resources however, parental involvement might help to target no only acquisition deficits but also performance deficits and problem behaviours by addressing both antecedent and consequences of behaviour leading to desired behaviours across multiple settings. Additionally, some researches report that parental involvement is integral for social skills interventions with children with PAE or with an FASD (Schonfeld et al., 2006). The research on social skills interventions for all populations

suggest that longer treatment durations that include parental involvement are associated with more long and short-term gains (Matson, 2009) and have been most effective with children who have attention and conduct problems (Spence, 2003). Therefore, the social skills intervention may have been more effective if it was longer in duration and included parental involvement.

Another attractive aspect of the intervention was that it was individualized and conducted in the school setting. However, it can be difficult to apply individual instruction in many school environments. Consequently, due to space, cost and time interventions are typically implemented within a group setting. Since children with PAE and with an FASD have a very social personality they may benefit from interventions conducted in a group setting, where social reinforcement may encourage social skills development while also providing a context to foster relationships with other children who have similar deficits and possible life experiences. Therefore, in the future it would be beneficial to examine the effectiveness of social skills interventions also conducted within a group setting.

Conclusion

In summary, the results demonstrate that children with PAE or an FASD display clinically significant social skill impairments and problem behaviours relative to normative samples. These impairments were not correlated with environmental factors (such as, number of home placements or SES) or other demographic variables (such as, sex, IQ, or age). This may highlight that the degree of participant's social skills and problem behaviours may not be due to environmental impacts alone or entirely explained by sex, the severity delays associated with PAE exposure or differences in IQ.

Participants facial affect recognition was on average within the normal range relative to the normative sample, however participants had significantly more difficulty identifying fearful faces. This specific impairment has been linked to social difficulties in other clinical populations, and therefore the fear affect recognition ability for children with PAE or an FASD should be explored further.

The results may also suggest that children with PAE or with an FASD display a specific pattern of social skills and problem behaviour strengths (cooperation, reduced bullying behaviour) and weaknesses (responsibility, hyperactivity). These strengths could represent cognitive strengths and may reflect the social and caring nature of children with PAE or with an FASD. Alternatively, the social skills weaknesses may be related to deficits in participant's cognitive functioning (e.g. executive functioning). More research on the contributing factors of social skills impairments in children with PAE or with an FASD is clearly needed. In addition, knowledge of how their social skills profile differs from other clinical populations may be important to aid in the development of the social profile of children with PAE or with an FASD in order to provide tailored interventions for this population.

Lastly, an intervention targeting social skills acquisition deficits such as social problem solving and information processing in children with PAE or an FASD had an impact on problem behaviours but not significantly above and beyond the effects of the comparison intervention. This could suggest that techniques such as teaching, modeling and role playing could have a positive impact on social functioning for children with PAE or with an FASD in many different formats. However, for possibly more successful outcomes, social skills interventions for children with PAE or with an FASD should also

address performance deficits and problem behaviours by including parent and/or teacher involvement and extend the duration of the interventions. Additionally, considering the social nature of children with PAE or with an FASD, interventions might be most effective if administered within a group format. Success of these programs could greatly help increase the social skills of children with PAE or with an FASD to reduce social rejection while concurrently increasing academic success, mental health and interpersonal relationships. This would foster overall wellness for children, their families and society.

References

Achenbach, M., McConaughy, H., & Howell, T. (1987). Child/adolescent behavioral and emotional problems: Implications of cross-informant correlations for situational specificity. *Psychological Bulletin, 101*, 213-232

Andrew, G. (2009). What is fetal alcohol spectrum disorder (FASD) and how is it diagnosed? Overview of FASD. Retrieved from, Fetal alcohol spectrum disorder (FASD): Across the lifespan: Proceedings from an IHE consensus development conference. Institute of Health Economics, Edmonton, Alberta.

Antshel, M., & Barkley, R. (2008). Psychosocial interventions in attention deficit hyperactivity disorder. *Child and Adolescent Psychiatric Clinics of North America, 17,* 421–437.

Astley, S., Stachowiak, J., Clarren, S., & Clausen, C. (2002). Application of the fetal alcohol syndrome facial photographic screening tool in a foster care population. *Journal of Pediatrics, 141,* 712–717.

Avcioglu, H. (2013). Effectiveness of video modeling in training students with intellectual disabilities to greet people when they meet. *Educational Sciences: Theory and practice, 13*, 466-472.

Bandura, A. (1977). *Social learning theory.* New York: General Learning Press.

Baker, J. (2003). *Social skills training for children and adolescents with Asperger Syndrome and social-communication problems.* Shawnee Mission, KS: Autism Asperger Publishing Company.

Bareket, R. (2006). *Playing it right! Social skills activities for parents and teachers of young children with Autism Spectrum Disorders, including Asperger Syndrome and Autism*. Shawnee Mission, KS: Autism Asperger Publishing Company.

Baron-Cohen, S., Ring, H., Wheelwright, S., Bullmore, E., Brammer, M., & Simmons, A. (1999). Social intelligence in the normal and autistic brain: An fMRI study. *European Journal of Neuroscience, 11,* 1891-1898.

Bauminger, N. (2007). Brief report: Group social-multimodal intervention for FASD. *Journal of Autism and Developmental Disorders, 37*, 1605-1615.

Beer, M., Kritzinger, A., & Zsilavecz, U. (2010). Young children with fetal alcohol spectrum disorder – communication profiles. *South African Journal of Communication Disorders, 57,* 33-42.

Benz, J., Rasmussen, C., & Andrew, G. (2009). Diagnosing fetal alcohol spectrum disorder: history challenges and future directions. *Pediatrics of Child Health, 14,* 231–237.

Bellack, A. S., Muesser, K. T., Gingerich, S., & Agresta, J. (2004). *Social skills training for schizophrenia: A step-by-step guide* (2nd ed.). New York, NY: Guilford Press.

Bishop, S., Gahagan, S., & Lord, C. (2007). Re-examining the core features of autism: A comparison of autism spectrum disorder and fetal alcohol spectrum disorder. *Journal of Child Psychology Psychiatry, 48,* 1111–1121.

Brown, R. T., Coles, C. D., Smith, I. E., Platzman, K. A., Silverstein, J., Erickson, S., & Falek, A. (1991). Effects of prenatal alcohol exposure at school age II. Attention and behavior. *Neurotoxicology and Teratology, 13*, 369–376.

Breen, C., & Burns, L. (2012). *Improving services to families affected by FASD.* National

Drug and Alcohol Research Centre, University of New South Wales, Australia.

Cappadocia, C. & Weiss, A. (2011). Review of social skills training groups for youth with asperger syndrome and high functioning autism. *Research on Autism Spectrum Disorder, 5,* 70–78.

Carmichael Olson, H., Streissguth, A., Sampson, P., Barr, H., Bookstein, F., & Thiede, K. (1997). Association of PAE with behavioral and learning problems in early adolescence. *Journal of American Academy of Child Adolescent Psychiatry, 36,* 1187–1194.

Carmichael Olson, H., Feldman, J., Streissguth, A., Sampson, P., & Bookstein, F. (1998). Neuropsychological deficits in adolescents with fetal alcohol syndrome: clinical findings. *Alcoholism: Clinical and Experimental Research, 22*, 1998–2012.

Cartwright-Hatton, S., Roberts, C., Chitsabesan, P., Fothergill, C., & Harrington, R. (2004). Systematic review of the efficacy of cognitive behavior therapies for childhood and adolescent anxiety disorders. *British Journal of Clinical Psychology, 43*, 421–436.

Chudley, A., Conry, J., Cook, J., Loock, C., Rosales, T., & LeBlanc, N. (2005). Fetal alcohol spectrum disorder: Canadian guidelines for diagnosis. *Canadian Medical Association Journal, 172,* 1-21.

Chafouleas, S., & Bray, M. (2004). Introducing positive psychology: Finding a place within school psychology. *Psychology in the Schools, 16,* 1–5.

Clarren, S., & Sandra, B. (1995). A Neurodevelopmental Psychoeducational Profile of Children with Fetal Alcohol Syndrome. Seattle, WA: University of Washington, unpublished manuscript.

Coggins, E., Olswang, B., Carmichael Olson, H., & Timler, R. (2003). On becoming socially competent communicators: The challenge for children with fetal alcohol exposure. *International Review of Research in Mental Retardation, 27*, 121–150.

Cohen, J., Mannarino, A., & Deblinger, E. (2006). *Treating traumatic grief in children and adolescents.* The Guildford Press, New York, NY.

Coles, C. D., Kable, J. A., & Taddeo, E. (2009). Math performance and behavior problems in children affected by prenatal alcohol exposure: intervention and follow-up. *Journal of Developmental and Behavioral Pediatrics, 30,* 7–15.

Corkum, P., Corbin, N., & Pike, M. (2010). Evaluation of a school-based social skills program for children with attention-deficit/hyperactivity disorder. *Child & Family Behavior Therapy, 32,* 139-151.

Crick, R., & Dodge, A. (1994). A review and reformulation of social information processing mechanisms in children's social adjustment. *Psychology Bulletin, 115,* 74–101.

Costello, J., Mustillo, S., Erkanli, A., Keeler, G., & Angold, A. (2003). Prevalence and development of psychiatric disorders in childhood and adolescence. *Archives of General Psychiatry, 60,* 837–844.

Dadds, R., Cauchi, J., Wimalaweera, S., Hawes, D., & Brennan, J. (2012). Outcomes, moderators, and mediators of empathic-emotion recognition training for complex conduct problems in childhood. *Psychiatry Research, 199,* 201–207.

David-Ferdon, C., & Kaslow, N. (2008). Evidence-based psychosocial treatment for child and adolescent depression. *Journal of Clinical Child & Adolescent Psychology, 37,* 62-104.

Davis, J., & Matthews, R. (2010). NEPSY, 2nd edition, (NEPSY-II). *Journal of Psychoeducational Assessment, 28,* 175-182.

De Boo, M., & Prins, P. M. (2007). Social incompetence in children with ADHD: Possible moderators and mediators in social-skills training. *Clinical Psychology Review, 27*, 78–97.

DuPaul, J., & Weyandt, L. (2006). School-based intervention for children with attention deficit hyperactivity disorder: Effects on academic, social, and behavioural functioning. *International Journal of Disability, Development and Education, 53*, 161–176.

Dusenbury, L., Zadrazil, J., Mart, A., & Weissberg, R. (2011). *State learning standards to advance social and emotional learning: The state scan of social and emotional learning standards, preschool through high school.* Retrieved from CASEL website: http://casel.org. On April 17, 2014.

Frankel, F. (2005) *Parent-assisted children's friendship training, in Psychosocial Treatments for Child and Adolescent Disorders: Empirically Based Approaches*. American Psychological Association, Washington, DC.

Frankel, F. & Myatt, R. (2003). *Children's Friendship Training*. Brunner- Routledge Publishers, New York.

Fryer, S. L., McGee, C. L., Matt, G. E., Riley, E. P., & Mattson, S. N. (2007). Evaluation of psychopathological conditions in children with heavy prenatal alcohol exposure. *Pediatrics, 119,* 733–741.

Garber, J., Weiss, B., & Shanley, N. (1993). Cognitions, depressive symptoms, and development in adolescents. *Journal of Abnormal Psychology, 102*, 47–57.

Greenbaum, L., Stevens, A., Nash, K., Koren, G., & Rovet, J. (2009). Social cognitive and emotion processing abilities of children with fetal alcohol spectrum disorders: a comparison with attention deficit hyperactivity disorder. *Alcoholism: Clinical Experimental Research, 33,* 1656–1670.

Gresham, F. M., & Elliott, S. N. (2008). *Social Skills Improvement System.* Minneapolis, MN: Pearson Assessments.

Gresham, F. M. & Elliott, S. N. (1990) *Social Skills Rating System Manual*. American Guidance Service, Circle Pines, MN, USA.

Gresham, F. (2010). Evidence-based social skills interventions: Empirical foundations for instructional approaches. In M. Shinn & H. Walker (eds.), *Interventions for achievement and behaviour problems in a three-tier model including RTI.* Behtesda, MD: National Association of School Psychologists.

Gresham, F. M. (2002). *Responsiveness to intervention: An alternative approach to the identification of learning disabilities*. In R. Bradley, L. Danielson, & D. P. Hallahan (2011). *Identification of learning disabilities: Response to treatment*. Routledge, New York, NY.

Gresham, F. M. (1981). Social skills training with handicapped children: A review. *Review of Educational Research, 51*, 139–176.

Gresham, F., Robichauz, N., York, H., & O'Leary, K. (2012). Issues related to identifying and implementing evidence-based social skills interventions for students with high-incidence disabilities. Advances in Learning and Behavioural Disabilities. In Cook, B., Tankersley, M., & Landrum, T., (2012). *Volume 25*

classroom behaviour, contexts and interventions. Emerald Group Publishing, West Yorkshire, England.

Gresham, F. M., Van, M. B., & Cook, C.R. (2006). Social skills training for teaching replacement behaviors: Remediating acquisition deficits in at-risk students. *Behavioral Disorders, 31*, 363-377.

Habbick, B. F., Nanson, J. L., Snydre, R. E., Casey, R. E., & Schulman, A. L. (1996). Fetal alcohol syndrome in Saskatchewan: Unchanged incidence in a 20-year period. *Canadian Journal of Public Health, 87,* 204 – 207.

Harrison, P., & Oakland, T. (2010). *Adaptive Behavior Assessment System*. 2nd ed. Western Psychological Services, Los Angeles, CA.

High, C. (2008). School readiness. *Pediatrics, 121*, 1008–1015.

Hollingshead AB: Four factor index of social status. (1975). Unpublished working paper, Yale University, New Haven, CT.

Howell, K., Lynch, M., Platzman, K., Smith, G., & Coles, C. (2006). Prenatal alcohol exposure and ability, academic achievements and school functioning in adolescence: a longitudinal follow-up. *Journal of Pediatric Psychology, 31,* 116–126.

James, J., Asante, K., Conry, J., Fast, D., Bax, M., Ispsiroglu, O., Bredberg, E., Loock, C., & Wasdell, M., (2010). Sleep health issues for children with fasd: Clinical considerations. *International Journal of Pediatrics, 2010,* 1-7.

John, K., Gamon, G., Prusoff, B. A., & Warner, V. (1987). The Social Adjustment Inventory for Children and Adolescents (SAICA): Testing of a new semi-

structured interview. *Journal of the American Academy of Child and Adolescent Psychiatry, 26,* 898–911.

Kable, J. A., Coles, C. D., & Taddeo, E. (2007). Socio-cognitive habilitation using the math interactive learning experience program for alcohol-affected children. *Alcoholism: Clinical and Experimental Research, 31,* 1425–1434.

Keil, V., Paley, B., Frankel, F., & O'Connor, M. (2010). Impact of a social skills intervention on the hostile attributions of children with prenatal alcohol exposure. *Alcoholism: Clinical Experimental Research, 34,* 231–241.

Kully-Martens, K., Denys, K., Treit, S., Tamara, S., & Rasmussen, C. (2012). A review of social skills deficits in individuals with fetal alcohol spectrum disorders and prenatal alcohol exposure: Profiles, mechanisms, and interventions. *Alcoholism: Clinical and Experimental Research, 36,* 568-576.

Kodituwakku, P. (2009). Neurocognitive profile in children with fetal alcohol spectrum disorders. *Developmental Disability Research Review, 15*, 218–224.

Lemoine, P., Harousseau, H., Borteyru, J.P., & Menuet, J.C. (2003). Children of alcoholic parents – observed anomalies: Discussion of 127 cases. *Therapeutic Drug Monitoring, 25*, 132–136

Lopata, C., Thomeer, L., Volker, A., & Nida, E. (2006). Effectiveness of a cognitive-behavioral treatment on the social behaviors of children with Asperger Disorder. *Focus on Autism and Other Developmental Disabilities, 21*, 237–244.

Lopata, C., Thomeer, L., Volker, A., Nida, E., & Lee, K. (2008). Effectiveness of a manualized summer social treatment program for High-Functioning children with

Autism Spectrum Disorders. *Journal of Autism and Developmental Disorders, 38*, 890–904.

Lundahl, B., Risser, H. J., & Lovejoy, M. C. (2006). A meta-analysis of parent training: Moderators and follow-up effects. *Clinical Psychology Review, 26*, 86–104.

Mattson, N., & Riley, P. (2000). Parent ratings of behavior in children with heavy prenatal alcohol exposure and IQ-matched controls. *Alcohol: Clinical Experimental Research 24,* 226–231.

Matson, J. (2009). *Social Behavior and Skills in Children*. Springer New York, Dordrecht Heidelberg, London.

Mattson, N., Riley, P., Sowell, R., Jernigan, L., Sobel, F., & Jones, L. (1996). A decrease in the size of the basal ganglia in children with fetal alcohol syndrome. *Alcoholism: Clinical and Experimental Research, 20*, 1088–1093.

Mattson, S. N., & Riley, E. P. (2000). Parent ratings of behavior in children with heavy prenatal alcohol exposure and IQ-matched controls. *Alcoholism: Clinical and Experimental Research, 24,* 226–231.

Mattson, N., Crocker, N., & Nguyen, T. (2011). Fetal alcohol spectrum disorders: neuropsychological and behavioral features. *Neuropsychological Review, 21*, 81–101.

Mattson, S., Roesch, S., Glass, L., Deweese, B., Coles, C., Kable, J., May, P., Kalberg, W., Sowell, E., Adnams, C., Jones, K., & Riley, E. (2012). Further development of a neurobehavioral profile of fetal alcohol spectrum disorders. *Alcoholism: Clinical and Experimental Research,* 1-12.

Mattson, S. N., Riley, E. P., Gramling, L. J., Delis, D. C., & Jones, K. L. (1997). Heavy

prenatal alcohol exposure with or without physical features of fetal alcohol syndrome leads to IQ deficits. *Journal of Pediatrics, 131,* 718–721.

May, P. A., & Gossage, J. P. (2001). Estimating the prevalence of fetal alcohol syndrome: A summary. *Alcohol Research and Health, 25*, 159–167.

May, P., Gossage, P., Kalberg, O., Robinson, K., Buckley, D., Manning, M., & Hoyme, H. (2009). Prevalence and epidemiologic characteristics of FASD from various research methods with an emphasis on recent in-school studies. *Developmental Disability Research Review, 15,* 176–192.

Melbin, D. (2004). Fetal alcohol spectrum disorder (FASD) and the role of family court judges in improving outcomes for children and families. *Juvenile and Family Court Journal,* 53-60.

McFall, R. M. (1982). A review and reformulation of the concept of social skills. *Behavioral Assessment, 8,* 3–10.

McGee, L., Fryer, L., Bjorkquist, O., Mattson, N., & Riley, P. (2008) Social problem solving deficits in adolescents with prenatal exposure to alcohol. *American Journal of Drug Alcohol Abuse, 34,* 423–431.

O'Connor, M., Frankel, F., Paley, B., Schonfeld, A., Carpenter, E., Laugeson, E., & Marquardt, R. (2006). A controlled social skills training for children with fetal alcohol spectrum disorders. *Journal of Consultant Clinical Psychology, 74,* 639–648.

Parker, G., & Asher, R. (1987). Peer relations and later personal adjustment: Are low-accepted children at risk? *Psychological Bulletin, 102*, 357-389.

Pelham, W. & Fabiano, G. (2008). Evidence-based psychosocial treatments for attention-deficit/hyperactivity disorder. *Journal of Clinical Child and Adolescent Psychology, 37,* 184-214.

Pei, J., Denys, K., Hughes J., & Rasmussen, C. (2011). Mental health issues in fetal alcohol spectrum disorder. *Journal of Mental Health 1,* 1-11.

Pfiffner, J., Calzada, E., & McBurnett, K. (2000). Interventions to enhance social competence. *Child and Adolescent Psychiatric Clinics of North America, 9*, 689–709.

Popova, S., Lange, S., Burd, L., & Rehm, J. (2012). Health care burden and cost associated with fetal alcohol syndrome in Canada: Based on official Canadian data. *PLoS ONE, 7*, e43024.

Riley, E., & McGee, C. (2005). Fetal alcohol spectrum disorders: an overview with emphasis on changes in brain and behavior. *Experimental Biology and Medicine 230*, 357–365.

Riley, M., Infante, A., & Warren, K., (2011). Fetal alcohol spectrum disorders: An overview. *Neuropsychological Review, 21,* 73-80.

Rasmussen, C., Becker, M., McLennan, J., Urichuk, L., & Andrew, G. (2011). An evaluation of social skills in children with and without prenatal alcohol exposure. *Child: Care, Health and Development, 37,* 711–718.

Rasmussen, C., Wyper, C., & Talwar, V. (2009). The relation between theory of mind and executive functions in children with fetal alcohol spectrum disorders. *Canadian Journal of Clinical Pharmacology, 16,* 370–380.

Rasmussen, C., Tamana, S., Baugh, L., Andrew, A., Tough, S., & Zwaigenbaum, L. (2012). Neuropsychological impairments on the NEPSY-II among children with FASD. *Child Neuropsychology, 19,* 337-349.

Rasmussen, C. (2005) Executive functioning and working memory in fetal alcohol spectrum disorder. *Alcoholism: Clinical and Experimental Research*, 29, 1359–1367.

Roebuck, T., Mattson, S., & Riley, E. (1999). Behavioral and psychosocial profiles of alcohol-exposed children. *Alcoholism: Clinical Experimental Research, 23,* 1070–1076.

Schonfeld, A., Paley, B., Frankel, F., & O'Connor, M. (2006). Executive functioning predicts social skills following prenatal alcohol exposure. *Child Neuropsychology 12*, 439–452.

Sofronoff, K., Leslie, A., & Brown, W. (2004). Parent management training and Asperger Syndrome. *Autism, 8,* 301–317.

Spence, S. H., Donovan, C., & Brechman-Toussaint. (1999). Social skills, social outcomes, and cognitive features of childhood social phobia. *Journal of Abnormal Psychology, 108*, 211–221.

Spence, S. H. (1995). *Social skills training: Enhancing social competence with children and adolescents*. Windsor: NFER-Nelson.

Spence, H. (2003). Social skills training with children and young people: Theory, evidence and practice. *Child and Adolescent Mental Health, 8*, 84-96.

Stade, B., Ali, A., Bennett, D., Campbell, D., Johnston, M., Lens, C., & Koren, G. (2009). The burden of prenatal exposure to alcohol: Revised measurement of cost. *Canadian Journal of Clinical Pharmacology, 16*, 91-102.

Steinhausen, H.C., & Spohr, H. L. (1998). Long-term outcome of children with fetal alcohol syndrome: Psychopathology, behavior and intelligence. *Alcoholism: Clinical and Experimental Research, 22,* 334–338.

Streissguth, A., Aase, J., Clarren, S., Randels, S., LaDue, R., & Smith, D. (1991). Fetal alcohol syndrome in adolescents and adults. *The Journal of the American Medical Association, 265,* 1961– 1967.

Streissguth, A. & Giuntam, C. (1988). Mental health and health needs of infants and preschool children with fetal alcohol syndrome. *International Journal of Family Psychiatry, 9,* 29-47.

Streissguth, A., Bookstein, F. L., Barr, H.M., Sampson, P. D., O'Malley, K., & Young, J. K. (2004). Risk factors for adverse life outcomes in fetal alcohol syndrome and fetal alcohol effects. *Developmental and Behavioral Pediatrics, 25*, 228-238.

Streissguth, A. P., & O'Malley, K. (2000). Neuropsychiatric implications and long-term consequences of fetal alcohol spectrum disorders. *Seminars in Clinical Neuropsychiatry, 5*, 177–190.

Sukhodolsky, D. G., Kassinove, H., & Gorman, B. (2004). Cognitive-behavioral therapy for anger in children and adolescents: A meta-analysis. *Aggression and Violent Behavior, 9,* 247–269.

Thomas, S., Kelly, S., Mattson, S., & Riley, E. (1998). Comparison of social abilities of children with fetal alcohol syndrome to those of children with similar IQ scores

and normal controls. *Alcoholism: Clinical and Experimental Research, 22,* 528–533.

Tse, J., Strulovitch, J., Tagalakis, V., Meng, L., & Fombonne, E. (2007). Social skills training for adolescents with Asperger Syndrome and High-Functioning Autism. *Journal of Autism and Developmental Disorders, 37*, 1960–1968.

Thompson, R. A., & Goodman, M. (2009). Development of self, relationships, and socio-emotional competence: Foundations for early school success. In O. A. Barbarin & B. Wasik (Eds.), Handbook of child development and early education: Research to practice, 147-171. New York: Guilford.

Uekermann, J., Kraemer, M., Abdel-Hamid, M., Schimmelmann, B., Hebebrand, J., Daum, I., Wiltfang, J., & Kis, B. (2010). Social cognition in attention-deficit hyperactivity disorder. *Neuroscience and Biobehavioral Reviews, 34,* 735-743

Wacha, V. H., & Obrzut, J. E. (2007). Effects of fetal alcohol syndrome on neuropsychological function. *Journal of Developmental Physical Disabilities, 19*, 217–226.

Welsh, J., & Bierman, L. (2001) Social competence [Encyclopedia of Childhood and Adolescence Web site]. April 6, 2001. Available at: http://findarticles. com/p/articles/mi_g2602/is_0004/ai_2602000487/. Accessed January 11, 2014

Whaley, S., O'Connor, M., & Gunderson, B. (2001) Comparison of adaptive functioning of children prenatally exposed to alcohol to a nonexposed clinical sample. *Alcoholism: Clinical and Experimental Research, 25,* 1018–1024.

Walthall, J., O'Connor, M., & Paley, B. (2008). A comparison of psychopathology in children with and without prenatal alcohol exposure. *Mental Health Aspects of Developmental Disabilities, 11*, 69–78.

Wilford, J. A., Richardson, G. A., & Leech, S. L. (2004). Verbal and visuospatial learning and memory function in children with moderate prenatal alcohol exposure. *Alcoholism: Clinical and Experimental Research, 28,* 497-507.