

UNIVERSITY OF CALGARY

Emotional Intelligence and Social Skills Abilities in Children with Attention-  
Deficit/Hyperactivity Disorder

by

Emma A. Climie

M.Sc., University of Calgary

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES  
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE  
DEGREE OF DOCTOR OF PHILOSOPHY

DIVISION OF APPLIED PSYCHOLOGY, FACULTY OF EDUCATION

CALGARY, ALBERTA

JUNE, 2012

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## Abstract

Children with Attention-Deficit/Hyperactivity Disorder (ADHD) are at risk for a number of negative outcomes, especially those within the social domain. They often struggle to interact appropriately with their peers, resulting in social rejection or isolation. Previous research surrounding the concept of emotional intelligence (EI), or the ability to understand one's own and others' emotions, has highlighted the relationship between social competence and EI, whereby those who are more emotionally "intelligent" are typically more socially-able. However, this relationship has not yet been examined in a population known to be at-risk for poor social outcomes, such as those with ADHD. Additionally, little is known about the EI abilities of children with ADHD. The current project explores the EI profile of children with ADHD-Combined type and incorporates both ability- and trait-based EI measures. Further exploration of the predictive relationship between EI and social outcomes is reported. Overall, children with ADHD demonstrate comparable EI abilities to the standardization sample in a number of areas. There is a positive, although weak, relationship between EI abilities and social skills ratings. Implications for practice and future research directions are discussed.

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|               |                                                                                                |
|---------------|------------------------------------------------------------------------------------------------|
| ADHD          | Attention-Deficit/Hyperactivity Disorder                                                       |
| ADHD-C        | Attention-Deficit/Hyperactivity Disorder, Combined type                                        |
| ADHD-H        | Attention-Deficit/Hyperactivity Disorder, predominantly Hyperactive-Impulsive type             |
| ADHD-I        | Attention-Deficit/Hyperactivity Disorder, predominantly Inattentive type                       |
| AS            | Asperger's Syndrome                                                                            |
| EQ-I          | Bar-On Emotional Quotient Inventory                                                            |
| EQ:I-YV       | Bar-On Emotional Quotient Inventory: Youth Version                                             |
| EQ:I-YV (S)   | Bar-On Emotional Quotient Inventory: Youth Version (short)                                     |
| DSM-IV-TR     | Diagnostic and Statistical Manual of Mental Disorders, 4 <sup>th</sup> edition (text revision) |
| EI            | Emotional Intelligence                                                                         |
| EQ            | Emotional Quotient                                                                             |
| FSIQ          | Full Scale Intelligence Quotient                                                               |
| IQ            | Intelligence Quotient                                                                          |
| MSCEIT        | Mayer-Salovey-Caruso Emotional Intelligence Test                                               |
| MSCEIT-YV     | Mayer-Salovey-Caruso Emotional Intelligence Test – Youth version                               |
| MSCEIT-YV (R) | Mayer-Salovey-Caruso Emotional Intelligence Test – Youth version (research edition)            |
| SSEIT         | Schutte Self-Report Emotional Intelligence Test                                                |
| SSIS          | Social Skills Improvement System                                                               |
| SUEIT         | Swinburne University Emotional Intelligence Test                                               |
| TEIQue        | Trait Emotional Intelligence Questionnaire                                                     |
| WASI          | Wechsler Abbreviated Intelligence Scale                                                        |

## Emotional Intelligence and Social Skill Abilities in Children with Attention-Deficit/Hyperactivity Disorder

Some children have difficulty paying attention at school or forming meaningful friendships with peers. These children seem unable to focus on what they are supposed to be doing, and teachers and parents are often frustrated by their short attention spans and subsequent behavioural challenges. They tend to act impulsively and seem to lack the social empathy and understanding that promotes age-appropriate peer relationships, leading to difficulties with both peers and adults. Often these children are referred to a pediatrician or psychologist to further explore the possibility of a diagnosis of Attention-Deficit/Hyperactivity Disorder, also referred to as ADHD.

The purpose of this study was to gain an understanding of the emotional intelligence skills of children with ADHD and examine how these abilities relate to their social capabilities. As there is limited research on the emotional intelligence strengths and limitations of school-aged children with ADHD, there is a need to better understand this concept in these children. Additionally, this study examines the influence of emotional intelligence on behaviours secondarily associated with ADHD, specifically poor social skills. Information regarding the emotional intelligence abilities of children with ADHD may help to guide intervention practices, particularly those related to emotional regulation and control such as social skills training activities.

To better understand this disorder and the abilities of affected individuals, a discussion of the three subtypes and current diagnostic criteria for ADHD is warranted. Following this review, an analysis of the current literature on emotional intelligence provides background information for the current study.

## **Attention-Deficit/Hyperactivity Disorder**

Attention-Deficit/Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder of behavioural inhibition hindering self-regulation, organization of behaviour, and goal-directed thought and action (Barkley, 1997a; Schwan & McCrimmon, 2008). It is often typified by continual energy and lack of attention and is most commonly identified in school-aged children. ADHD appears to be a disorder that is not limited by culture, gender, or race (American Psychiatric Association, 2000).

ADHD is characterized by pervasive inattention and/or hyperactivity-impulsivity and may result in significant functional impairment. The Centers for Disease Control (2010) estimates that 5.4 million American youth ages 4-17 have been diagnosed with ADHD by a healthcare professional and 2.7 million youth aged 4-17 are currently receiving medication treatment for the disorder. These numbers represent a 22% increase in identification between 2003 and 2007. In school-aged children, estimates of the prevalence of this disorder are between 3-10% of children (American Psychiatric Association, 2000; Centers for Disease Control, 2005; 2010) with a 3:1 over-representation of boys to girls (Szatmari, 1992). More recent statistics have estimated that the lifetime prevalence of ADHD may be closer to 9% (Merikangas, et al., 2005). In Canada, Scahill and Schwab-Stone (2000) reported that ADHD prevalence rates in school-aged children may range from 5-10% and in recent years, ADHD has become one of the most commonly diagnosed disorders in children.

ADHD is listed in the *Diagnostic and Statistical Manual of Mental Disorders, 4<sup>th</sup> edition (text revision)* (DSM-IV-TR; American Psychiatric Association, 2000) as a disorder comprised of two primary symptoms: hyperactive-impulsive behaviour and inattention. Hyperactive-impulsive behaviours are typically displayed as restlessness, spontaneous actions, not thinking

things through before responding, excessive running or climbing, and an inability to wait (American Psychiatric Association, 2000; Schwean & McCrimmon, 2008). Inattention is typically manifested as excessive daydreaming or lack of focus and a general inability to sustain attention, often resulting in an individual forgetting information or appearing as though he or she is disorganized (American Psychiatric Association, 2000).

ADHD is associated with both primary (e.g., impulsivity and inattention) and secondary impairments in functioning. Secondary impairments are not considered to be core features of the disorder but are instead difficulties associated with the disorder (Barkley, 2006). Specifically, children with ADHD may demonstrate diminished functioning in personal, academic, familial, social, and eventually, occupational domains of daily life (Barkley, 2003). For example, children with ADHD are at a greater risk for a number of poor academic outcomes including a greater rate of school failure, lower grades, and more expulsions (Klein & Mannuzza, 1991; Marshall, Hynd, Handwerk, & Hall, 1997; Stein, 2007). Adaptively, they may have an increased difficulty in meeting their personal daily needs (e.g., self-care skills), as they are likely to act impulsively and without thought (Stein, Szumowski, Blondis, & Roizen, 1995). Further, tertiary characteristics of ADHD may also persist within these individuals, including drug or alcohol abuse, antisocial behaviour, inability to hold employment, or an increased risk of teen pregnancy or driving accidents.

### **ADHD Diagnostic Criteria**

Diagnosis of ADHD typically occurs during early to middle childhood, often between the ages of 7 and 12. Children younger than four or five years of age frequently demonstrate variable behaviours that hinder accurate diagnosis of ADHD, and therefore diagnosis of the disorder is more likely to occur in late childhood. However, even with children as young as two

or three years of age, a limited attention span or movement in excess of what would be typically expected given the child's developmental age may be early indicators of ADHD. The symptoms of ADHD must be present before the age of seven and persist for at least six months for a diagnosis to be provided (American Psychiatric Association, 2000; Barkley, 2006). Often these symptoms persist into adulthood, although they may diminish in severity over time. Adolescents and adults with ADHD may develop coping mechanisms that allow them to manage their disorder and cope with the symptomology.

According to the DSM-IV-TR (American Psychiatric Association, 2000), there are three subtypes of ADHD: Attention-Deficit/Hyperactivity Disorder, predominantly Inattentive type (ADHD-I); Attention-Deficit/Hyperactivity Disorder, predominantly Hyperactive-Impulsive type (ADHD-H); and Attention-Deficit/Hyperactivity Disorder, Combined type (ADHD-C). Differential diagnosis of ADHD is dependent on the symptomology and behaviours presented by the individual.

**Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive type (ADHD-I).** ADHD-I is given as a diagnosis if the child demonstrates six or more symptoms of inattention but fewer than six symptoms of hyperactivity-impulsivity. Symptoms of inattention include failure to give close attention to details, careless mistakes (e.g., in schoolwork), failure to listen when spoken to directly, difficulty organizing tasks and activities, being easily distracted by extraneous stimuli, or forgetfulness in daily activities (American Psychological Association, 2000; Barkley, 1997a; 1997b). This diagnosis does not rule out hyperactive behaviours but simply recognizes that the child does not meet the criteria for a hyperactive-impulsive or combined-type diagnosis.

**Attention-Deficit/Hyperactivity Disorder, Predominantly Hyperactive-Impulsive Type (ADHD-H).** A diagnosis of ADHD-H is given if a child presents with six or more symptoms of hyperactivity-impulsivity but fewer than six symptoms of inattention. Symptoms of hyperactivity-impulsivity include constant fidgeting with hands or feet, excessive talking, difficulty awaiting his or her turn, impulsivity in responding, and interrupting others' conversations (American Psychiatric Association, 2000; Barkley, 1997b). As with ADHD-I, a diagnosis of ADHD-H does not rule out inattention as a significant clinical feature in the child but simply notes that, at the time of assessment, the child did not meet the clinical threshold for an ADHD-I or ADHD-C diagnosis.

**Attention-Deficit/Hyperactivity Disorder, Combined Type (ADHD-C).** ADHD-C is characterized by six or more symptoms of inattention, as well as six or more symptoms of hyperactivity-impulsivity, all of which have been present for a minimum of six months. ADHD-C is the most prevalent form of ADHD and the most commonly diagnosed subtype of ADHD (American Psychiatric Association, 2000; Barkley, 1997b).

**Distinction between subtypes.** It is important to highlight that emerging literature and prominent researchers have begun to identify ADHD-I as a distinct disorder that differs from ADHD-C in a number of ways (Barkley, 2001; Milich, Balentine, & Lynam, 2001). Children with ADHD-I are described as sluggish, hypoactive, and daydreamers (Carlson & Mann, 2000). There is some research to indicate that children with ADHD-I may be more likely to develop comorbid internalizing difficulties (e.g., anxiety, depression) than their ADHD-C counterparts (Barkley, 2001; Elia, Ambrosini, & Berretini, 2008; Milich et al., 2001) and are less responsive to stimulant medication (Barkley, DuPaul, & McMurray, 1991). Additionally, these children

have been reported to be more withdrawn and shy than both children with ADHD-C and children without ADHD (McQuade & Hoza, 2008).

In contrast, children with ADHD-C are described as disinhibited, hyperactive, and distractible (Carlson & Mann, 2000). They are more likely to be diagnosed at an earlier age than children with ADHD-I and include a greater proportion of males to females (Lavigne, LeBailly, Hopkins, Gouze, & Binns, 2009; Milich et al., 2001). Additionally, children with ADHD-C are more likely to have comorbid externalizing disorders, such as Oppositional Defiant Disorder or Conduct Disorder (Faraone, Biederman, Weber, & Russell, 1998), and are often outwardly rejected by their peers (Hodgens, Cole, & Boldizar, 2000).

It is often found that there is a developmental “progression” for children with ADHD. Frequently, young children are initially diagnosed with the hyperactive-impulsive subtype of ADHD, as these are the more prevalent behaviours in early childhood (age four to six; Lahey, Pelham, Loney, Lee, & Willcutt, 2005). As the child moves into the school-age years, where there are greater demands to maintain adequate levels of focused attention (e.g., in a classroom environment), symptoms of inattention become more prevalent, indicating that the child meets criteria for an ADHD-C diagnosis. Finally, many individuals become better able to manage the hyperactivity/ impulsivity side of ADHD as they enter later childhood and adolescence, leaving only the inattentive component of ADHD remaining (Biederman, Mick, & Faraone, 2000; Hart, Lahey, Loeber, Applegate, & Frick, 1995).

As such, it is important within any study to clearly delineate the specific subtype of ADHD, as individual children may demonstrate significantly different areas of deficit based on their age and subtype diagnosis. For the purpose of the current study, all participating children

met criteria for a diagnosis of ADHD-C and those with predominantly ADHD-I or ADHD-H subtypes were not included in the final sample.

### **Neuropsychological Influence**

Increasing evidence suggests that ADHD, particularly ADHD-C and ADHD-H, appears to arise from abnormalities in the structure and function of the prefrontal cortex and its networks with other brain regions, such as the striatum (Barkley, 1997a). The development of the prefrontal cortex is thought to parallel the development of many key executive functions such as self-regulation, planning, working memory, and flexible thinking abilities (Bunge, Dudukovic, Thomason, Vaidya, & Gabrieli, 2002; Diamond & Amso, 2008). Specifically, response inhibition has been linked to the functional development of some prefrontal cortex areas whereby maturation of these areas is required for children to successfully and reliably inhibit prepotent, or automatic, tendencies (Bunge et al., 2002; Johnson, 2005). As many individuals with ADHD appear to demonstrate deficiencies in executive function abilities such as inhibitory control, Barkley's model of ADHD focuses on the neurological underpinnings in the development of ADHD.

The model put forth by Barkley (e.g., 1997a, 1997b, 2003, 2006) is the prevalent model of ADHD theory in the current literature (see figure 1). It is important to note that this theory addresses ADHD-C and ADHD-H only and does not incorporate ADHD-I into the model. The primary tenant of this model emphasizes that the core deficit of ADHD is one of response inhibition. Specifically, a deficit in response inhibition results in compromised abilities relative to nonverbal working memory (the visual perception and temporary preservation of stimuli), internalization of speech (the ability to converse with oneself nonverbally), self-regulation of affect, motivation, and arousal (an individual's ability to govern control over emotional reactions

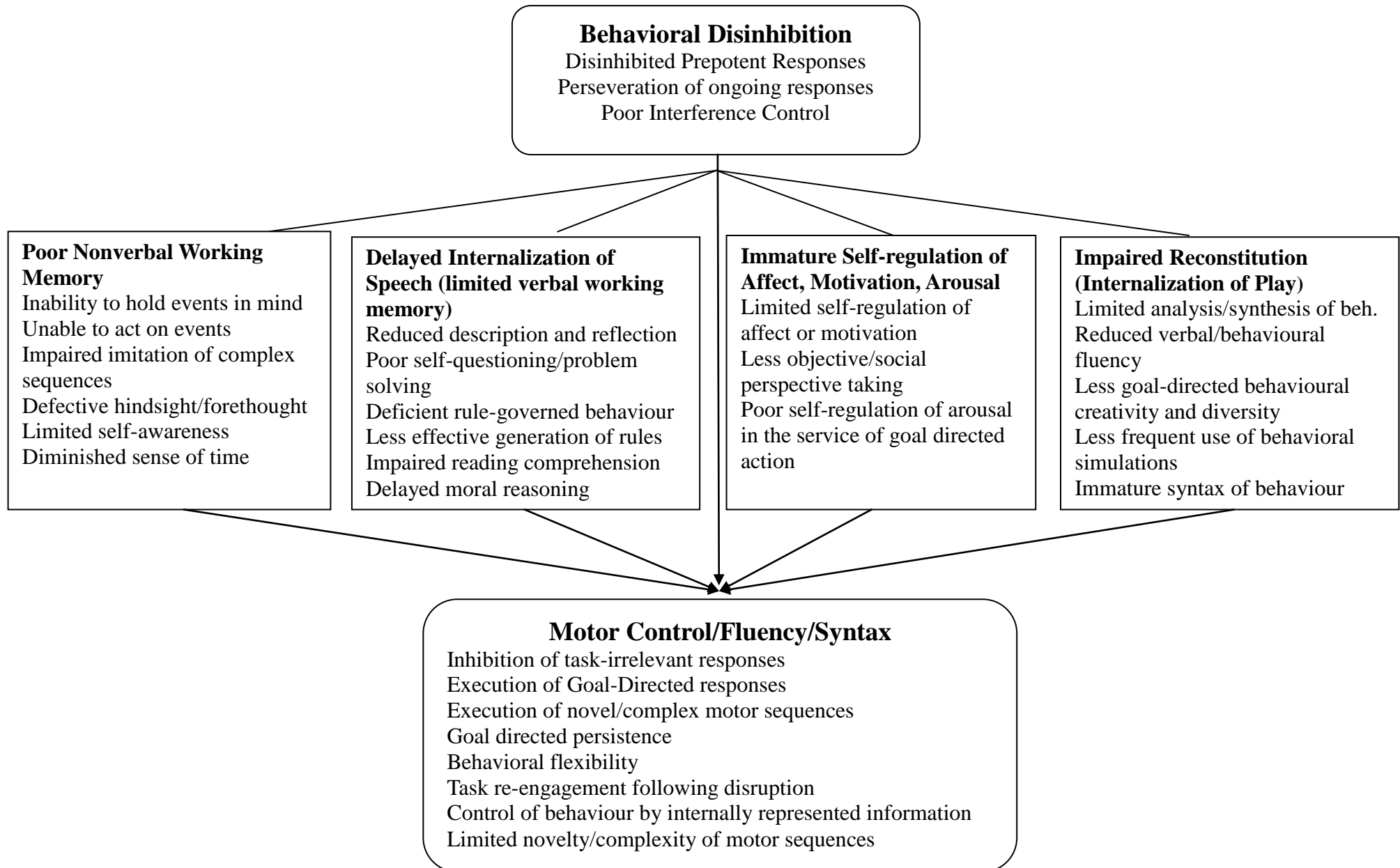
to external stimuli), and reconstitution (analysis and synthesis of behaviour, either verbally or non-verbally) (Schwean & McCrimmon, 2008). As a result of these deficits, children with ADHD-C often demonstrate difficulty with inhibiting responses that are not related to the task at hand, planning, carrying out goal-directed behaviour, or attending to relevant information.

Closer examination of Barkley's model (1997a; 1997b, 2003, 2006) reveals a number of potential poor behavioural outcomes for children with ADHD. Specifically, Barkley identifies that these children have difficulty responding flexibly to changing environments, are insensitive to response feedback (e.g., such as within a conversation), often engage in off-task or non-goal orientated behaviours, and have a difficult time re-engaging with an activity following interruption.

In addition, Barkley describes ADHD as a disorder of *performance*. He acknowledges that, in many situations, individuals with ADHD have the prior knowledge necessary to understand how they should act but struggle with the application of this knowledge. Specifically, he notes that, "*The problem, then, for those with ADHD is not one of knowing what to do, but of doing what they know when it would be most adaptive to do so*" [Italics original] (Barkley, 1997b, p. 244).

Consequently, the problematic behaviours associated with poor application of knowledge may result in impairment across a number of domains, including, but not limited to, personal, academic, familial, and eventually, occupational domains of daily life (Barkley, 2003). Additionally, children with ADHD-C also have a strong propensity to demonstrate difficulties with appropriate social interactions with adults and peers.

Figure 1. Barkley's Model of ADHD (Barkley, 1997b)



## **Social Challenges in ADHD**

The primary deficits of ADHD may give rise to secondary social deficits in a significant number of affected children. Specifically, the behaviours that result in social impairment may be a direct consequence of the defining symptoms of ADHD. Upon closer examination of Barkley's model (1997a; 1997b), it is apparent that many of the behavioural outcomes described may be applied to the social context. For example, to hold an age-appropriate conversation with a peer, children must be able to allow turn-taking (behavioural flexibility), ignore competing stimuli (inhibition of task-irrelevant responses), respond appropriately to the conversation (sensitivity to response), and maintain a continuous thread of conversation (goal-directed behaviours). It is apparent that some children with ADHD are not able to perform these necessary behaviours adequately during social situations (e.g., a conversation with peers, interacting on the playground, working independently or in small groups) (Greene, Biederman, Faraone, Sienna, & Garcia-Jetton, 1997), further supporting Barkley's position that secondary social deficits in ADHD may be a result of primary behavioural inhibition difficulties.

In addition, some of the criteria for ADHD in the DSM-IV-TR refer directly to inappropriate social conduct, such as "interrupts or intrudes on others," "often talks excessively," and "does not seem to listen when spoken to directly" (p. 92, American Psychiatric Association, 2000). In general, the combination of hyperactivity, impulsivity, and inattention in children with ADHD is likely to influence the development and refinement of appropriate social behaviour (Nijmeijer et al., 2008). Unfortunately, tertiary problems may subsequently result from these social difficulties, including substance abuse, delinquency, or school problems (McQuade & Hoza, 2008), highlighting the need to better understand the social functioning of children with ADHD.

Not all children with ADHD demonstrate social deficits; however, those with ADHD are generally more likely to be rejected or isolated by peers, experience difficulty forming and maintaining close friendships and relationships, and have trouble understanding social and environmental cues. Specifically, children with ADHD-C have been found to have poorer social skills than their non-ADHD counterparts across a number of social environments (see McQuade & Hoza, 2008 for review of current literature).

In addition, there are differential social functioning abilities between children diagnosed with ADHD-I and those diagnosed with ADHD-C. Although children with ADHD-C struggle to interact with their peers, the types of behaviours that precipitate their poor interactions are distinct from those with ADHD-I. For example, children with ADHD-C have been found to display more hostile and controlling behaviour, physical and verbal aggression towards others, lack of self-control, and are less likely to follow rules and guidelines than children with ADHD-I (Buhrmester, Whalen, Henker, MacDonald, & Hinshaw, 1992; Erhardt & Hinshaw, 1994; Milich et al., 2001; Mrug, Hoza, Pelham, Gnagy, & Greiner, 2007; Solanto, Pope-Boyd, Tryon, & Stepak, 2009; Wheeler & Carlson, 1994). Children with ADHD-C may also exhibit a number of inappropriate hyperactive and/or impulsive behaviours that other children find difficult to manage in a given situation (e.g., in a classroom). These children may yell loudly, actively run around, talk at inappropriate times, and interrupt other children's play and classroom work (Barkley, 1997a; Greene et al., 1996; Greene et al., 1997; Nijmeijer et al., 2008). Indeed, Solanto and colleagues (2009) reported that children with ADHD-C were also rated as significantly deficient in cooperation abilities.

In contrast, children with inattentive ADHD are more likely to be socially isolated (Hodgens et al., 2000). They are often rated as shy or passive by adults and peers and likely to

be left out of social situations (McQuade & Hoza, 2008; Mikami & Hinshaw, 2003; Milich et al., 2001; Wheeler & Carlson, 1994). Hodgens and colleagues (2000) noted that boys with ADHD-I were likely to spend more time playing alone and less time interacting with others. Additionally, in a study examining the behaviour of ADHD children in a computerized chat session, Mikami, Huang-Pollock, Pfiffner, McBurnett, and Hangai (2007) reported that children with ADHD-I contributed fewer responses to the online chat, were less engaged with the conversation, and had more difficulty remembering or following the conversation thread than typically-developing children.

**Measuring social ability in children.** Assessing social competence in children is most commonly done through the use of rating scales. Ideally, parents, teachers, and children themselves complete measures to provide a thorough and well-rounded understanding of a child's social abilities at home and at school. The use of multiple raters has a number of benefits, including the ability to examine social competencies across situations (e.g., in the classroom versus at home), as well as allowing for individual input from a number of people who are familiar with the child and his or her behaviour.

For children with ADHD, the use of parent and teacher ratings may be especially useful, as self-reports of behaviour can be problematic. Researchers have suggested that children, and especially children with ADHD, are poor raters of their own behaviour. Specifically, a number of researchers have examined the correlation between parent and ADHD child reports of a number of internalizing and externalizing behaviours (e.g., Kolko & Kazdin, 1993; Loeber, Green, & Lahey, 1990; Loeber, Green, Lahey, & Stouthamer-Loeber, 1991; Schwean, Burt, & Saklofske, 1999; Youngstrom, Loeber, & Stouthamer-Loeber, 2000). The literature has been relatively consistent in reporting that children with ADHD are a less reliable source (as

compared to parents and teachers) when reporting their own externalizing behaviours such as hyperactivity, inattention, and oppositional behaviours. However, when reporting children's internalizing difficulties, parents and children are seen to be more useful sources of information than teachers (Kolko & Kazdin, 1993; Loeber, et al., 1990; Loeber, et al., 1991). Taken together, although it is important and often useful to include the child's view of his or her own social behaviour, it is also advantageous to include ratings from other, potentially more reliable, sources of information when available.

**Long-term outcomes and social abilities.** The developmental literature has long purported that peer acceptance is a key factor in future adaptational abilities (e.g., Kohlberg, LaCrosse, & Ricks, 1972; Mikami & Hinshaw, 2003). An emerging literature field has recently begun to recognize the importance of social interaction as an influential factor in the development of strong children and researchers have undertaken longitudinal studies to examine the long term impact of social isolation and/or rejection in children (Gest, Sesma, Masten, & Tellegen, 2006). Socially-competent children are generally better able to develop strong relationships with peers and adults, interact appropriately with others at home and at school, and are more accepted by their same-age peers, whereas those who are less socially-competent often face rejection from peers, social isolation, and are at risk for a number of other difficulties (Gest et al., 2006). There is a consistent link between social competency and a number of important later life outcomes, including academic competency (Elias & Haynes, 2008; Welsh, Parke, Wideman, & Neil, 2001), presence of internalizing disorders such as anxiety and/or depression (Burt, Obradovic, Long & Masten, 2008; Cole, 1990), and reduced job competency (Gest et al., 2006; Roisman, Masten, Coatsworth, & Tellegan, 2004).

This research points to the critical long term consequences that are faced by socially competent and incompetent children. Those who are more successful with their peers have significantly better long term outcomes and are often viewed as more resilient than their less competent peers (Gest et al., 2006). Therefore, further examination of the factors influencing social competency is warranted, as these elements may be important in strengthening positive outcomes and promoting resilience in children who are at risk for poor social abilities, such as those children with ADHD.

### **Problems in the Current Literature**

Despite the strong literature base examining the social skill deficits of children with ADHD, two potentially problematic variables have been noted in the literature. First, many studies that examine the social abilities of these children fail to consider the potential influence that psychotropic stimulant medication may have on children's behaviour. Specifically, stimulant medication in itself is known to substantially affect social behaviour (Hinshaw, Henker, Whalen, Erhardt, & Dunnington, 1989; Ialongo, Lopez, Horn, Pascoe, & Greenberg, 1994; Solanto et al., 2009), including possible increases in social withdrawal (Granger, Whalen, & Henker, 1993). Additionally, those children identified as ADHD-I may be less responsive to medication (Barkley et al., 1991) and therefore inclusion of a mixed group of children with ADHD (i.e., children with diagnoses of ADHD-H, ADHD-I, and ADHD-C together) may drastically impact previously reported findings regarding social outcomes of children with ADHD.

Second, in many studies, co-morbid or co-occurring conditions have not been taken into consideration. These co-morbidities may be of an internalizing (e.g., anxiety, depression, self-esteem) or externalizing (e.g., oppositional behaviours, conduct problems) nature. Although

some studies (e.g., Hinshaw, 2002) report the occurrence of these co-morbid behaviours in their sample, they fail to take this information into consideration when interpreting their findings. Additionally, some studies (e.g., Maedgen & Carlson, 2000) simply do not report co-morbid conditions in their samples, possibly limiting the generalizability of the findings. In a recent study that did account for co-morbid conditions, it was found that children with ADHD with greater internalizing concerns (specifically, anxiety) demonstrated decreased assertiveness when interacting socially with peers. Those who demonstrated greater externalizing difficulties (e.g., oppositionality) had lower self-control and cooperation abilities in a group setting (Solanto et al., 2009). These results indicate that it is important to consider both medication status as well as possible co-morbid conditions when engaging in research with children with ADHD, as both of these factors may significantly affect social outcomes.

### **Overall Perceptions of Children with ADHD**

Children with ADHD are often seen in a negative light. Indeed, significant amounts of research dollars have been devoted to identifying areas in which these children perform more poorly than children without ADHD. As well, these children are often marginalized in the school or community environment; teachers typically identify the children who have been diagnosed with ADHD and make sweeping, often negative, generalizations about how these children may behave in their class.

As such, it is even more important to develop research that provides a more balanced approach to children with ADHD. Despite facing adverse risk, some children with ADHD are resilient and demonstrate success in a number of areas despite their diagnosis. Recently, resilience models have strived to become less deficit-focused and instead more centered on areas of success for children (e.g., Climie, Mastoras, McCrimmon, & Schwean, in press; Mastoras,

Climie, Schwan, & Saklofske, 2010). The resilience paradigm has begun to recognize that all individuals have the ability to develop emotional strength and that their success may be determined by how they cope with adverse situations (Burt et al., 2008). Logically, the next step focuses on how this new research direction may be used to support or enhance resilient skills in children, allowing them to achieve to their potential (Sapienza & Masten, 2011).

Past research has attempted to investigate numerous theories pertaining to the behavioural and social difficulties demonstrated by children with ADHD. One important factor that may influence the social acceptance of children with ADHD is their potential lack of understanding or identification of other's emotions, resulting in rejection or isolation from peers. In addition, children with ADHD often fail to act appropriately on their limited understanding of other's emotions. Even in contexts where they may be able to accurately describe the emotional content in a situation, they often are unable to respond in a socially-appropriate manner. These negative behaviours and unfavourable displays of emotion by children with ADHD-C lead typically-developing children to seek playmates and friends with similar temperament and self-control abilities rather than those individuals with social or behavioural challenges. The ability to recognize or comprehend another's emotional state and respond in a socially-appropriate manner is referred to as emotional intelligence.

### **Emotional Intelligence**

In 1990, Salovey and Mayer published the first paper outlining the construct known as emotional intelligence (EI). As EI is a relatively new psychological term, its description continues to be redefined. Initial conceptualization of EI identified it as the "ability to monitor one's own and others' feelings and emotions, to discriminate among them, and to use this information to guide one's thinking and actions" (Goleman, 1995; Salovey & Mayer, 1990). It

has been further conceptualized as “an ability, capacity, skill, or a self-perceived ability to identify, assess, and manage the emotions of one's self, of others, and of groups” (Dulewicz & Higgs, 2000). Proponents of EI suggest that it can help facilitate enhanced understanding of individual differences beyond that of personality and intelligence. Specifically, it may impact important theoretical outcomes such as social skills and general quality of life (Austin, Saklofske, & Egan, 2005).

### **Theoretical Underpinnings**

Over the past two decades, theorists have proposed a number of distinct models of EI. However, two predominant theoretical frameworks have emerged in the recent literature and are the focus of most emotional intelligence research (Freeland, Terry, & Rodgers, 2008). These two frameworks are the ability-based EI model and the trait EI model. These models, while describing the same psychological construct, examine EI from differing perspectives and provide contrasting insight into the abilities defined by this construct. In a sense, these models look at the “knowing” versus “doing” when it comes to behaviour. Ability theorists focus on what the individual *knows* to do in a specific situation, regardless of what action is taken (i.e., cognitive-emotional capacity) and believe EI to be more related to cognitive factors such as general intelligence than trait EI. On the other hand, trait theorists focus on what individuals would actually *do* in the situation and whether they would use their knowledge in everyday social situations (i.e., emotional self-efficacy; Freeland et al., 2008). Accordingly, trait EI is thought to be more closely related to personality constructs than ability EI (Mavroveli, Petrides, Shove, & Whitehead, 2008; Petrides & Furnham, 2001). Research on EI and personality has been found to be relatively consistent in making this distinction (Ciarrochi, Chan, & Caputi, 2000).

**Ability-based EI.** The ability-based EI model (ability EI) formulated by Mayer, Salovey, and colleagues (e.g., Salovey & Mayer, 1990; Mayer, Salovey, & Caruso, 2002; Mayer, Salovey, Caruso, & Sitarenios, 2003) identifies EI as the ability to perceive emotion, integrate emotion to facilitate thought, understand emotions, and regulate emotions to promote personal growth (Salovey & Mayer, 1990; Salovey & Grewal, 2005). The ability model views emotions as useful sources of information that help one to make sense of and navigate the social environment. It focuses on an individual's knowledge of how to interact appropriately and successfully in these social environments.

The ability EI model proposes that individuals vary in their capacity to process information of an emotional nature and relate emotional processing to a wider cognition. This ability is seen to manifest itself in certain adaptive behaviours such as the development of social relationships. The model proposes that EI includes four types of emotional ability, or “branches”, which are linked together in hierarchical order beginning with basic psychological processes and moving towards more complex processes that integrate both emotion and cognition (Mayer et al., 2002; Salovey & Mayer, 1990).

At the lower end of the EI hierarchy lies the ability to *perceive* emotions, an essential level for the basic development of EI in individuals. The facility to perceive emotions focuses on the ability to detect and decipher emotions in faces, pictures, and voices, including to identifying one's own emotions. Perceiving emotions represents the most basic aspect of emotional intelligence development as it makes all other processing of emotional information possible.

At the second level of the hierarchy, the ability to *facilitate* emotions helps individuals to harness emotions to perform various cognitive activities such as thinking and problem solving.

This ability to facilitate emotions helps people to determine and reflect upon important information as well as to assist in the consideration of others' perspectives. The emotionally intelligent person can capitalize fully upon his or her changing moods in order to best fit the task at hand.

*Understanding* emotions is the key component of the third level. This level focuses on the ability to comprehend the language of emotion, identify and organize emotions, and appreciate more complex relationships among emotions. For example, understanding emotions encompasses the ability to be sensitive to slight variations between emotions and the ability to recognize and describe how emotions evolve over time.

The fourth and highest level of psychological processing of emotions focuses on the *managing* of emotions or the ability to regulate emotions in both ourselves and others. Therefore, the emotionally intelligent person can develop the ability to harness emotions, even negative ones, and manage them to achieve intended goals.

**Trait-based EI.** In contrast to the ability-based approach to EI, Bar-On (1997) proposed a trait-based approach to defining and assessing emotional intelligence. Bar-On described EI as “an array of non-cognitive capabilities, competencies, and skills that influence one’s ability to succeed in coping with environmental demands and pressures” (1997, p.14). Both Goleman (1995) and Bar-On (1997) conceptualized emotional intelligence according to the broad yet interdependent domains of non-cognitive competencies such as intrapersonal skills, interpersonal skills, self-actualization, self-esteem, adaptability, stress management, and general mood or well-being, providing specific distinction between the trait and ability-based models of EI.

Bar-On (1997; 2006) developed the first measure of EI that used the term "Emotional Quotient" (EQ). He defines emotional intelligence as being concerned with effectively

understanding oneself and others (intrapersonal skills), relating well to people (interpersonal skills), and adapting to and coping with immediate surroundings (stress management, adaptability) to be more successful in dealing with environmental demands. Bar-On posits that EI develops over time and can be improved through training, programming, and therapy. Individuals with higher EQ scores are thought to be more successful in meeting environmental demands and pressures than those with lower EQ scores. Bar-On also notes that a deficiency in EI can mean a lack of success in the social environment and the potential development of emotional problems.

Problems in coping with one's environment are thought, by Bar-On, to be especially common among those individuals lacking in the areas of reality testing, problem solving, stress tolerance, and impulse control (1997; 2006). In general, Bar-On considers emotional intelligence and cognitive intelligence to contribute equally to a person's general intelligence, which then offers an indication of one's potential to succeed in life.

In lay terms, trait EI refers to an individual's self-perceptions of their emotional abilities. This definition of EI encompasses behavioural dispositions and identifies how one would actually respond in given situations. It is measured by self report, as opposed to the ability-based model which examines performance-based abilities, which have proven more difficult to accurately measure scientifically.

### **Measuring Emotional Intelligence**

Different models of EI have led to the development of various instruments for the assessment of emotional intelligence. Although some of these measures may overlap in scope, most researchers agree that they tap slightly different constructs of EI. Emotional intelligence can be measured in a number of ways depending on the theoretical framework utilized. The

measurement of emotional intelligence abilities in children, however, is more challenging. As with any measure of children's abilities, developmental differences must be taken into consideration when creating a new children's assessment measure or when modifying an existing adult measure to be suitable for children.

**Ability-based EI.** The development of ability EI measures is somewhat limited, as few researchers have created reliable and valid measures of individuals' ability-based emotional intelligence. In fact, current literature discusses only one measure of ability EI – the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT).

The current measure of Mayer and Salovey's model of EI, the MSCEIT, is based on a series of emotion-based problem-solving items. Consistent with the model's claim of EI as a type of intelligence, the test is modeled on ability-based IQ tests. By testing a person's abilities on each of the four branches of ability EI, it generates scores for each of the branches (Perceiving Emotions, Facilitating Thoughts, Understanding Emotions, and Managing Emotions) as well as a two area scores (Experiential and Strategic EI) and a total overall score (Salovey & Grewal, 2005).

Central to the four-branch model is the idea that EI requires attunement to social norms. Therefore, the MSCEIT is scored in a consensus fashion with higher scores indicating higher overlap between an individual's answers and those provided by a worldwide sample of respondents. The MSCEIT can also be expert-scored, so that the amount of overlap is calculated between an individual's answers and those provided by a group of 21 emotion researchers (Salovey & Grewal, 2005). Correlation between expert and consensus scoring ranges between .93 to .99.

Although promoted as an ability test, the MSCEIT is unlike standard IQ tests in that its items do not have objectively correct responses. Additionally, the consensus scoring criterion means that it is impossible to create items that only a minority of respondents can solve because, by definition, responses are deemed emotionally 'intelligent' only if the majority of the sample has endorsed them.

Recently, the MSCEIT has been expanded to create a youth version known as the MSCEIT-YV (research edition) that is targeted at children 10 to 17 years of age (Mayer, Salovey, & Caruso, in press). Although this measure is still in the research phase, it holds promise to be a useful contribution to the measurement of EI in youth. A recently conducted independent validity study of the MSCEIT-YV (R) concluded that it was a true measure of the ability model of EI and the construct validity scores were acceptable (Peters, Kranzler, & Rossen, 2009). No other ability-based EI measures for children, adolescents, or adults are currently available.

**Trait-based EI.** The development of trait-based EI measures has been more expansive than that of ability-based measures. There are a number of measures designed to capture trait-based EI including the Swinburne University Emotional Intelligence Test (SUEIT; Palmer & Stough, 2001), the Schutte Self-Report Emotional Intelligence Test (SSEIT; Schutte et al., 1998), and, most recently, the Trait Emotional Intelligence Questionnaire (TEIQue; Petrides & Furnham, 2004). However, the most recognized measure of trait-based EI is the Bar-On Emotional Quotient Inventory (EQ-I; Bar-On, 1997).

The EQ-I is a self-report measure of EI developed as an assessment of emotionally and socially competent behaviour that provides an estimate of one's overall emotional and social intelligence (Bar-On, 1997). The EQ-I is not meant to measure personality traits or cognitive

capacity but rather the ability to be successful in dealing with environmental demands and pressures. The EQ-I is a self-report measure designed for individuals aged 16 and older, consisting of five subscales (intrapersonal, interpersonal, stress management, adaptability, and general mood) and total EQ (Bar-On, 1997). As well, positive impression and inconsistency index scores are provided to allow the examiner to identify individuals who may be striving to appear overly positive about their abilities or who respond in an inconsistent manner, therefore potentially invalidating the measure in both instances.

Doubts have been expressed in the research literature regarding the creation of a measure aimed to capture trait-based EI, particularly the validity of self-report, as an index of emotional intelligence (Matthews, Zeidner, & Roberts, 2007). Indeed, the EQ-I has been found to be highly susceptible to faking, which may limit its usefulness (Day & Carroll, 2004; Grubb & McDaniel, 2007). These concerns must be taken into consideration when utilizing the EQ-I for research or clinical purpose.

Assessment of children's trait-based EI is more developed than that of ability-based EI. Specifically, the EQ-I has been adapted and modified to be appropriate for use with youth and adolescents. Bar-On's Emotional Quotient Inventory: Youth Version (EQ:I-YV) and Emotional Quotient Inventory: Youth Version (short; EQ:I-YV (S)) allows for the standardized assessment of EI using the trait-based model of EI. The EQ-I:YV is designed as a self-report measure for individuals aged 7 to 18 years (Bar-On & Parker, 2000). As with the adult version, it allows for measurement of eight subscales including a positive impression and inconsistency index to increase test validity. However, given that the MSCEIT and Bar-On measure arguably different aspects of EI (i.e., ability versus trait EI, respectively), it is important to consider both measures when examining EI abilities in children and adults.

## **Emotional Intelligence and Social Ability**

Emotional competence is known to be a critical contributor to positive social interaction. The emotional ability necessary to facilitate interactions among peers and colleagues has been extensively examined in current literature, and the influential factor of emotion in adaptive social functioning and interpersonal communication has been well-documented from toddlerhood (e.g., Denham, McKingley, Couchoud, & Holt, 1990). The importance of peer acceptance in middle childhood has been found to be a strong predictor of a number of key social-emotional indicators including well-being, academic performance, and self-concept (Vandell & Hembree, 1994). Conversely, the consequence of peer rejection during this time often leads to detrimental social-emotional outcomes and negative behaviours.

Recent studies have begun to examine the relation between emotional intelligence and peer acceptance in school-aged typically-developing children (e.g., Mavroveli, Petrides, Sangareau, & Furnham, 2009) and adolescents (e.g., Mavroveli, Petrides, Rieffe, & Bakker, 2007). These studies examined trait EI and generally found that EI scores were strongly predictive of emotional and social criteria, including peer acceptance and social competency. Specifically, children with higher trait EI scores have been found to have better peer relations and are rated as being more pro-social by peers (Ciarrochi, Chan, & Baigar, 2001; Mavroveli et al., 2007; Mavroveli et al., 2009). These findings parallel those found in adult studies of EI and social relationships (Goleman, 1995). Given the very recent development of a child-sensitive measure of ability EI (MSCEIT-YV, Mayer, et al., in press), there is limited published research on the ability-based EI capabilities of typically-developing children and those with exceptionalities (e.g., ADHD).

Given these previous studies linking emotional intelligence abilities and social functioning in a typically-developing population, it is important to further understand the role of emotional intelligence in clinical populations and, more specifically, those populations that are known to demonstrate social skills deficits.

### **Linking Emotional Intelligence and Clinical Populations**

Previous research on emotional intelligence in clinical populations has focused on young adults with Asperger's Syndrome (AS). This line of research has indicated that there is a difference between ability and trait measures of EI (Montgomery et al., 2008). Specifically, individuals with AS demonstrated equivalent *understanding* of emotional intelligences (ability-based EI) as their typical peers but reported significantly lower *behavioural* control in real-life situations (trait-based EI). When these individuals had time to think about and consider their responses (such as on the MSCEIT), their performance was equal to that of typically-developing individuals. However, when they were faced with real-life situations (which often do not allow consideration time in responding), those with AS reported impairments in their actual behaviours (as measured by the Bar-On EQ:I).

Although the AS population has a different clinical presentation than individuals with ADHD, there are some similarities in social functioning that may provide a basis for comparative research. As such, it may be possible to use the findings in these studies to guide predictions in the relation between emotional intelligence and social abilities in other clinical populations and especially those known to be at-risk for poor social skills, such as individuals diagnosed with ADHD.

Furthermore, Barkley's (1997b) work highlighting the distinction between individuals with ADHD's knowledge of what to do in a situation as compared to their actual performance

would lend support to the idea that there may be distinctions between the “knowing” versus “doing” aspects of emotional intelligence. Given this framework, there may be anticipated differences between trait and ability EI whereby the trait (“doing”) aspect of EI may be adversely affected by ADHD symptoms. Additional research has identified that individuals lacking impulse control, stress tolerance, and problem solving abilities may also demonstrate a decreased EQ score (Bar-On, 1997). Given that individuals with ADHD often demonstrate deficits in these areas, it would not be unexpected if their trait-based EI scores would also be affected. However, despite the growing body of research examining EI abilities in children and adults, no studies to date have examined the emotional intelligence abilities of children with ADHD, leading to a significant gap in the current literature.

### **Present Study**

The current study explored EI abilities in children with ADHD-C and examined the relationship between EI and social abilities in these children. It should be noted that the same children participated in all components of this study and that the procedures utilized were part of a larger collaborative project.

To examine the EI abilities of children with ADHD-C, the following research questions were addressed:

1. What is the emotional intelligence profile of a child with ADHD-Combined type? In what areas do they demonstrate strength or deficit across the EI measures MSCEIT-YV (R) (e.g., understanding emotions, perceiving emotions) and Bar-On (e.g., interpersonal skills, intrapersonal skills) as compared to the normed standardization sample? Do children with ADHD-C demonstrate differences between ability- and trait-based EI abilities?

2. What differences in trait or ability EI exist within the ADHD-C sample? Do children taking medication for ADHD demonstrate differences in overall trait or ability EI as compared to the non-medicated children? Do children with co-morbid internalizing or externalizing disorders demonstrate differences in overall trait or ability EI?
3. What is the correlation between parent and child report on the social skills composite score on the SSIS in this ADHD-C sample?
4. What is the relation between overall trait or ability EI and social skill ability in children with ADHD-C? What aspects of trait or ability EI (e.g., interpersonal skills, intrapersonal skills) predict better social outcomes in these children?

## **Method**

### **Participants**

Children were required to meet a number of specific criteria to be eligible to participate in the study. The inclusionary criteria were consistent with those used by many ADHD and child researchers. Please note that all assessment measures are fully described in the “measures” section of this document below. Specifically, inclusionary criteria for children included the following four requirements:

1. Must have resided with their parents or current guardians for at least the previous five years to ensure that guardians could provide adequate information regarding the family history.
2. Must have attended school full-time within an Alberta Education school district at the time of participation.
3. Must not have any indication or previous diagnosis of Autism Spectrum Disorder, psychosis, epilepsy, or significant gross neurological, sensory, or motor impairments.

4. Must have cognitive abilities that fell minimally within the Average range of functioning or higher (Full Scale Intelligence Quotient  $\geq 85$ ) as based on an individually-administered cognitive assessment measure (Wechsler Abbreviated Intelligence Scale; WASI, Wechsler, 1999). This requirement was necessary to ensure that participants were able to understand the questions asked of them and that performance was not limited by low cognitive abilities.

Additionally, following methods put forth by prominent researchers in the field (e.g., Barkley, Fischer, Smallish, & Fletcher, 2002; Rapport, Jofler, Alderson, Timko, & DuPaul, 2009), specific additional criteria were identified for the ADHD participants to be eligible to participate.

1. Participants had previously received a diagnosis of ADHD from a psychologist, psychiatrist, or medical doctor (as reported by parent).
2. To address specific ADHD-C symptomology and severity, DSM-IV-TR (American Psychiatric Association, 2000) inattentive and hyperactive/impulsive scales on the Conners-3 Rating Scale (Conners, 2008) Parent Report yielded T-scores greater than or equal to 70 (Very Elevated) on at least one scale *and* a T-score of 65 (Elevated) on the second scale. Additionally, children must have met DSM-IV-TR symptom counts for ADHD criteria for both ADHD-H and ADHD-I so that they may be identified as ADHD-C.

It should be noted that seven children were excluded from the overall project for not meeting required full scale intelligence quotient or ADHD inclusionary criteria or child refusal to complete measures. Additionally, 16 children were not included in the current sample due to

their identification as primarily ADHD-Hyperactive/Impulsive type ( $n = 5$ ) or ADHD-Inattentive type ( $n = 11$ ).

Participants in the final sample included 41 children between the ages of 9 years, 1 month and 11 years, 11 months of age ( $M = 10.29$  years,  $SD = .80$ ) who had previously received a diagnosis of ADHD-C. The sample consisted of slightly more males than the typical ADHD population with regards to gender, as 34 of the 41 participants were male (82.9%) and only 7 were female. Table 1 provides information regarding participant age and IQ scores.

Additionally, both medicated ( $n = 27$ , representing 65.9% of the sample) and non-medicated ( $n = 9$ , 22.0%) children participated in this study. Determination of “medicated” versus “non-medicated” was determined by parent completion of a medication checklist that asked if their children took medication during the week, at weekends, and on holidays. Five children were excluded from medication-related data analyses, as they did not clearly fit into a “medicated” or “non-medicated” group (two children generally took medication during the week but not during the testing sessions and three children took medication for only one of their two days of study participation). No differences in age or cognitive scores were found between medicated and non-medicated children.

*Table 1. Participant Characteristics*

| Variable       | N  | Mean*       | Standard Deviation | Range*           |
|----------------|----|-------------|--------------------|------------------|
| Age            | 41 | 10.29 years | .80                | 9.08-11.92 years |
| Verbal IQ      | 41 | 107.20      | 14.39              | 80-144           |
| Performance IQ | 41 | 107.35      | 13.09              | 80-134           |
| Full Scale IQ  | 41 | 107.70      | 12.30              | 85-143           |

\*standard score, unless otherwise indicated

The final sample also incorporated a number of children with co-morbidities ( $n = 20$ , 48.7% of the sample) including those with Learning Disorders ( $n = 8$ , representing 19.5% of the

sample), Developmental Coordination Disorder (n = 3, 7.3%), Oppositional Defiant Disorder (n = 2, 4.9%), Obsessive Compulsive Disorder (n = 2, 4.9%), Anxiety (n = 1, 2.4%), and Language Disorders (n = 1, 2.4%). Parents reported the presence or absence of co-morbid conditions in their children as part of participation in the research. Two families did not report the presence or absence of co-morbidities. See Table 2 for summary of reported comorbid conditions.

*Table 2. Co-morbid Psychological Diagnoses Reported by Participant's Parent*

| Psychological condition                   | Number of participants | Percent of total participants |
|-------------------------------------------|------------------------|-------------------------------|
| None                                      | 21                     | 51.2                          |
| Learning Disorder                         | 8                      | 19.5                          |
| Developmental Coordination Disorder       | 3                      | 7.3                           |
| Oppositional Defiant Disorder             | 2                      | 4.9                           |
| Obsessive Compulsive Disorder             | 2                      | 4.9                           |
| Did not report                            | 2                      | 4.9                           |
| Anxiety                                   | 1                      | 2.4                           |
| Language Disorder                         | 1                      | 2.4                           |
| Anxiety and Obsessive Compulsive Disorder | 1                      | 2.4                           |

Statistical analyses conducted in this study compared children with ADHD-C to the typically-developing children used in the normed sample of each measure, rather than a matched control sample of non-ADHD children. The normative data of each measure (WASI, MSCEIT-YV (R), Bar-On EQ:i-YV (S), and the SSIS composite scores) all yield standardized mean scores of 100 with a standard deviation of 15. Use of the normative data provides the best indicator of responding by large samples of children, as the normative groups for each test often include responses from thousands of children of similar age to those in the current study.

## Measures

Parents and children independently completed a number of measures that allowed for an understanding of the child and his or her abilities across a number of areas. These measures

were used for several purposes, including determining inclusionary/exclusionary criteria as well as answering the research questions associated with this study. It should be noted that attempts were made to include teacher reports in the current study; however, the response rate from teachers was limited, resulting in insufficient data for the current sample.

**Parent report measures.** Parents completed a number of measures to gain a comprehensive description of their child's behaviours in the home environment. Additionally, parents completed a demographic questionnaire to collect information regarding family make up and the participating child's developmental history (including past and present medication record, diagnosis history, etc.).

***Conners Rating Scale – 3<sup>rd</sup> edition – Parent Form.*** The Conners Rating Scale – 3<sup>rd</sup> edition (Conners-3; Conners, 2008) is a standardized measure that uses observer ratings to help assess a child's behaviour related to inattention, hyperactivity/impulsivity, learning problems, executive functioning, aggression, and peer relations. In addition, the scale provides a total score indicative of an attention or behavioural disorder. This form was used to determine a child's eligibility to participate in the ADHD-C sample in this study.

Psychometrically, the Conners-3 (parent) demonstrates strong reliability and validity estimates. Specifically, the technical manual reports that both internal consistency ( $r = .85$  to  $.94$ ) and 2- to 4-week test-retest reliability ( $.72$  to  $.98$ ) coefficients were within the acceptable range (Conners, 2008). Additionally, convergent and divergent validity were confirmed through comparisons between Conners-3 scores and other relevant measures, including the previous version of this measure, the Conner's Rating Scale-Revised (Conners, 1997), the Behaviour Assessment Scale for Children – 2<sup>nd</sup> edition (Reynolds & Kamphaus, 2004), the Achenbach System of Empirically Based Assessment (Achenbach, 1991), and the Behaviour Rating

Inventory of Executive Function (Gioia, Isquith, Guy, & Kenworthy, 2000). Finally, the Conners-3 (parent) is reported to be able to distinguish between children and youth with ADHD and those in the general population 77.61% of the time, indicating adequate discriminative validity (Conners, 2008).

***Social Skills Improvement System – Parent Form.*** The Social Skills Improvement System (SSIS; Gresham & Elliott, 2008) is a standardized multi-rater assessment of student social behaviours that can be used to evaluate Social Skills, Problem Behaviours, and Academic Competence. For the purposes of this study, only the social skills composite score and subtests were used. Parents completed 46 items related to the Social Skills composite score and were required to determine how often his or her child performed the target behaviour (e.g., “follows household rules”). Parents were asked to choose from four options: never, seldom, often, or almost always.

The Social Skill composite is reported as a standard score ( $M = 100$ ,  $SD = 15$ ) and is comprised of seven subscales: Communication, Cooperation, Assertion, Responsibility, Empathy, Engagement, and Self-Control. Communication examines the child’s ability to take turns and make appropriate eye contact during conversation as well as general politeness to others. Cooperation addresses his or her ability to help others, share materials, and comply with rules. Assertion indicates the extent to which a child initiates behaviours (e.g., asking for information, responding to the actions of others, introducing oneself). Responsibility captures the child’s regard for property and his or her ability to communicate with adults. Empathy reflects a child’s ability to show concern or respect for other’s feelings or viewpoint, while Engagement reports his or her ability to join or invite others to join activities, initiate conversation, and make friends. Finally, Self-Control examines a child’s ability to respond

appropriately in conflict (e.g., teasing) or non-conflict situations (e.g., taking turns; Gresham & Elliott, 2008). All subscale variables are reported as raw scores only, as standard scores are not created for these scales. Appendix A contains the behaviour levels corresponding to the seven subscale raw scores for this measure.

For the Social Skills composite and subscale score on the parent report, adequate reliability and validity scores were reported. Internal consistency for the Social Skills composite was .95, with subscale scores ranging from .73 to .86 across gender and combined scores. Test-retest correlations fell between .76 and .86 across composite and subscale scores. Regarding validity, inter-correlation coefficients between the Social Skills composite and subscales acceptably ranged from .42 to .84. Additionally, to address convergent validity, consistency was found between similar composite and subscale scores between different versions of the SSIS (e.g., parent, teacher, self-report). Conversely, support for discriminant validity was found when examining components of the SSIS that were not related; for example, the Social Skills composite and subscales were not correlated with those in the Problem Behaviours domain (Gresham & Elliott, 2008).

**Child assessment measures.** For the current study, child participants completed a number of measures assessing their cognitive and self-reported social capabilities as well as two specific measures focusing on trait and ability EI respectively.

**Wechsler Abbreviated Intelligence Scale.** To assess children's cognitive capabilities, the Wechsler Abbreviated Intelligence Scale (WASI; Wechsler, 1999) was administered. The WASI is a standardized intelligence scale for individuals aged 6.0 to 89.11 years and is designed to measure the intellectual functioning of an individual as compared to others of the same age. The WASI provides three factor-based scores including Verbal Intelligence Quotient (VIQ),

Performance Intelligence Quotient (PIQ), and a Full Scale Intelligence Quotient (FSIQ), derived from the combined results of the four core subtests. For the purposes of participation in this project, children were required to score within the Average range or higher (standard score of 85 or greater) on the FSIQ.

The WASI was standardized on a sample of 2,245 individuals from across the United States, in accordance with the 1997 US census data. Internal consistency estimates are high and range from .92 to .98 for the IQ scores. Stability coefficients for the VIQ range from .92 to .97, indicative of high reliability. In examining the validity of this measure, scores on the WASI demonstrated strong correlation with the Wechsler Intelligence Scale for Children, 3<sup>rd</sup> edition (Wechsler, 1991; ranged from .69 to .74 for subtests; .76 to .87 for IQ scores) as well the Wechsler Adult Intelligence Scale, 3<sup>rd</sup> edition (Wechsler, 1997; .66 to .88 for subtest scores; .84 to .92 for IQ scores). In addition, Saklofske, Caravan, and Schwartz (2000) examined the validity of the WASI for use in a Canadian context. They concluded that the measure correlated adequately with other brief Canadian intelligence and academic scales (e.g., Canadian Achievement Tests-2 and the Canadian Test of Cognitive Skills), indicating that this measure is appropriate for use as a brief measure of intelligence for Canadian children.

***Social Skills Improvement System – Self-Report Form.*** Children also completed the SSIS self-report form, providing insight into their own social skill abilities. As with the parent form, only the Social Skills composite and subscales (Communication, Cooperation, Assertion, Responsibility, Empathy, Engagement, Self-Control) were used. A specific description of each of these subscales was previously provided. Children completed 46 items related to the Social Skills composite score and were required to determine how true each question was for them (e.g.,

“I try to forgive others when they say sorry”). Children could choose from four options: not true, a little true, a lot true, or very true (Gresham & Elliott, 2008).

For the Social Skills composite and subscale score on the self-report, similar to the parent report, adequate reliability and validity scores were also found. Internal consistency for the Social Skills composite was .94, with subscale scores ranging from .70 to .81 across gender and combined scores. Test-retest correlations fell between .58 and .80 across composite and subscale scores. Regarding validity, inter-correlation coefficients between the Social Skills composite and subscales acceptably ranged from .49 to .84. Additionally, to address convergent validity, consistency was found between similar composite and subscale scores between different versions of the SSIS (e.g., parent, teacher, self-report). Conversely, support for discriminant validity was found when examining components of the SSIS that were not related; for example, the Social Skills composite and subscales were not correlated with those in the Problem Behaviours domain (Gresham & Elliott, 2008).

***Bar-On Emotional Quotient Inventory: Youth Version.*** The Bar-On Emotional Quotient Inventory: Youth Version, (EQ-I:YV ; Bar-On & Parker, 2000) is a self-report measure of emotional intelligence that examines the level of emotional and social functioning in children and adolescents aged seven to 17 years. This measure is available in both a long (EQ-I:YV) and a short (EQ-I:YV (S)) form; for the purpose of this project, the short form was utilized. The EQ-I:YV (S) can be used to identify a child’s strong and weak areas and help develop the skills needed for academic, personal, and social success. All 30 questions are answered using a four-point Likert scale, where the respondent indicates the extent to which the question describes them. For example, a score of one would indicate that the statement is “Not true of me (never, seldom)” while a score of four indicates that it is “Very Much true of me (very often).”

The EQ-I:YV (S) reports a total Emotional Quotient (EQ) score, as well as four subscales (i.e., Intrapersonal Scale, Interpersonal Scale, Stress Management Scale, Adaptability Scale) and a Positive Impression Scale. The Intrapersonal Scale consists of questions related to emotional self-awareness, assertiveness, self-regard, self-actualization, and independence and includes questions such as “It is easy to tell people how I feel”. The Interpersonal Scale examines empathy, social responsibility, and interpersonal relationships (e.g., “I care what happens to other people”). The Stress Management Scale consists of two related abilities: stress tolerance and impulse control. Questions in this scale include items such as “I get too upset about things”. Items on the Adaptability Scale include “I can come up with good answers to hard questions” and examines concepts such as reality testing, flexibility, and problem solving. Finally, the Positive Impression scale provides insight into the participant’s pattern of responses and identifies those that may be creating an overly favourable impression of themselves. This scale includes items such as “Nothing bothers me” and “I like everyone I meet” (Bar-On & Parker, 2000).

Psychometrically, the EQ-I:YV (S) has demonstrated adequate reliability and validity. Specifically, internal reliability was acceptable, with coefficients on the Total EQ and subscales ranging from .65 to .87 across ages and gender. Test-retest (three weeks) coefficients also ranged from .77 to .88, indicating excellent reliability. Regarding validity, the EQ-I:YV (S) demonstrated low to moderate inter-correlations between subscales and composite scores ( $r = .17$  to  $.69, p < .05$ ), consistent with the view that the EQ-I:YV captures a number of distinct aspects of EI (e.g., adaptability, interpersonal skills, intrapersonal skills). As well, strong correlations were found between the EQ-I:YV and the adult Bar-On EQ-I ( $r = .56$  to  $.88, p < .05$ ; Bar-On & Parker, 2000).

*Mayer-Salovey-Caruso Emotional Intelligence Tests - Youth Version (Research edition)*). The Mayer-Salovey-Caruso Emotional Intelligence Test – Youth Version, research edition (MSCEIT-YV (R); Mayer, et al., in press) is a 102-item measure completed online and assesses a young person's (age 10-17 years) performance-based EI.<sup>1</sup> Currently, only expert-scoring is available for this measure. In addition to a total EI score, the MSCEIT-YV (R) assesses two areas (Strategic and Experiential) and four branches of EI. The Experiential EI area is comprised of the Facilitating Thought and Perceiving Emotions branches, while the Strategic EI encompasses the Managing and Understanding Emotions branches.

The Perceiving Emotions section requires the participant to rank along a standardized scale the extent to which photographed facial expressions suggest certain emotions (e.g., surprise, anger, disgust). The Facilitating Thought section requires the participant to rank along a standardized scale the extent to which a particular emotion (e.g., “excited”) is similar to various tactile, color, and taste sensations (e.g., warm, heavy, dark, pink). The Understanding Emotions section requires the participant to read a description of a blend of emotions (e.g., “When you have something really nice, and then someone steals it, you end up feeling...”) and to select the answer choice representing most accurate complex feeling (e.g., jealous, disgusted). Finally, the Managing Emotions section requires the participant to read brief scenarios (e.g., “A boy received some very sad news. He wants to feel happy before going to a fun party. How helpful would each of the following be in getting the boy to feel happy?”) and to rank the degree of constructiveness of each presented possible solution (e.g., “not very helpful” to “very helpful”).

As the MSCEIT is a test of ability, participants’ responses are evaluated and scored according to a criterion of correctness rather than relying on a self-evaluation as is common in personality measures as well as the Bar-On EI scales. Participant responses were sent to the test

<sup>1</sup>Multi-Health Systems Inc. has stated that this measure can be extended downward to be used for children as young as nine years of age.

publisher, Multi-Health Systems Inc., to be scored using the expert scoring criteria, where points were awarded according to a scoring key agreed upon by the authors of the MSCEIT-YV (R). Specifically, the MSCEIT-YV (R) items were scored according to the pre-set scale ranging from zero (less correct) to two (more correct), and the sum of the respective items yielded branch, area, and total MSCEIT-YV (R) scores. It should be noted that the MSCEIT-YV (R) is currently in the final stages of development and is not available for general use at the time of writing. However, the project researchers were given permission to use the prepublication research measure and were provided with standard scores for the total score, two composites, and four subscales.

Due to the research nature of this measure, there is limited published information regarding the psychometric properties of the MSCEIT-YV (R). However, two independently-conducted examinations of validity found support for the construct validity of the MSCEIT-YV (R) (Cha & Marin, 2009; Peters et al., 2009). Specifically, Peters and colleagues reported that the MSCEIT-YV (R) demonstrated moderate correlations ( $r = .42, p < .05$ ) with theoretically-related constructs on the Bar-On EQ-I:YV but diverged from the EQ-I:YV on unrelated constructs. Additionally, the adult form of the MSCEIT (from which the youth version was created) has continually demonstrated psychometric soundness (Mayer et al., 2002).

## **Procedure**

Information regarding the study was dispersed throughout the Calgary community with support from ADHD agencies, local media, school boards, lab website, and an on-campus psycho-educational assessment clinic (see Appendices B and C, respectively). Interested parents contacted the researchers and were provided with additional information on the study. They completed a phone-based pre-screening questionnaire to determine initial eligibility (see

Appendix D). Children and families who met initial inclusion criteria were invited to participate in the study. Most families participated over the course of two three-hour sessions to allow time for breaks and snacks (as needed). Families were provided with free parking at the university as well as a \$25 family-friendly gift card (e.g., Chapters, Cineplex, restaurants) as an acknowledgement of their participation. Children chose a special toy from the prize box. Approval from the University of Calgary Conjoint Faculties Research Ethics Board was obtained for all aspects of this study.

Assessment measures were administered in a pseudo-random order, with the WASI (Wechsler, 1999) always administered on day one to ensure that the child's cognitive abilities fell within the Average range or higher, as per the inclusionary criteria. For all self-report rating scales, items were read by the researcher to the child, unless the child indicated he or she would like to read independently. For children with identified learning disabilities, particularly in reading, effort was made to ensure that participants were comfortable with the examiner and that that child was aware that all questions would be read to them. After completing informed consent paperwork (see Appendix E), parents were given the option to complete their measures in a quiet room while their child was participating or to take the forms home to complete and return on the second day of testing. Most parents chose to complete the forms during their child's testing time.

### **Current Study**

Although there is an extensive amount of published research describing children with ADHD and their abilities (or lack thereof) as well as a substantial literature base examining emotional intelligence, there is limited intersection between these two areas. There are few studies that examine EI in individuals with ADHD and none that have specifically explored EI

abilities in a school-aged ADHD-C population. Thus, this is a noticeable area of deficit and worthy of further exploration.

This study examined the EI profile of children with ADHD-C with the purpose of providing an informed understanding of the aspects of EI in which children with ADHD-C may demonstrate strength or are able to perform equivalently to their same-age peers. Additionally, this study investigated associations between EI and social outcomes by exploring EI as a predictor of social competencies. By utilizing social skill abilities as the desired outcome, this study examined the effect that EI may have on social competency of children with ADHD. Subsequently, the results of this study may be used to inform key areas of intervention and support for these children.

An explanation of participant inclusionary criteria was previously provided. For the purposes of this study, two measures of EI were utilized: the Bar-On EQ-I:YV (S) (Bar-On & Parker, 2000) to measure trait-based EI abilities and the MSCEIT-YV (R) (Mayer et al., in press) to gain an understanding of ability-based EI. Additionally, the SSIS (Gresham & Elliott, 2008) was used to measure social skills abilities. Both the parent and self-report (child) versions of the SSIS were used independently. These measures were thoroughly explained in an earlier section of this document.

### **Research Questions**

To gain a better understanding of the trait and ability emotional intelligence skills of children with ADHD-C and how these abilities relate to social skills, the following research questions were posed:

1. What is the emotional intelligence profile of a child with ADHD-Combined type? In what areas do they demonstrate strength or deficit across the EI measures MSCEIT-YV

- (R) (e.g., understanding emotions, perceiving emotions) and Bar-On (e.g., interpersonal skills, intrapersonal skills) as compared to the normed standardization sample? Do children with ADHD-C demonstrate differences between ability- and trait-based EI abilities?
2. What differences in trait or ability EI exist within the ADHD-C sample? Do children taking medication for ADHD demonstrate differences in overall trait or ability EI as compared to the non-medicated children? Do children with co-morbid internalizing or externalizing disorders demonstrate differences in overall trait or ability EI?
  3. What is the correlation between parent and child report on the social skills composite score on the SSIS?
  4. What is the relation between overall trait or ability EI and social skill ability in children with ADHD-C? What aspects of trait or ability EI (e.g., interpersonal skills, intrapersonal skills) predict better social outcomes in these children?

### **Results**

To examine research question one regarding the EI abilities of children with ADHD-C, preliminary descriptive analyses were conducted (see table 3). An overall examination of the data revealed that there were no significant outliers in responding to either of the EI scales. Further examination of skewness and kurtosis values indicated that a majority of values fell within the excellent range ( $\pm 1$ ) and that all values fell within the acceptable range ( $\pm 2$ ) as per Tabachnick and Fidell (2007). Six participants did not complete the MSCEIT-YV (R) and one participant did not complete the Bar-On EQ-i:YV (S). As part of the informed consent procedures, participants were free to decline completion of particular tasks if they chose. Consequently, these data were not obtained for this study.

Table 3. *Descriptive data for the EI tasks.*

| Variable                   | N  | Mean   | Standard<br>Deviation | Skewness | Kurtosis |
|----------------------------|----|--------|-----------------------|----------|----------|
| <b>MSCEIT:YV (R)</b>       |    |        |                       |          |          |
| Total EI Score             | 35 | 101.39 | 12.080                | -.268    | .070     |
| Area 1 - Experiential EI   | 35 | 102.39 | 13.516                | .150     | -.154    |
| Area 2 - Strategic EI      | 35 | 100.69 | 11.238                | -.602    | .265     |
| Perceiving Emotions        | 35 | 100.36 | 14.211                | -.847    | 1.106    |
| Facilitating Thoughts      | 35 | 102.53 | 14.518                | .272     | .302     |
| Understanding Emotions     | 35 | 96.13  | 10.479                | -.059    | -.407    |
| Managing Emotions          | 35 | 104.77 | 12.719                | -1.129   | 1.475    |
| <b>Bar-On EQ-i: YV (S)</b> |    |        |                       |          |          |
| Total Emotional Quotient   | 40 | 98.63  | 12.929                | .465     | -.434    |
| Intrapersonal Scale        | 40 | 101.80 | 12.815                | .538     | -.216    |
| Interpersonal Scale        | 40 | 93.95  | 14.509                | -.288    | -.655    |
| Stress Management Scale    | 40 | 99.93  | 12.513                | -.294    | -.247    |
| Adaptability Scale         | 40 | 94.58  | 17.185                | .091     | -1.080   |
| Positive Impression Scale  | 40 | 91.78  | 16.060                | -.022    | -1.095   |

It should be noted that for all analyses within the current study, Bonferroni corrections were not applied due to the exploratory nature of the study and the limited sample size. Bonferroni corrections are typically applied to ensure conservative examination of results. However, in this study, applying an adjustment would enhance the problematic issue of sample size, thus reducing Type I error (rejecting the null hypothesis when it is true) and possibly increasing Type II error (accepting the null hypotheses when it is false). Consequently, some results may be underestimated. Instead, an alpha level of .05 was pre-set and only those analyses that yielded an alpha level at or below .05 were considered to be significant. Additionally, exact significance values (p) were reported for all analyses to aid in interpretation and caution is advised in interpreting results.

To determine if the ADHD-C group differed significantly from the typical (i.e., normative) populations on which the MSCEIT:YV (R) and the Bar-On EQ-I: YV(S) were normed, single subject t-tests (two-tailed) were conducted. For each of the MSCEIT:YV (R) and

the Bar-On EQ-I: YV(S), scores for the overall EI score as well as individual subscale scores were compared to the standardization mean score of 100 ( $SD = 15$ ). Across all ages, standardization of these measures results in a mean score of 100 ( $SD = 15$ ). See table 4.

Table 4. *Single Sample Comparisons of EI for ADHD-C Group and Normative Group*

|                               | Mean score | Mean diff. | Sig.(two-tailed) | Effect size (r) |
|-------------------------------|------------|------------|------------------|-----------------|
| <b>MSCEIT:YV (R)</b>          |            |            |                  |                 |
| Total EI Score                | 101.39     | 1.386      | .502             | -               |
| Area 1 - Experiential EI      | 102.39     | 2.394      | .302             | -               |
| Area 2 - Strategic EI         | 100.69     | .693       | .717             | -               |
| Perceiving Emotions           | 100.36     | .360       | .882             | -               |
| Facilitating Thoughts         | 102.53     | 2.525      | .311             | -               |
| Understanding Emotions        | 96.13      | -3.872     | .036             | .148            |
| Managing Emotions             | 104.77     | 4.770      | .033             | .169            |
| <b>Bar-On EQ-i: YV (S)</b>    |            |            |                  |                 |
| Total Emotional Quotient (EQ) | 98.63      | -1.375     | .505             | -               |
| Intrapersonal Scale           | 101.80     | 1.800      | .380             | -               |
| Interpersonal Scale           | 93.95      | -6.050     | .012             | .201            |
| Stress Management Scale       | 99.93      | -.075      | .970             | -               |
| Adaptability Scale            | 94.58      | -5.425     | .053             | .166            |
| Positive Impression           | 91.78      | -8.225     | .002             | .256            |

In investigating the data from the MSCEIT:YV, the overall EI score for the ADHD-C group ( $M = 101.39$ ,  $SD = 12.08$ ) did not differ from that of the norm group,  $t(34) = 0.68$ ,  $p = .50$ . However, a closer examination of branch scores revealed interesting findings. The ADHD-C group performed significantly better than the norm group on the Managing Emotions branch score ( $M = 104.77$ ,  $SD = 12.72$ ),  $t(34) = 2.22$ ,  $p = .03$  but significantly worse than the norm group on the Understanding Emotions branch score ( $M = 96.13$ ,  $SD = 10.48$ ),  $t(34) = -2.19$ ,  $p = .04$ . Performance on the two area scores (Experiential and Strategic EI), as well as the Perceiving Emotions and Facilitating Emotions branches, did not significantly differ from the norm group.

Examination of the overall performance on the Bar-On EQ-I: YV (S) indicated that, similar to the MSCEIT: YV, the ADHD-C group ( $M = 98.63$ ,  $SD = 12.93$ ) did not differ from the norm group on the Total EQ score,  $t(39) = -.67$ ,  $p = .51$ . Of particular interest, there was a significant difference on the Positive Impressions scale, which identified the likelihood that the respondent was trying to make him or herself appear in a less positive light. On this variable, the ADHD-C group ( $M = 91.78$ ,  $SD = 16.06$ ) scored approximately 8 points lower than the norm group,  $t(39) = -3.24$ ,  $p = .002$ , indicating that they did not present themselves in an overly positive light and, in fact, were slightly less positive than the normed group. However, in the manual for the Bar-On EQ-I: YV (S) (Bar-On & Parker, 2000), it was stated that only standard scores greater than 130 on the positive impression index were considered problematic and that lower scores, as with the current ADHD-C sample, were acceptable. No scores within the current sample were greater than 118; therefore, no further adjustments to the data were deemed to be necessary.

Further examination of analyses using the Bar-On EQ-I: YV (S) revealed that the ADHD-C group reported significantly lower performance on the Interpersonal ( $M = 93.95$ ,  $SD = 14.51$ ;  $t(39) = -2.64$ ,  $p = .012$ ) and Adaptability ( $M = 94.58$ ,  $SD = 17.19$ ;  $t(39) = -2.00$ ,  $p = .053$ ) scales. No differences were found between the ADHD-C and norm groups on the Intrapersonal or Stress Management scales.

To examine whether this sample of children with ADHD-C demonstrated a significant difference in performance on trait and ability EI, a paired samples t-test was performed. Analyses revealed that there was no significant difference between mean scores of the overall EI (MSCEIT;  $M = 101.39$ ,  $SD = 12.08$ ) and the total EQ (Bar-On;  $M = 98.63$ ,  $SD = 12.93$ ),  $t(33) =$

1.30,  $p = .20$ . Due to the non-significant omnibus analysis, no further follow up analyses were conducted.

Further analyses examined differences within the ADHD-C group. Specifically, independent sample t-tests were performed to examine differences in performance on trait and ability EI measures between children who were medicated ( $n = 27$ ) and those who were not medicated ( $n = 9$ ). It should be noted that these analyses were conducted with uneven sample sizes in addition to a small number of participants. Thus, results should therefore be considered tentative and exploratory in nature. See table 5 for means of all composite and subscale scores for both the MSCEIT: YV (R) and Bar-On EQ-I: YV (S) measures for medicated and non-medicated children.

Table 5. *Independent Samples t-tests: EI comparisons between Medicated and Non-medicated children.*

|                            | Medicated Children | Non-Medicated Children | t-value | Sig. (two-tailed) | Effect Size (r) |
|----------------------------|--------------------|------------------------|---------|-------------------|-----------------|
|                            | Mean Score (SD)    | Mean Score (SD)        |         |                   |                 |
| <b>MSCEIT:YV (R)</b>       |                    |                        |         |                   |                 |
| Total EI Score             | 100.40 (13.06)     | 102.99 (10.72)         | -.500   | .621              | -               |
| Area 1 - Experiential EI   | 101.63 (14.84)     | 102.94 (7.68)          | -.236   | .815              | -               |
| Area 2 - Strategic EI      | 99.76 (11.60)      | 102.53 (12.70)         | -.564   | .577              | -               |
| Perceiving Emotions        | 98.84 (12.91)      | 109.44 (7.31)          | -2.182  | .038              | .451            |
| Facilitating Thoughts *    | 102.41 (16.95)     | 98.68 (6.55)           | .869    | .392              | -               |
| Understanding Emotions *   | 95.55 (8.80)       | 97.01 (15.92)          | -.247   | .810              | -               |
| Managing Emotions          | 103.70 (14.39)     | 107.11 (7.93)          | -.631   | .533              | -               |
| <b>Bar-On EQ-i: YV (S)</b> |                    |                        |         |                   |                 |
| Total Emotional Quotient   | 98.96 (13.11)      | 97.89 (12.86)          | .213    | .833              | -               |
| Intrapersonal Scale        | 101.46 (12.41)     | 104.89 (10.67)         | -.738   | .466              | -               |
| Interpersonal Scale        | 95.77 (14.89)      | 90.22 (11.11)          | 1.020   | .315              | -               |
| Stress Management Scale    | 100.12 (13.65)     | 100.00 (11.67)         | .023    | .982              | -               |
| Adaptability Scale         | 94.62 (16.11)      | 91.44 (20.75)          | .473    | .640              | -               |
| Positive Impression        | 94.12 (16.58)      | 87.78 (17.33)          | .978    | .335              | -               |

\* equal variances not assumed (Levene's Test for Equality of Variance,  $p < .05$ )

Five medicated children and one non-medicated child did not complete the MSCEIT: YV (R) due to time constraints of testing or child unwillingness to participate. Overall, the children who were medicated ( $n = 22$ ;  $M = 100.40$ ,  $SD = 13.06$ ) did not differ from those who were not medicated ( $n = 8$ ;  $M = 102.99$ ,  $SD = 10.72$ ) on the total EI score,  $t(28) = -.50$ ,  $p = .62$ . In addition, no significant differences were found between the medicated and non-medicated groups at the area level or on three of the four subscale scores. The only significant difference was found on the Perceiving Emotions subscale, where children who were not medicated ( $M = 109.44$ ,  $SD = 7.31$ ) significantly outperformed those who were medicated ( $M = 98.84$ ,  $SD = 12.91$ ),  $t(28) = -2.18$ ,  $p = .04$ .

On the Bar-On EQ-I: YV (S), one medicated child did not provide useable data for inclusion in this analysis. Children who were medicated ( $n = 26$ ;  $M = 98.96$ ,  $SD = 13.11$ ) did not differ from those who were not medicated ( $n = 9$ ;  $M = 97.89$ ,  $SD = 12.86$ ) on the overall EI score,  $t(33) = .21$ ,  $p = .83$ . In addition, no significant differences were found between the medicated and non-medicated groups on any subscale scores.

Additionally, planned analyses included a comparison of children with co-morbid internalizing or externalizing disorders. However, only two children were reported to have co-morbid externalizing disorders (Oppositional Defiant Disorder) and two children were reported to have internalizing disorders (Anxiety, Obsessive Compulsive Disorder). Due to the extremely small sample size of these populations, statistical analyses were not justified and therefore were not conducted. It is acknowledged that this was a limitation of the study due to sample size and participant composition.

Before conducting analyses to determine the relationship between EI and social skills abilities in children with ADHD, preliminary descriptive analyses were conducted to determine

the characteristics of the SSIS measure (see table 6). The SSIS yielded standard scores ( $M = 100$ ,  $SD = 15$ ) for both the parent and self-report Social Skills Composite variables, respectively. All subscale variables (Communication, Cooperation, Assertion, Responsibility, Empathy, Engagement, Self-Control) were reported as raw scores, as standard scores are not created for these scales. An overall examination of the data revealed that there were no significant outliers in responding. Further examination of skewness and kurtosis values indicated that a majority of values fell within the excellent range ( $\pm 1$ ) and that all values fell within the acceptable range ( $\pm 2$ ) (Tabachnick & Fidell, 2007). It should be noted that six of the child participants did not complete the SSIS (self-report) and one parent did not complete the SSIS (parent report). Consequently, this data was not available for final analyses or interpretation.

Table 6. *Descriptive data for the Social Skills Improvement System (SSIS) – parent and child reports.*

| Variable                   | N  | Mean  | Standard Deviation | Range  | Skewness | Kurtosis |
|----------------------------|----|-------|--------------------|--------|----------|----------|
| <b>SSIS - Parent</b>       |    |       |                    |        |          |          |
| Social Skills Composite*   | 40 | 85.80 | 14.458             | 50-117 | -.359    | .159     |
| Communication              | 40 | 14.00 | 3.282              | 6-20   | -.486    | -.042    |
| Cooperation                | 40 | 10.33 | 2.526              | 5-15   | .065     | -.805    |
| Assertion                  | 40 | 12.18 | 3.029              | 5-18   | -.030    | -.485    |
| Responsibility             | 40 | 10.00 | 2.926              | 2-15   | -.459    | .174     |
| Empathy                    | 40 | 11.37 | 3.712              | 4-18   | -.043    | -.704    |
| Engagement                 | 40 | 12.73 | 3.796              | 4-21   | -.401    | -.057    |
| Self-Control               | 40 | 9.10  | 3.521              | 1-18   | .091     | .987     |
| <b>SSIS – Child report</b> |    |       |                    |        |          |          |
| Social Skills Composite*   | 35 | 96.74 | 16.254             | 68-128 | .255     | -.473    |
| Communication              | 35 | 12.83 | 3.981              | 0-18   | -1.002   | 1.868    |
| Cooperation                | 35 | 14.11 | 3.946              | 6-21   | .013     | -.937    |
| Assertion                  | 35 | 13.31 | 4.464              | 4-21   | .099     | -.281    |
| Responsibility             | 35 | 13.89 | 3.708              | 7-21   | .312     | -.326    |
| Empathy                    | 35 | 12.69 | 3.261              | 6-18   | -.134    | -.681    |
| Engagement                 | 35 | 14.80 | 3.864              | 7-21   | .119     | -.832    |
| Self-Control               | 35 | 11.46 | 4.154              | 5-18   | -.209    | -1.251   |

All scores are reported as raw scores except those marked \* - these scores are reported as standard scores ( $M = 100$ ,  $SD = 15$ ).

To examine the correlation between parent and child report on the social skills composite score on the SSIS, Pearson correlation analyses were performed. A significant correlation was found between parent and child SSIS composite scores,  $r = .369, p = .03$ , indicating limited agreement between parent and child regarding perceptions of the child's overall social skills abilities (see table 7).

To examine the relation between trait and ability EI and social skills in children with ADHD-C, Pearson correlation analyses were performed (see table 7). Significant correlations were found between overall MSCEIT: YV (R) and Bar-On EQ-I: YV (S) scores,  $r = .413, p = .02$ . The relationship between the Bar-On EQ-I: YV (S) total score and the composite SSIS ratings revealed interesting results. For the child self-report SSIS composite score, there was a significant relationship with the Bar-On EQ-I: YV (S) total score,  $r = .690, p < .001$ , while the parent composite SSIS rating trended towards significance,  $r = .275, p = .09$ . In contrast, however, the overall MSCEIT: YV (R) score did not correlate with either the parent SSIS ( $r = .210, p = .23$ ) or the child SSIS ( $r = .098, p = .61$ ).

Table 7. *Correlations between overall trait and ability EI and SSIS composite scores*

|                              | 1 | 2     | 3    | 4      |
|------------------------------|---|-------|------|--------|
| MSCEIT – total score         | - | .413* | .210 | .098   |
| Bar-On – total EQ            |   | -     | .275 | .690** |
| SSIS – parent composite      |   |       | -    | .369*  |
| SSIS – self report composite |   |       |      | -      |

\*  $p < .05$ ; \*\* $p < .01$ ; two-tailed

The predictive relationship between trait and ability EI on social skill ability was also examined. Two multiple regression analyses were performed using different dependent variables (Parent Social Skills composite and Child self-report Social skills composite, respectively). Due to the relatively small sample size of the current study, the standard method of variable entry was

utilized so as to ensure conservative estimation of results. However, despite this conservative approach, these analyses were considered exploratory.

In the first regression analysis, the overall EI score for the MSCEIT and Bar-On were entered as the independent variables, with the Parent Social Skills composite as the dependent variable. This model was not found to be significant,  $F(2, 30) = 1.61, p = .22$ . The model explains only 9.7% of the variance (Adjusted  $R^2 = .037$ ), indicating that there was limited predictive value in these variables (see table 8).

Table 8. *Standardised Regression Coefficients for Model Predicting Parent-reported Social Skills*

| <b>Predictor Variable</b> | <b>Beta</b> | <b><i>p</i></b> |
|---------------------------|-------------|-----------------|
| Bar-On Total EQ           | .272        | .206            |
| MSCEIT Total EIQ          | .134        | .553            |

The second regression analysis also used the overall EI score for the MSCEIT and Bar-On as the independent variables, with the Child-reported Social Skills composite as the dependent variable. This model was found to be significant,  $F(2, 27) = 13.92, p < .001$ . The overall model explained 50.8% of the variance (Adjusted  $R^2 = .471$ ). However, upon further examination of the results, the Bar-On total EI score had significant positive regression weights, indicating that children with higher scores on this scale were predicted to score better on the SSIS composite, after controlling for other variables in the model. The MSCEIT total EI score did not contribute to the multiple regression model (see table 9).

Table 9. *Standardised Regression Coefficients for Model Predicting Child-reported Social Skills*

| <b>Predictor Variable</b> | <b>Beta</b> | <b><i>p</i></b> |
|---------------------------|-------------|-----------------|
| Bar-On Total EQ           | .909        | <.001           |
| MSCEIT Total EIQ          | -.122       | .545            |

## **Discussion**

The data obtained in this study provide encouraging findings regarding the EI abilities of children with ADHD. Specifically, this preliminary work highlights areas in which children with ADHD were very similar to typically-developing children on a number of aspects of trait- and ability-based EI. Considering that much of the literature in the ADHD field is deficit-focused, results indicating that these children have abilities that are more alike those without ADHD may argue for a required shift in the way in which these children are described or “talked” about. Results are discussed in relation to the current ADHD literature as well with consideration for the typical development of children.

### **Emotional Intelligence Profile of Children with ADHD**

In the examination of the pattern of responses on the MSCEIT-YV (R), it is clear that children with ADHD demonstrate an overall EI score comparable to that of the normed sample. Specifically, the overall EI scores of children in the current study did not statistically differ from the norm group, nor did their scores within the Perceiving Emotions or Facilitating Thoughts subscales. This finding highlights an area of individual strength for the children in the current sample, as these results indicate that children with ADHD-C are knowledgeable regarding a number of aspects of ability-based EI. Additionally, children in the sample demonstrated better understanding on the Managing Emotions subtest than the normed sample, although their comprehension was weaker, albeit still within the Average range, on the Understanding Emotions subtest.

In general, these results are not surprising. Children with ADHD are often intelligent individuals and are able to problem-solve their way through situations when given adequate time to consider the alternatives. However, their impulsivity and lack of attention to detail may often

impair their performance. On the MSCEIT-YV (R), children in this study were able to work through the task at their own pace, guided by the examiner (e.g., reading questions, etc.). There were no time constraints on task completion and extraneous interfering information was removed from the situation (e.g., background noise, other children, etc.). In this circumstance, these children were able to demonstrate their knowledge of what to do and how to act in a given socially-based situation. They demonstrated equal or above average performance across domains examining their ability to correctly identify emotions and feelings, using their emotions to solve problems creatively, and control their emotions (e.g., how to make themselves feel better after experiencing a negative situation). Their single area of deficit was on a subtest that asked them to identify similar emotion-related words from a multiple choice list (e.g., “which word means the same as...”). This subtest is more abstract than the other three subtests, as there are no pictures or contextual cues to help the children succeed. Of note, some of the children did not understand the word “disgust,” which may have impeded their performance on this specific subtest.

Results of the Bar-On EQ-I:YV (S) demonstrate that the children with ADHD-C in the current sample report comparable performance abilities on the Total EQ score, as well as on the Intrapersonal and Stress Management scales. However, they scored significantly lower on the Interpersonal and Adaptability Scales, as well as on the Positive Impression Scale. These results are interesting given the literature base that highlights that children with ADHD often view themselves in a more favourable light than those around them (i.e., as compared to parent or teacher ratings) (Owens, Goldfine, Evangelista, Hoza, & Kaiser, 2007). Within this sample, the respondents actually scored lower on the Positive Impression scale than the normed group. The Positive Impression scale is designed to ensure that children are not biased in their responding

nor trying to make themselves appear in a more favourable light (i.e., responding in a socially-desirable manner). Instead, the children in this study answered in a slightly less favourable manner than those in the normed sample, indicating that their ratings may be slightly more negative than the normed group.

In examining the overall response pattern on the Bar-On scale, children in the current study reported Intrapersonal and Stress Management abilities equal to those of the normed sample. Indeed, the self-rated Intrapersonal abilities of children with ADHD, or their ability to understand, recognize, and communicate their emotions to others, as well as their ability to respond appropriately to stressful situations, are within the Average range of ability. Children with ADHD-C are often given strategies on how to deal with stressful situations (whether at home, with peers, or at school), which may have influenced their rating on this subscale. Their concurrent stronger performance on the Managing Emotions subscale on the MSCEIT provides further support for their strong knowledge of how to influence their own moods and how to change their emotions when needed. According to the children in this study, they are able to use this emotional knowledge appropriately when approaching and managing stressful occurrences in their own lives.

Conversely, children in the current sample reported poorer performance in both the Interpersonal and Adaptability domains on the Bar-On. Specifically, these children self-identify difficulties interacting appropriately with others, including understanding and recognizing the feelings and emotions of others, as well as being flexible and effective at managing change. The literature base on the social and adaptability difficulties of children with ADHD is extensive (e.g., Barkley, Murphy, & Kwasnik, 1996; Stein, et al., 1995), and it is not surprising that their performance in these areas is impaired.

However, it is interesting to note that the Bar-On scale is a self-report scale and that the children in this study were able to acknowledge their own shortcomings in these domains. This finding may be especially interesting given that work by Owens and colleagues has indicated that children with ADHD, and especially those with ADHD-C, are more likely to overestimate their own competencies than children without ADHD or those with ADHD-I (Hoza et al., 2004; Owens & Hoza, 2003; Owens et al., 2007). Specifically, children with ADHD have been found to demonstrate a “positive illusory bias” towards their own behaviours, whereby they rate themselves more favorably as compared to ratings from parents or teachers. In particular, children with ADHD have been found to over-estimate their abilities the most in domains where they demonstrate greatest deficit (e.g., those with co-morbid Conduct Disorder rate themselves as more competent in behavioural domains while those with co-morbid learning difficulties overinflate their perceived abilities in academic domains) (Hoza et al., 2004). Therefore, it is possible, and indeed likely, that although the children in the current sample have acknowledged some aspect of deficit in the areas of Interpersonal Relations and Adaptability, their self-perceived abilities are overinflated as compared to their true abilities.

There was no statistical difference in scores on the total EI of the MSCEIT-YV and the total EQ of the Bar-On. This result was not surprising given that, on both measures, children with ADHD-C in the current sample scored similarly (i.e., comparable performance on both measures).

Together, these findings are in alignment with Barkley’s (1997b) position in which he advocates that children with ADHD do not demonstrate a deficit in knowledge regarding appropriate behaviours and actions but instead have a difficult time putting knowledge into practice. In this study, across a number of ability-based subscales, it was evident that children

with ADHD demonstrated average or better ability when it came to knowing what to do in a given situation as compared to typically developing children. When these children are in a low-pressure, un-timed, distraction-free situation, they are able to reasonably work through emotionally-based scenarios, evaluate possible options, and apply their knowledge appropriately and accurately. As such, it may be that other factors associated with ADHD, such as impulsivity or inattention, may have a significant impact on these children's ability to demonstrate their knowledge appropriately.

However, children with ADHD also self-reported areas of deficit when it came to putting this EI knowledge into practice. Specifically, these children reported poorer performance when interacting with others, as well as adapting to new environments, both of which are common areas of difficulty for children with ADHD. In naturalistic settings, such as in the classroom or on the playground, children with ADHD are often overwhelmed with information to process; they must consider their own feelings, the behaviours of others, situational cues, and context and are less able to inhibit their impulsive responses. As a result, they often respond in a manner that is incongruent with their knowledge. Indeed, if children with ADHD are asked how they "should" have responded in a given situation, they invariably provide the correct answer. However, in the moment, they are unable to consider the best option and often act impulsively. Given time and opportunity to consider their response in a social situation, children with ADHD-C are able to recognize the emotions of other and adjust their own feelings and behaviours accordingly.

Within the ADHD-C sample, comparisons between medicated and non-medicated children were performed. These analyses were conducted to examine EI differences between those children who take medication for ADHD and those who do not. As previously discussed,

much of the ADHD literature does not account for medication status and often does not make comparisons between those who are medicated and those who are not. Given the potential differences that may exist between these groups, the EI abilities of children who are typically medicated and those who are not medicated were examined.

The only significant difference between medicated and non-medicated children with ADHD-C in the current study on the MSCEIT-YV (R) or Bar-On EQ:I-YV (S) was on the Perceiving Emotions subscale of the MSCEIT. On this subtest, children who were not medicated performed significantly better than those who were medicated. This result is somewhat contrary to what would be predicted, as one of the primary goals of medication therapy is to increase a child's ability to maintain adequate levels of attention to detail. However, as a number of researchers have highlighted, it is extremely important that children with ADHD are on the most appropriate type and dosage of medication for them individually (Connor, 2006; Greenhill et al., 2001; Rapport et al., 1988). Determining the appropriate type and dose of medication requires consideration of the efficacy of the medication as well as the severity of the ADHD symptoms and the potential side effects that may emerge. Often, medical professionals initially prescribe a low dose to observe the effects of the medication before tweaking the dosage to obtain optimal benefit (Greenhill et al., 2001). A child who is under-medicated may continue to demonstrate impulsive, hyperactive, or inattentive behaviours, whereas an over-medicated child may be overly emotional or irritable and appear "zoned out" (Conner, 2006; Rapport et al., 1988).

It is therefore possible that, within the current sample, a number of medicated children were not on the most appropriate dosage of their medication. Indeed, a number of parents commented on the continual need to reassess medication dosage and many families with newly-diagnosed children were still trying to find the correct "balance" of medication for their children.

Additionally, medication dose should constantly be re-examined as a child grows, as body weight may be an influential factor in the effectiveness of the medication. Consequently, the children in the current study may be under- or over-medicated, which may influence their ability to attend to detail. On the Perceiving Emotions subtest, children are required to detect important but subtle details when examining facial cues. It is possible that the medicated group were unable to appropriately attend to these details as a result of an imbalance in their medication. It should be noted that all other subtests on the MSCEIT, Bar-On, and SSIS involved written questions (instead of pictures, as with the Perceiving Emotions subtest) and all questions were read aloud to the child during the testing session. However, although this proposed explanation may have some validity, it is also possible that the results of this analysis are again affected by the limited sample size of the groups. Specifically, a non-mediated group of only nine children may result in significant variability in responding with such a small number of children and therefore this result may simply be due to chance.

Another goal of this study was to examine the possible differences in EI abilities between children with ADHD-C and other co-morbid conditions. Specifically, comparisons between children with co-morbid internalizing (e.g., Anxiety, Depression) or externalizing (e.g., Oppositional Defiant Disorder, Conduct Disorder) conditions were proposed. However, due to the limited availability of children who were diagnosed with these co-morbid conditions, these analyses were not able to be conducted. These questions will be important areas of future exploration within this field.

### **Emotional Intelligence and Social Outcomes**

A subsequent aspect of this study examined the relationship between EI and social outcomes in children with ADHD-C. First, the relation between parent and child social skills

rating was examined. Following, a series of correlations was conducted to explore associations within and between EI instruments and composite SSIS scores pertaining to social outcomes from parent and child reports. A subsequent examination of regression analyses exploring the predictive ability of EI on social outcomes will be discussed.

Initial analyses examined the social skills abilities of children with ADHD-C from the perspective of both parent and child. As previously discussed, children, and especially those with ADHD are often poor raters of their own behaviours (e.g., Kolko & Kazdin, 1993; Loeber et al., 1990, Schwean et al., 1999) and the use of parent ratings is often beneficial when examining the social abilities of children. In the current study, when comparing the self-reported ratings of social skills by children with ADHD-C to those ratings of their parents, a correlation of .37 was found. Within the present sample, parents rated their children as being less socially competent (within the Low Average range of ability) than the children's own self-ratings (within the Average range of ability). This finding is somewhat consistent with the literature in that, although parents and children do not necessarily have strong agreement on ratings, correlations between ratings trend in a positive direction.

Further analyses examined the relation between overall trait or ability EI and social skill ability in children with ADHD-C. Specifically, correlational analyses revealed that there was a significant positive correlation ( $r = .41$ ) between the total EI score on the MSCEIT-YV (R) and the total EQ score on the Bar-On. This result is consistent with previous research that has stated that although the MSCEIT and Bar-On measure similar aspects of the EI construct, they do not measure identical components (Brackett & Mayer, 2003; Brackett, Rivers, Shiffman, Lerner, & Salovey, 2006; Ciarrochi et al., 2000). Therefore, although some minor overlap between the two

measures is expected, the correlation should fall within the low to medium range, as it did within this study.

When looking at the correlation between the child-reported overall SSIS and performance on the MSCEIT-YV (R) and Bar-On, different patterns of correlational results were found. Specifically, there was no significant correlation between the MSCEIT-YV (R) total EI and the composite SSIS; however, there was a strongly significant relationship between the Bar-On total EQ and the SSIS composite score.

Regarding the lack of correlation between the total EI score on the MSCEIT and the child-reported SSIS composite score, previous literature has found only weak support for the relationship between these variables and therefore, it may not be surprising that no correlation was found in the current sample. Specifically, although a correlation between MSCEIT scores and self-rating of social competence was found in one study (Brackett et al., 2006), the researchers highlight that this correlation was present in university-aged adult males only. No similar correlation was found in females and has not been replicated in further studies (e.g., with different age groups). In addition, researchers have noted that, in general, individuals are poor at estimating their own abilities (Dunning, Johnson, Ehrlinger, & Kruger, 2003). For example, Dunning and colleagues (2003) reported that adults' self-reported beliefs of their own mental competencies had limited correlation with actual performance on ability tasks. Therefore it is not surprising that, when it comes to predicting one's own social abilities, participants in the current study demonstrate limited correlation with their actual abilities.

An alternate explanation to understand the lack of correlation between the total EI score on the MSCEIT and the child-reported SSIS composite score in the current study relates again back to the literature base surrounding the positive illusory bias. As previously mentioned, the

positive illusory bias is a tendency in which children, and especially those with ADHD, overestimate the self-perceptions of their own abilities and competencies (Hoza et al., 2004; Owens & Hoza, 2003; Owens et al., 2007). It is possible that, within the current sample, children overestimated their social abilities as compared to their performance on the MSCEIT measure, resulting in a limited relation between the two variables.

When examining the strong correlation between the Bar-On total EQ and the child-report SSIS composite score, it is apparent that, in the view of the children in the current study, their performance in situations that require emotional intelligence, such as social interactions, is strongly related to their social skill abilities. However, caution is advised in interpreting the strength of this finding, as both of these measures are self-reported rating scales completed by the children. There are inherent problems with estimating relationships between two variables using the same rater, as it is likely that the scores will be highly correlated (Hoyt, 2000). Indeed, the children with ADHD-C in the current sample have rated themselves consistently on both the Bar-On and the SSIS, resulting in high correlational values but limited practical significance. However, this finding does provide support for the fact that these children are consistent in their ratings, therefore supporting the reliability of their responding.

When further examining the correlation between the EI measures and the composite scores on the SSIS, it was found that the parent measures did not correlate significantly with either of the total scores on the MSCEIT-YV (R) or the Bar-On. In further examining the MSCEIT-YV (R) literature, it appears as though the relationship between social competence and ability-based EI is somewhat tenuous. As highlighted earlier, previous research using an adult sample found a significant relationship between performance on the MSCEIT and social competence for males only (Brackett et al., 2006). This relationship within males appears to be

somewhat robust, having been replicated in two studies; however, it is not known why this relationship does not extend to adult women. As well, individuals who are at risk for poor social outcomes may demonstrate differential performance on the MSCEIT, as these individuals may know how to respond in a given social situation given ample time and space to analyze the problem (such as on the MSCEIT) but may admit to on-going social difficulties within their peer group (such as those ratings on the SSIS). Given the restricted result in previous literature, exacerbation of social difficulties and the inconsistency in performance demonstrated by children may wash out any potential findings in the current sample. It should be noted that, with the current sample, comparisons between males and females were not conducted due to the limited number of females in the current sample ( $n = 7$ ). Given an appropriate sample size, further follow up of this relationship may reveal interesting gender differences in performance.

In understanding the lack of correlation between the Bar-On EQ score and the composite SSIS score for the parents, previous literature has found that often parent-child ratings trend toward a similar direction but are not necessarily significantly correlated. This result was found when examining the relationship between parent and child report on the SSIS, whereby the correlation was within the low-medium range of correlation. In examining the Bar-On and SSIS composite scores, the correlation between these variables fell within the low-medium correlation range ( $r = .28$ ). Within this sample, the parent SSIS and child Bar-On ratings are slightly positively correlated, indicating that their responses trend in the same direction but are not statistically correlated. These results indicated that child's ratings of their own EI abilities do not strongly correlate with their parents' ratings of their social competence. Again, as was previously highlighted, children with ADHD may over-estimate their own abilities or performance in a given area (such as the actions that they would take in a given situation) while

parents have a somewhat more objective view of their child's interaction skills with peers and adults and in social situations.

Given the previous literature linking EI and social abilities, it was surprising that results from the current study were not as strong as have been previously found (e.g., Brackett et al., 2006; Mavroveli et al., 2007; Mavroveli et al., 2009). However, previous literature has primarily focused on typically-developing individuals and, more specifically, typically-developing adults and has not included individuals at-risk for demonstrating social difficulties (such as those with ADHD). As such, it may be possible that this specific population does not demonstrate as strong a relationship between EI and social skills as may be seen in typically-developing adults and children.

Further analyses examined the predictive ability of EI on social outcomes. Two separate regression analyses were conducted to examine the relationship between these variables. The first analysis used the overall EI score for the MSCEIT and Bar-On to determine the predictive ability of the Parent Social Skills composite score. Neither the overall model nor the individual predictor variables were found to be significant for this analysis. However, given the moderate correlation between the MSCEIT and Bar-On scores, as well as the low correlation between the EI measures and the parent SSIS composite score, this result is not unexpected.

The second analysis used the overall EI score for the MSCEIT and Bar-On to determine the predictive ability of the Child Social Skills composite score. Within this analysis, the overall model was found to be significant, and it was apparent that the primary factor driving this predictive relationship was the Bar-On EQ score. Specifically, scores on the Bar-On total EQ significantly predicted scores on the child reported SSIS composite score. However, as

previously mentioned, given the strong correlation between these two measures and the inherent difficulties with self-report of behaviour, this result should be interpreted with caution.

Previous research examining EI and social interactions have found that trait-based EI is generally a good predictor of peer acceptance in children and adolescents (Mavroveli et al., 2007; Mavroveli et al., 2009). Specifically, children with higher trait EI scores have been found to have better peer relations and are rated as being more pro-social by peers (Ciarrochi et al., 2001; Mavroveli et al., 2007; Mavroveli et al., 2009). However, an important distinction between these studies and the current study lies in the population of interest. More specifically, these previous studies have examined the relationship between EI and social outcomes in typically-developing children only. Consequently, this relationship may be different within children who have known social deficits, such as those with ADHD. For example, those with social deficits may not elicit equivalent social opportunities in which to enhance or develop their EI skills at the same rate as more socially-competent individuals. Thus, their EI abilities are diminished, further impacting their social competence. This lack of development may create a “downward spiral” effect, whereby children with poor social abilities are not able to engage in activities that may strengthen their EI skills (such as participating in appropriate social interaction), which further affect their social proficiency.

Also of note, previous studies have frequently used “peer acceptance” as the outcome variable (as rated by peers of the child), whereas in the current study, a social skills composite score, incorporating abilities across a number of areas, including communication, cooperation, assertion, responsibility, empathy, engagement, and self-control, was used. Thus, the scope of behaviours that are encompassed by the social skills composite score in the current study is much broader than what has been used previously. Using a composite of these wide varieties of skills

may actually mask the relationship between individual skills and emotional intelligence. It is acknowledged that this is a weakness in the SSIS measure and in the current study.

Taken together, these factors may explain why the results from the present study differ from what has previously been found in the literature. Consequently, further research is necessary to determine the specific aspects of social development that may be predicted by trait and ability EI and how this relationship may differ for individuals with social difficulties, such as those with ADHD.

### **Implications**

Overall, this study expands the current understanding of the abilities of children with ADHD as well as the importance of the development of emotional intelligence. Specifically, furthering the knowledge of the relation between social skill ability and emotional intelligence allows for a greater understanding of the social challenges experienced by children with ADHD and provides additional insight into their areas of emotional strength and social ability. The results of these studies will be of interest to parents, teachers, practitioners, and those who work with children with ADHD.

This study has two major implications for front-line practice in the field. Of note, the following implications may be most relevant for school- or community-based settings, as a majority of participants in the current study were recruited through these means and not through clinical populations.

First, results of this study indicate that children with ADHD-C generally have the emotional knowledge necessary to interact appropriately in social situations. Sharing this information with those who work with children with ADHD will be extremely important, as it is often believed that children with ADHD simply do not know how to act in social situations.

Results from this study imply that, given appropriate time and opportunity to consider the situation, children with ADHD-C are able to correctly interpret and respond in these social environments. Their actions in the classroom do not necessarily indicate their underlying knowledge regarding social situations but may instead reflect on the impulsivity associated with ADHD. Teachers and parents must understand that the impulsivity and distractibility of children with ADHD-C may be a key impediment to their social success and must therefore work to support children in translating knowledge regarding social interactions into everyday practice.

Second, a broader understanding of emotional intelligence in children with ADHD-C and its relation to social ability may help to guide future intervention services for these children. Many children with ADHD attend social skill groups that aim to teach them how to interact appropriately with peers and adults. The primary teaching method of many of these groups is to instill knowledge regarding appropriate social conventions; however, it is apparent that many children with ADHD-C possess the necessary knowledge to interact appropriately with their peers but simply lack specific types of abilities to translate their knowledge into practice. Therefore, the focus of these social skill groups should be the *implementation* of social skills, rather than the teaching of knowledge. For example, activities such as role playing, team building activities, or group games with a shared common goal may provide children with ADHD-C the opportunity in which to implement their knowledge and practice their skills, guided by group facilitators in a safe environment. This type of program may be significantly more likely to initiate change in social skills performance than those programs which focus primarily on reiterating and regurgitating knowledge.

Given the importance of appropriate social development, it is crucial to provide children who may demonstrate weak social skills with as many opportunities for success as possible.

However, this support may begin with a more clear understanding of what these children are able to do and how they may be best supported. This study provides the first step in understanding what children with ADHD-C understand regarding appropriate social interaction and where their abilities fall. It should be the goal of parents and teachers to help these children implement their knowledge on a more constant and successful basis. Children with ADHD-C have the capacity to be successful in their social interactions, but require support and understanding in order to achieve to their potential.

### **Limitations**

As with any research study, there are limitations that must be noted. As is often the case with applied research, there are a number of potentially influential factors that are outside the control of the experimenter. Despite applying careful scientific rigor to the current study, a number of limitations are acknowledged.

It is recognized that the sample size for this study is the primary limiting factor, therefore constricting the statistical analyses and power of the research. Given the relatively small sample size, analyses for these studies are considered to be exploratory in nature, pending further data collection and analysis. In this case, any findings are considered preliminary and may provide guidance for future studies which may incorporate larger sample sizes to address the current research questions.

Methodologically, it is also important to highlight that the children with ADHD-C in the current study were compared to a normed sample and not a matched control sample. Using the normed sample provides a strong indicator of “typical” patterns of responding of a large number of children on which the tests are standardized and provides a strong basis of comparison for the ADHD-C sample. However, the use of a matched control sample may give slightly different

results, as it is possible to specifically hold a number of potentially influential variables constant (e.g., age, gender) rather than comparing them to a large, somewhat heterogeneous standardization sample. Moving forward with this study, a typically-developing sample of matched non-ADHD children will be included in the final sample so as to provide a comparable sample to the ADHD children.

Additionally, the generalizability of the current ADHD-C sample to the larger ADHD population may be limited. Specifically, the children recruited for the current study were primarily a community-based sample and did not necessarily include clinically-referred children, possibly overlooking a more severe subgroup of children with ADHD-C. Consequently, it is possible that the children in the current study represent those with less severe ADHD symptomology. Indeed, the prevalence of severe behavioural disorders (e.g., Oppositional Defiant Disorder) was low in comparison to current co-morbid ADHD/Oppositional Defiant Disorder estimates. It is acknowledged that this sample may not be purely representative of the larger ADHD-C population. A more focused recruitment of participants through healthcare clinics, the Alberta Children's Hospital, Child Development Center, and other agencies that support families whose children demonstrate more severe ADHD behaviours may help to increase the generalizability of the results of this study.

One of the primary measures in this research, the MSCEIT-YV (R), is currently in the research stage of development. Given the strong literature base in the adult version of the MSCEIT, there is support for the reliability and validity of the new youth version of this measure. However, until the final version of the MSCEIT-YV and the final normative data are released, it is acknowledged that the current research status of this measure is a limitation of the research study. Additionally, the MSCEIT-YV (R) was developed for children and adolescents

aged 10 through 17 years of age. For the purposes of the current project, the age range was extended down to nine years of age. This expansion was done in collaboration with the support and knowledge of the research personnel at the publishing company and is commonly done with the adult MSCEIT, where the measure can be extended downward to include those who are 16 years of age (test range is 17 years and older). However, it is acknowledged that it may be problematic to compare the nine-year old children in this sample to the norms of 10-year old typically-developing children.

Finally, of the three child-completed scales in this study, two of them were self-report measures. It is recognized that correlating reporting scales from the same respondent (whether child or adult) often results in limited variability between measures and may produce biased results. This issue may be compounded by the finding in previous literature that children in general are not always the most reliable reporters of their own externalizing behaviours (Schwean, et al., 1999; Youngstrom, et al., 2000). This finding may be particularly relevant for children with ADHD, as recent research has highlighted a positive illusory bias in these children, whereby children with ADHD tend to see themselves in a much more favourable light than that is reported by their parents or teachers (e.g., Owens & Hoza, 2003).

Despite these limitations, these studies provide encouraging findings that justify the need for future follow up research in this area. The addition of more research participants would significantly strengthen this study and data collection is ongoing.

### **Future Research Directions**

There are a number of different avenues that warrant follow up as a result of this study. First, the current sample size and demographic limited the ability to make definitive conclusions. However, it will be important to continue to explore specific factors influencing children with

ADHD-C. For example, examining the EI performance of children with co-morbid internalizing or externalizing disorders may reveal important distinctions between ability and trait EI within these populations. These findings may be particularly helpful when treating individuals with ADHD and co-morbid conditions.

As this is one of the first studies that examines the EI profiles of children with ADHD, it would be beneficial to continue to monitor these children to determine how their profiles may change as these school-aged children reach adolescence. How might their awareness of others and their ability to interact with peers and adults change as they become more independent at home and at school? Do those with higher levels of EI in late childhood become more successful with their peers during middle and later adolescence as compared to those with lower levels of EI?

A second line of future research highlights the beginning of a fledgling field of research examining resilience in children with ADHD. Given the promising results of this study, it would be beneficial to continue to explore ways in which children with ADHD may be more successful, using resilience frameworks as a guideline for future research. What factors may promote success in these children despite the presence of ADHD symptoms and secondary characteristics? What aspects of personal development, family support, and school or community involvement may help these children achieve to their potential? The answers to these questions are not yet known.

In conclusion, it is important that research recognizing the abilities of children with ADHD continues. Despite the current deficit-focused literature base, the importance of identifying areas of individual, family, and community strength, such as those identified through the exploration of emotional intelligence and social abilities, will be extremely important in

supporting positive long-term outcomes in all children and especially those diagnosed with ADHD.

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## Appendix A: Behaviour Levels Corresponding to Subscale Raw Scores (SSIS)


|                | Parent form   |         |               | Student form  |         |               |
|----------------|---------------|---------|---------------|---------------|---------|---------------|
|                | Below Average | Average | Above Average | Below Average | Average | Above Average |
| Communication  | 0-12          | 13-19   | 20-21         | 0-10          | 11-17   | 18            |
| Cooperation    | 0-9           | 10-16   | 17-18         | 0-12          | 13-20   | 21            |
| Assertion      | 0-11          | 12-18   | 19-21         | 0-9           | 10-18   | 19-21         |
| Responsibility | 0-9           | 10-16   | 12-18         | 0-11          | 12-19   | 20-21         |
| Empathy        | 0-9           | 10-17   | 18            | 0-9           | 10-17   | 18            |
| Engagement     | 0-11          | 12-19   | 20-21         | 0-11          | 12-19   | 20-21         |
| Self-Control   | 0-7           | 8-16    | 17-21         | 0-6           | 7-15    | 16-18         |

## Appendix B: Recruitment Poster

Promoting the Positives in Challenging Children



# STRENGTHS IN ADHD



Do you have a **child 8-11 years** of age with a diagnosis of **ADHD**?

If so, you are invited to participate in valuable research exploring strengths in ADHD!

- Participation includes 1-2 visits to the University of Calgary
- Participating families receive a \$25 gift card plus a fun toy!
- All information is confidential
- No diagnosis will be provided

Project Contact Information:  
 Phone number: (403) 210-6726  
 Email address: [adhdkids@ucalgary.ca](mailto:adhdkids@ucalgary.ca)  
[www.ucalgary.ca/adhdkids/](http://www.ucalgary.ca/adhdkids/)



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## THANK YOU FOR YOUR HELP!

In addition to receiving a \$25 family-friendly gift certificate and a special toy for your child, you will be helping advance research that is intended to help your child and others with ADHD.

### OUR TEAM

Emma Climie, Don Saklofske  
Sarah Mastoras & Vicki Schwewan

Faculty of Education, University of Calgary

Doctoral and Masters students in the School & Applied Child Psychology Program

**CONTACT US!**  
(403) 210-6726  
adhdkids@ucalgary.ca  
www.ucalgary.ca/adhdkids

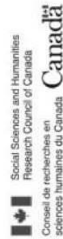
*If you know of other families who might be interested in participating, please pass this on!*

The Strengths in ADHD Project is supported by grants from:

**Alberta Centre for Child, Family, and Community Research**



**Social Sciences and Humanities Research Council of Canada**



**Carlson Family Research Award in ADHD**

Promoting the Positives in Challenging Children



Do you have a child 8-11 years of age diagnosed with Attention Deficit Hyperactivity Disorder (ADHD)?

***If so, participate in our research!***



## What is **STRENGTHS IN ADHD?**

The *Strengths in ADHD* research study is intended to **identify strengths in children with ADHD**, and highlight factors that support children in achieving **academic, social, and emotional success.**



We will be exploring factors within **the child, the family, and the community** that are most important to promoting well-being.

## How you can help

### **WE NEED YOU!**

Children **aged 8-11** with a **diagnosis of ADHD** provided by a doctor or psychologist.

*We are also looking for children without ADHD to participate!*

### **WHAT, WHEN & WHERE?**

- 1-2 visits to the University of Calgary scheduled at a mutually convenient time
- Children will engage in activities designed to identify their strengths, and parents will be asked to provide information about the child and family
- Free parking and refreshments for your visits
- All information provided will remain **confidential**
- Please note that no diagnosis will be provided as a result of your participation

## Why is this research **IMPORTANT?**

- Focus on a **strengths-based understanding** of ADHD – looking at what helps these children be happy & successful!
- Consider children **within their everyday environments** to ensure a well-rounded picture of their functioning and development.
- Further our understanding of how to **identify children with ADHD** who are most at-risk and require **support and assistance.**



## Appendix D: Prescreening Questionnaire

**Pre-screening Questionnaire (Administered over phone)**

Thank you for your interest in the Strengths in ADHD study. In order to determine whether your child is able to participate in this study, we have some questions for you now which will take approximately 5 minutes to complete. Is this a good time to complete our pre-screening questionnaire?

**\*ASSIGNED ID:** \_\_\_\_\_ **Sibling participant ID (if applicable):** \_\_\_\_\_

**DATES BOOKED:**

Session 1: \_\_\_\_\_

Session 2: \_\_\_\_\_

Name of researcher: \_\_\_\_\_ Date of questionnaire: \_\_\_\_\_

Name of individual completing this questionnaire: \_\_\_\_\_

*Where did you hear about us?* \_\_\_\_\_

Relationship to child: \_\_\_\_\_

Phone Number: \_\_\_\_\_ E-mail address: \_\_\_\_\_

Child's full name: \_\_\_\_\_ Gender: \_\_\_\_\_

Child's date of birth: \_\_\_\_\_ Age: \_\_\_\_\_

What are the living arrangements for this child? (e.g., lives with both parents, one parent)

If doesn't live with both parents, what is custody arrangement? \_\_\_\_\_

If joint custody, is other parent aware of this study? Will you be able to get a consent form signed by them as well?      Y      N

Does this child attend school full time?    Y    N    \*(we cannot accept home-schooled kids)

Child's primary language: \_\_\_\_\_

If English is not first language, is the child fluent in English?    Yes    No

Does your child have a diagnosis of ADHD?    Yes      No

If so, do you know if a specific subtype was provided? \_\_\_\_\_

Who provided the diagnosis? Profession: \_\_\_\_\_

When was this diagnosis made? \_\_\_\_\_

Has your child received any other mental health or learning diagnoses? Yes No

If so, what other diagnosis does your child have or has had and when were they diagnosed?

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Has your child ever had a psychological assessment? Yes No

If so, when was the last time an assessment was completed? \_\_\_\_\_ (date)

Does your child suffer from any of the following medical conditions:

|                                   |     |    |
|-----------------------------------|-----|----|
| Epilepsy:                         | Yes | No |
| Gross motor difficulties:         | Yes | No |
| Major hearing or vision problems: | Yes | No |
| Autism Spectrum Disorder:         | Yes | No |

Is your child currently taking medication for attentional concerns? Yes No

If yes, what medication? \_\_\_\_\_

\*\*\*\*\* **For office use only** \*\*\*\*\*

Based on these questions:

Does the child meet inclusionary criteria to participate in this study? Yes No

If so, in what group? ADHD Control

Is the child needed based on age, gender, or comorbidity needs at this time? Y / N

\*\*\*\*\* *Scripted responses to parents*\*\*\*\*\*

**If participant does qualify:**

Thank you for completing these questions. Based on the information provided, you are able to participate in this study. Do you have any questions at this time? If you choose to participate, when you first arrive for your session, you will be provided with an opportunity to review and sign the consent form. We would be happy to provide you an email copy of this consent form now to review before deciding to participate. The consent form will provide you with more detailed information about the study and your participation in it. Would you like to first have a chance to review this consent form or would you like to book a time to come to the University of Calgary to participate at this time?

**If participant does not qualify:**

Thank you for completing these questions. Based on the information provided, your child unfortunately does not meet our criteria to participate in this study. We do thank you for your interest in this research, and encourage you to pass on our information to anyone else you know who might be interested in participating. Do you have any questions for us? Thank you again for your interest and we wish you all the best.

## Appendix E: Parent/Guardian Consent Form



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CALGARY

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**Name of Researcher, Faculty, Department, Telephone & Email:**

Sarah Mastoras, Tara Crumpler, Colleen Stinson, Caroline Buzanko, Meghan Taylor & France Goulard  
Graduate Students  
Educational Studies in Psychology, Faculty of Education  
(403) 210-6726, [adhdkids@ucalgary.ca](mailto:adhdkids@ucalgary.ca)

**Co-Researchers and Supervisors:**

Emma Climie, Dr. Vicki L. Schwean and Dr. Don H. Saklofske

**Title of Project:**

Socioemotional Resilience in Children with ADHD

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This consent form, a copy of which has been given to you, is only part of the process of informed consent. If you want more details about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

The University of Calgary Conjoint Faculties Research Ethics Board has approved this research study.

**Purpose of the Study:**

The purpose of this research project is to better understand the factors that support children with ADHD in doing well and achieving their goals. Specifically, we are interested in the abilities that best promote social and emotional resilience in individuals with ADHD, and will be exploring these areas in relation to factors such as cognitive abilities, self-perceptions, family composition and functioning, and academic performance. Many of these factors will be evaluated in working directly with your child. However, in order to obtain multiple perspectives about their emotional and social abilities, additional information will be gathered from parents/guardians and teachers.

Two groups of participants will take part in this study: families that have a child with ADHD, and families that have a child without ADHD or any other learning or behavioural diagnoses. By comparing these two groups, we will be able to better understand what is similar and different about children with ADHD relative to other children and whether there are factors that are more important for children with ADHD in supporting their positive development. You and your son/daughter have been invited to participate in this research project because you meet criteria for one of these groups.

**What Will I Be Asked To Do?**

If you choose to participate in this research project and you are determined to be eligible based on a brief pre-screening questionnaire, you and your son/daughter will visit the University of Calgary Applied Psychology and Educational Services clinic (U-CAPES) for two sessions of 2-3 hours each. Within these sessions, your child will work one-on-one with a researcher to complete a number of tasks that evaluate your child's cognitive, academic, and social abilities. Some of these tasks will involve having your child solve problems, and others will involve asking them questions about how they think

cognitive, academic, and emotional functioning. Though unlikely, it is possible that we may learn information about your child that suggests that they require further assessment or intervention. **It is important to acknowledge that we do not provide diagnoses or intervention within this study.** However, should we believe that your child requires a formal assessment or other mental health support, we will refer you to the appropriate services through Alberta Health Services.

In addition, as psychologists, we are required by law to report to the appropriate agencies suspicions of harm to a child or harm to another person. Should information be revealed that fits within these categories, we will be required to pass this information on accordingly. Only relevant information will be shared and no additional information about results within this research project will be revealed.

### **Benefits**

It is expected that the information collected in this study will provide us with a better understanding of the social and emotional characteristics of children with ADHD. There is surprisingly little research examining the social and emotional abilities that best promote success and resilience in individuals with ADHD. The researchers involved in this study believe that it is important to understand these characteristics because these children have a greater likelihood of encountering social and emotional challenges.

This research is fundamentally important to ensuring that children with ADHD enjoy all the rights, privileges, and services granted to typically-developing children. The identification of factors that promote resilience has the potential to inform and guide government policy and subsequent funding initiatives for support services for children with ADHD, their families, and their communities. Most importantly, through the identification of factors that contribute to successful outcomes, this research becomes the first step in identifying interventions designed to build on and strengthen protective factors within these children. We want to thank you very much in advance for your help in furthering this research.

Participating families will be provided with a \$25 gift card as a thank you for participation. As well, your child will be presented with an age-appropriate toy at the completion of each visit to the university. Parking while at the university will be paid for. It is important to understand that you will not be provided with any specific results from the measures completed with your child, as these are for research purposes only. However, we would be happy to provide you with a list of the assessment tools that have been used should your child require a formal assessment. This will ensure that any assessment is not impacted by the work completed within this project. As well, you will be given the option of receiving a summary report of research findings upon the study's completion.

### **What Happens to the Information I Provide?**

Participation in this study is completely voluntary and confidential. No one except the researchers and supervisor will be allowed to see any specific results or questionnaires or access any audio or videotapes. Only group information will be summarized for any presentation or publication of results. All materials will be stored in a locked facility by one of the researchers or the research supervisor, Dr. Vicki Schwean. Data will be entered onto a password protected computer without your or your child's name attached, and thus all electronic files will remain anonymous. Your data will be stored for five years in a locked cabinet and on anonymously on a password protected computer, at which point it will be destroyed or permanently erased.

and behave. Most children find these tasks quite enjoyable. Your son/daughter won't be asked to do anything that is very difficult or that might make him/her feel uncomfortable. While the researcher is working with your child, you will be asked to complete a questionnaire that asks about your family and your child's history, as well as several scales that ask you about your child's behaviour. You will also be asked to provide the name of your child's current teacher, who we will contact and provide several scales that ask about your child's academic performance as well as the teacher's views of his/her behaviour and functioning in the school setting. There will be lots of breaks for your son/daughter, as well as drinks and snacks provided by the researcher. Your son/daughter will be given a small toy as a special thank you for their time and participation in this study. You will also have the opportunity at this time to indicate whether you are willing to be contacted in the future for follow-up data collection. Should you agree, you will be provided with full information on what this follow-up component would include and will be given the opportunity at that time to consent to your continued participation.

Your participation in this study is wholly voluntary, and choosing to participate or not will have no impact on you or any services you currently receive. **Participants may withdraw from the research project for any reason, at any time, without penalty of any sort.** Participants will still receive full remuneration should they choose to withdraw their consent before the completion of their research participation. If participants choose to withdraw from the research project, the data collected up to this point may be used in the current study, unless the participants request that their data be destroyed. Further, participants will be informed if any new information arises that may affect their decision to remain in the research project.

### **What Type of Personal Information Will Be Collected?**

Should you choose to participate, you will be asked to provide in-depth information about your family and your child. This will include educational and developmental history of your child, information about your family and family history, parent/guardian employment and educational information, and any medications or support your child has received. **Please understand that all information collected during the course of this research project will remain strictly confidential and the participant's name will not be identified at any time or associated with any published results.** All participating families will be assigned a participant number which will be used to identify their information. No names will be recorded on assessment measures. No individuals outside of the research team will have knowledge of your family's participation in this project, with one exception. Given that we are interested in obtaining information from the child's classroom teacher, this teacher will be aware of the child's participation in the current study. However, it is important to note that the teacher will NOT be provided with any information or results of the child's participation.

Data generated from this research project are primarily intended to be used in doctoral and master's level student research. The results of these projects may be presented at local, national, or international conferences or submitted for publication to peer-reviewed journals. Only group information will be summarized for any publication or presentation of results and individual participants will not be identifiable.

### **Are there Risks or Benefits if I Participate?**

#### **Risks**

As part of this research project, we will be collecting information about your child regarding their

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**Signatures (written consent)**

Your signature on this form indicates that you 1) understand to your satisfaction the information provided to you about your participation in this research project, and 2) agree to participate as a research subject.

In no way does this waive your legal rights nor release the investigators, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from this research project at any time. You should feel free to ask for clarification or new information throughout your participation.

Child's Name: (please print) \_\_\_\_\_

Child's Signature \_\_\_\_\_ Date: \_\_\_\_\_

Participant's Name: (please print) \_\_\_\_\_

Participant's Signature \_\_\_\_\_ Date: \_\_\_\_\_

Researcher's Name: (please print) \_\_\_\_\_

Researcher's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**Questions/Concerns**

If you have any further questions or want clarification regarding this research and/or your participation, please contact:

Emma Climie, Sarah Mastoras, Tara Crumpler, Colleen Stinson, Caroline Buzanko, Meghan Taylor & France Goulard  
 Educational Studies in Psychology, Faculty of Education  
 (403) 210-6726, [adhdkids@ucalgary.ca](mailto:adhdkids@ucalgary.ca)

Co-researchers and Supervisors: Dr. Vicki Schwean, Faculty of Education, [Vicki.schwean@ucalgary.ca](mailto:Vicki.schwean@ucalgary.ca)  
 Dr. Don Saklofske, Faculty of Education, [don.saklofske@ucalgary.ca](mailto:don.saklofske@ucalgary.ca)

If you have any concerns about the way you've been treated as a participant, please contact the Senior Ethics Resource Officer, Research Services Office, University of Calgary at (403) 220-3782; email [rburrows@ucalgary.ca](mailto:rburrows@ucalgary.ca).

A copy of this consent form has been given to you to keep for your records and reference. The investigator has kept a copy of the consent form.

Revised: October, 2011