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# Is Knowledge Power? The Influence of Parental ADHD Knowledge on their Child's ADHD Symptom Severity and Bullying Experiences

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# Is Knowledge Power? The Influence of Parental ADHD Knowledge on their Child's ADHD Symptom Severity and Bullying Experiences

by

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**Abstract**

The current study aims to explore contributing factors related to the increased risk of reporting bullying experiences, either as a victim or a bully on the Reynolds Bullying Victimization Scale (BVS), for children with Attention-Deficit/Hyperactivity Disorder (ADHD) aged 8 – 13 years old. The two factors considered in this study are ADHD symptom severity (i.e., t-scores from the Conners 3-P Rating Scale) and parental ADHD knowledge (i.e., scores from the Knowledge of Attention Deficit Disorders Scale or KADDS). More specifically, it was hypothesized that ADHD symptom severity and reported bullying experiences would be the primary relationship that is moderated or influenced by parental ADHD knowledge. Results indicated a statistically significant relationship between severity for both inattentive and hyperactive/impulsive symptoms and bullying among a sample of children with and without ADHD (ADHD, $n$ =23; Controls, $n$ =20). However, among the ADHD participants, there was no significant relationship or moderating effect of parental ADHD knowledge for symptom severity or bullying experiences. These results suggest that further research investigating other factors that influence the relationship between all three variables is necessary in order to provide those working with the ADHD population (i.e., teachers, school administrators and other professionals) with a comprehensive understanding of how to reduce ADHD-related bullying behaviours through knowledge.

*Keywords:* Attention-Deficit/Hyperactivity Disorder, bullying, peer victimization, ADHD parental knowledge

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## Dedication

This work is for all the people who ever felt misunderstood.

Together, we can help others better understand us and seek ways to help improve the lines of communication. Bravely reach out and surprise yourself with the number of people, near and far, who are working to make this world a little more understanding and empathetic.

Hang in there.

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| | |
|---|---|
| ADHD | Attention-Deficit/Hyperactivity Disorder |
| APA | American Psychiatric Association |
| BVS | Reynolds Bullying Victimization Scale |
| Conners 3-P | Conners 3rd Edition Parent Rating Scale |
| DSM-5 | Diagnostic and Statistical Manual of Mental Disorders – 5th Edition |
| FSIQ-4 | Full Scale Intelligence Quotient-4 |
| HI | Hyperactive/Impulsive |
| IA | Inattentive |
| KADDS | Knowledge of Attention Deficit Disorders Scale |
| WASI-II | Wechsler Abbreviated Intelligence Scale, 2nd Edition |

## Chapter 1: Introduction

Navigating social settings can be a particularly hard skill to master. It requires an individual to be attuned to others social cues and to accurately interpret how others react in various settings. Children who have difficulties paying attention during social interactions may struggle to develop meaningful relationships with their peers. For children with Attention-Deficit/Hyperactivity Disorder (ADHD), their symptoms often create challenges in social settings. A lack of attention and ability to attend to social cues may leave children vulnerable to negative peer experiences such as physical aggression, name-calling, or isolation. The symptoms of ADHD can impede an individual's ability to successfully handle social situations and as a result, increases the chance of misunderstanding and peer rejection. When these negative encounters are recurring and involve a peer who holds more power, a child can become a victim of bullying. Unfortunately, yet not surprising, ample research has demonstrated that children with ADHD tend to experience higher levels of bullying and victimization compared to their peers (Bacchini, Affuso, & Trotta, 2008; Humphrey, Storch & Geffken, 2007; Sciberras, Ohan, Anderson, 2012; Taylor et al., 2010; Timmermanis & Wiener, 2011; Wiener & Daniels, 2016; Wiener & Mak, 2009).

The purpose of this study was to explore whether parent knowledge of ADHD influences the relationship between ADHD symptoms and bullying experiences (i.e., being bullied or bullying others). ADHD stigmatization associated with misconceptions of ADHD often prevents parents from accessing effective treatments for their child with ADHD (dosReis et al., 2010; Lebowitz, 2016; Moldavsky & Sayal, 2013; Sciutto, 2015). Some children who believe that others view their use of ADHD medication as negative may try to avoid the situation. These children are less likely to adhere to dosing schedules or may try less effective forms of treatment

(Singh et al., 2010). However, providing accurate information regarding ADHD has been shown to encourage seeking of more efficacious treatments and adhesion to treatment plans (Bai, Wang, Yan & Nui, 2015; McCleary & Ridley, 1999; Sonuga-Barke, Daley, Thompson, Laver-Bradbury, & Weeks, 2001; Svanborg et al., 2009). As there is limited research exploring how ADHD knowledge can promote positive peer relationships for children with ADHD, this study aims to determine if ADHD knowledge influences rates of victimization and bullying among school-aged children who demonstrate ADHD symptoms. During school age, children rapidly develop their social skills and there is a need to better understand how to prevent negative peer relationships at this age to avoid the adverse, long-term effects of bullying. Consequently, determining whether ADHD knowledge is associated with bullying behaviours may help shape future preventative measures.

## Chapter 2: Literature Review

### Attention-Deficit/Hyperactivity Disorder

As defined by the *Diagnostic and Statistical Manual of Mental Disorders – Fifth Edition* (DSM-5; American Psychiatric Association [APA], 2013), ADHD is a common neurodevelopmental disorder that is characterized by persistent challenges with attention and/or hyperactivity-impulsivity. These behavioural challenges are developmentally inappropriate and interfere with the child's daily functioning. Functional impairments, such as inability to stay on task, lack of attentional ability, or high distractibility, commonly impact the child's home life, academic performance, and/or social relationships (Barkley, 2014). In addition, these symptoms present in more than one setting (e.g., at home, at school, in community-based settings, or in other activities). The severity of the symptoms differs by individual and can present as mild (i.e., presentation of few symptoms in excess of the diagnostic requirements and minor functional impairments), moderate (i.e., impairments and symptoms slightly higher than mild, but less than severe), or severe (i.e., having most, if not all, symptoms listed in the diagnostic criteria resulting in significant functional impairments; APA, 2013). The following section outlines diagnostic symptoms, etiological influences, and theoretical underpinnings of ADHD.

**Diagnostic Symptomatology.** To be identified with ADHD, symptoms must be present for a minimum of six months and be evident before the age of 12 years. The presentation of ADHD symptoms can be generally classified into two categories: inattentive and hyperactive-impulsive (APA, 2013). Three presentations of ADHD are identified; specific diagnostic criteria for each presentation are outlined in the following section.

***Predominately Inattentive Presentation.*** Inattentive (IA) behaviours include the inability to remain focused on a task, zoning out or daydreaming, not listening when directly

spoke to, difficulties following instructions, organizing materials or planning activities, frequently losing items, or appearing absent-minded (APA, 2013; Nigg & Barkley, 2014; Roberts, Milich, & Barkley, 2014). According to the DSM-5, these behaviours must manifest in a way that is developmentally inappropriate for the child's age. To receive the predominantly inattentive classification, a child must ascribe to six of the nine symptoms (APA, 2013) and less than six symptoms of hyperactivity/impulsivity.

***Predominantly Hyperactive/Impulsive Presentation.*** Hyperactive behaviours usually include excessive motor movements such as running and climbing in inappropriate situations, fidgeting, squirming, tapping, and/or the inability to engage in activities quietly. Impulsive behaviours include the inability to wait, such as in conversation (e.g., interrupting others, talking excessively, blurting out answers), acting before instructions, and/or a limited ability in considering the consequences of one's actions (e.g., doing before thinking; APA, 2013; Nigg & Barkley, 2014; Roberts et al., 2014). Together, these hyperactive/impulsive (HI) behaviours indicate challenges with remaining physically and mentally still or with self-control that are atypical for the child's developmental age. Similar to the predominately inattentive presentation, a child must exhibit six of the nine symptoms of predominantly hyperactive/impulsive behaviours to receive this identification (APA, 2013) and less than six symptoms of inattention.

***ADHD Combined Presentation.*** A diagnosis of ADHD with combined presentation can be given when the diagnostic criteria for predominately inattentive and hyperactive/impulsive are met over the previous six months (APA, 2013). According to the DSM-5, the combined presentation is the most common specifier in ADHD. In addition, Barkley (2014) notes that the combination of symptoms from both the inattentive and hyperactive/impulsive presentations are what make the embodiment of ADHD appear heterogeneous and diverse among those diagnosed.

**Importance of Assessing Symptom Presentation and Severity.** Despite the vast amount of research on ADHD, the majority of studies analyze data by comparing an ADHD group with a non-ADHD group. ADHD group membership is often assigned by a pre-existing diagnosis given by an external source (i.e., another healthcare provider). One of the limitations in using a previous diagnosis is that researchers are not privy to the type of behaviours or behaviour severities that merited the ADHD diagnosis. Without a standardized method in which symptoms can be measured across all participants, researchers may miss the nuances of how a certain cluster of symptoms or severity of symptoms affects relationships of interest.

Given that heterogeneous nature of ADHD, researchers are starting to address how various symptoms relate to particular outcomes. For example, Bozkurt, Evren, Umut, and Evren (2016) found that ADHD symptom severity was positively associated with alcohol-related problems, in that those with more severe ADHD symptoms during childhood were at a greater risk of developing an alcohol use disorder as an adult, especially if the symptoms were related to impulsivity. In a Latin-American clinical study, De la Peña Olvera (2012) found that the greater the severity of inattentive symptoms, the more dysfunctions were reported in the home and school, whereas, impulsiveness severity was positively correlated with more dysfunctions with peers.

Another risk identified with higher symptom severity relates to treatment outcomes. Halldorsdottir and Ollendick (2016) found that higher levels of ADHD symptoms predicted poor immediate and long-term outcomes in a brief, yet intensive cognitive behavioural therapy protocol. Together, these studies emphasize the necessity of including a measure to assess symptom severity in ADHD research to help give greater detail regarding specific outcomes and risks.

Researchers have also been trying to predict the future trends for those with a certain clustering of symptoms. For instance, when both sets of symptoms are present, as seen in the ADHD combined presentation, Willcutt et al. (2012) suggest that children and adolescents are more likely to be significantly impaired than those who met criteria for only one of the two ADHD presentations. Additionally, Willcutt and colleagues (2012) indicate that individuals with the combined presentation of ADHD are more likely to meet criteria for another mental health disorder such as a specialized learning disorder, externalizing disorders (i.e., oppositional defiant disorder, conduct disorder, tic disorder), or internalizing disorders (i.e., anxiety, depression, bipolar disorder).

**Epidemiology and Etiology.** Previous research has explored ADHD prevalence rates and looked to define contributing factors to the disorder by analysing trends across the lifespan, by gender, and through variations in geographical locations (Erskine et al., 2014; Nigg & Barkley, 2014; Polanczyk, de Lima, Horta, Biderman, & Rohde, 2007; Rowland et al., 2015). The following section highlights the recent literature in these areas.

***Prevalence*.** According to the DSM-5, ADHD affects approximately 1 in 20 (5%) school-aged children (APA, 2013; Polanczyk et al., 2007); however, researchers have noted some variation in prevalence. For instance, some researchers have estimated the prevalence of ADHD to be as low as 2.2% (Erskine et al., 2014) or as high as 16% of school-aged children (Rowland et al., 2015). Certain conditions could explain why these rates could vary. First, variations in how ADHD is diagnosed can create an under- or over-estimate of reported cases (Nigg & Barkley, 2014; Polanczyk, et al., 2007). Second, cultural differences in understanding the symptoms and the perceptions of which symptoms are appropriate in certain settings can vary. For instance, Polanczyk and colleagues (2007) reported a range of prevalence rates across

certain parts of the world: 2.5% in the Middle East, 4% in Asia, 4.5% in Europe and Oceania, 6% in North America, 8% in Africa and 12% in South America. Overall, these discrepancies in prevalence rates may not stabilize unless clinicians and researchers begin using an agreed-upon standardized method of assessing symptoms and applying diagnostic criteria in a consistent manner. Nevertheless, prevalence studies highlight the global impact of ADHD among children and provide merit for on-going research in the field.

***Age.*** Diagnosis of ADHD typically occurs during childhood or adolescence. Nevertheless, symptoms may be present in preschool-aged children (three to five years of age). One of the challenges in diagnosing ADHD in a younger child (i.e., before the age of five) is that it becomes difficult to distinguish what is developmentally typical for a preschooler from true ADHD symptomatology. Furthermore, having symptoms persist for more than six months to meet diagnostic requirements becomes challenging at an age where development is dynamic and children transition through stages quickly. Retrospectively, children who were later diagnosed with ADHD often show more symptoms of hyperactivity/impulsivity than inattentive symptoms at a younger age (Lahey et al., 1998; Willcutt, 2012). However, Campbell and von Stauffenberg (2009) explain that this behaviour trend is most likely noted because the settings where inattentive symptoms become more easily observed occur when the demands of a typical classroom increase in grade school (e.g., focusing on a lesson or the expectation to remain seated). Therefore, symptoms of inattention may be present but not be identified due to the less rigorous structure of preschool activities. As a child enters the classroom and the demands for attention increase, symptoms of ADHD can become more apparent, along with the behaviours' impact on the child's global functioning (Nigg & Barkley, 2014).

Many children (50-80% of those diagnosed) with ADHD continue to experience symptoms into adolescence (Nigg & Barkley, 2014) and adulthood (22-43%; Barbaresi, Colligan, Weaver, Voigt, Killian, & Katusic, 2013; Klein et al., 2012; Rasmussen & Gillberg, 2001); however, the severity of the symptoms may lessen over time (APA, 2013). For instance, a young child's hyperactivity may manifest in running and climbing in situations that require stillness; however, adults may experience these symptoms as feeling restless and fidgety. As a result, adolescents and adults (i.e., age 17 and older) need to meet only five of the nine symptoms for either presentation to receive an ADHD diagnosis (APA, 2013). Despite lower severity and fewer symptoms, adolescents and adults continue to experience the impact of their symptoms at levels that are significantly higher than their same-aged peers without ADHD (Fischer, Barkley, Smallish, & Fletcher, 2005; Nigg & Barkley, 2014).

***Gender.*** In general, a greater proportion of males are diagnosed with ADHD as compared to females, at rates of approximately 2:1 (APA, 2013). In some cases, school-aged boys were reported to be three times more likely to have an ADHD diagnosis compared to same-age females (Willcutt et al., 2002). In line with Willcutt et al. (2002), Visser and colleagues (2014) observed that in high school, only 5.6% of girls have a diagnosis of ADHD while 13.2% of their male counterparts had an ADHD identification. One explanation for the differential rates of diagnosis is that males tend to exhibit externalizing behaviours more than females and are primarily referred for evaluation based on concerns regarding disruptive behaviours (Hinshaw & Blachman, 2005). Because externalizing behaviours can be more disruptive to caregivers and teachers, children with these behaviours may be referred for an ADHD assessment more readily than those children who demonstrate inattentive behaviours. Females are more likely to present with inattentive symptoms (APA, 2013) and hence, a referral bias may exist if the externalizing

behaviours of ADHD, which are more common among males, are being targeted for immediate remediation compared to the quieter, less noticeable symptoms of ADHD (Hinshaw & Blachman, 2005).

**Theoretical Underpinnings.** Executive functioning (EF) is the ability to organize one's thoughts and actions towards the obtaining a goal (Barkley, 1997; 2012). Self-regulation and behavioural inhibition are two key aspects of EF. According to Barkley (1997), self-regulation assists individuals to adjust their behaviours to align with attaining their goals, whereas behavioural inhibition allows individuals to resist distractions by preventing them from engaging in off-task behaviours. Behavioural inhibition is the ability to start a task, stay on task, and stop other distractions (Barkley, 1997). As a child develops, EF skills improve with the development of the prefrontal cortex of the brain and hence, researchers concur that EF is associated with the frontal lobe (Barkley, 2001; Barkley, 2014; Biederman et al., 2004; Goldstein, Naglieri, Princiotta, & Otero, 2014). More advanced imaging technology has allowed for the neuropsychological deficits of a child with ADHD to be better conceptualized and understood when comparing neurological activity with typically developing brains. Various studies have identified regions of the ADHD brain that differ from those without ADHD. These regions include the parietal lobe (Sowell et al., 2003), basal ganglia (Castellanos & Giedd, 1994), corpus callosum (Giedd et al., 1994), cerebellum (Berquin et al., 1998), and the frontal lobe (Castellanos et al., 2002). Of these structures, the frontal lobe has been studied in the most detail. Krain and Castellanos (2006) reviewed several neuroimaging studies and highlighted that children with ADHD have significantly lower volumes of brain matter in the prefrontal cortex (Castellanos et al., 1996; Filipek et al., 1997), and cerebellum (Berquin et al., 1998). Impairments in EF can contribute to the behavioral challenges those with ADHD experience (Biederman et al., 2004;

Barkley, 2014). For instances, symptom reports by clinicians and parents suggest that the severity of ADHD symptoms are linked to the smaller volumes found within these regions (Castellanos et al., 2002; Karin & Castellanos, 2006; Semrud-Clikeman et al., 2000). Given that EF abilities cooccur in the same regions where the ADHD brain is underdeveloped (Barkley, 2001; Barkley, 2014; Biederman et al., 2004; Blackmore & Choudhury, 2006; Goldstein et al., 2014), investigating the theoretical facets of EF can lead to greater understanding of ADHD symptomatology.

To date, the most comprehensive unifying model between ADHD and EF postulates that behavioral inhibition is the core attribute that influences a person's EF ability or lack thereof (Barkley, 1997). Barkley's model outlines four major aspects of EF: (1) working memory, (2) self-regulation of affect, motivation and arousal, (3) internalization of speech and (4) reconstitution. As proposed by Barkley (1997), behavioral disinhibition is the crux of dysfunctions in EF ability in these four areas and is marked by poor interference control (i.e., distractibility) and challenges with stopping an ongoing response or impulse.

***Working Memory.*** Working memory is the ability to not only store memory for a short period of time but, more importantly, the ability to manipulate and work with the information stored (Miyake & Shah, 1999). The ability to plan and organize tasks and thoughts, have a general sense of time, and the ability to be reflective on past events along with the ability to see potential outcomes and the evaluation of future rewards stem from working memory (Barkley, 1997). Children with working memory deficits struggle in completing multistep instructions, working through academic problems mentally and may be poor estimators of the time that has past.

***Self-Regulation of Motivation, Affect, and Arousal.*** To endure through uninteresting tasks, an individual often pulls on various forms of motivation to help engage in tedious obligations. Children with ADHD will often avoid difficult tasks and may be more susceptible to distraction during a task that requires more effort (APA, 2013; Barkley, 1997). Studies have demonstrated that children with ADHD respond differently to certain rewards; they are more motivated by immediate forms of reinforcement (Douglas, 1999) and are less likely to see value in rewards that are too delayed into the future (Barkley, Edwards, Laneri, Fletcher, & Metevia, 2001). In terms of affect and arousal, children with ADHD can experience strong emotions that can quickly change (Barkley, 1997). Barkley (1997) suggests that the inability to control one's motivation, affect, or arousal can relate to issues with behavioural inhibition.

***Internalization of Speech.*** An extension to self-regulation, yet still a separate EF construct, internalization of speech allows for self-directed dialogue that assists an individual to reflect, question, and conceptualize various events and ideas (Berk & Potts, 1991; Kopp, 1982). As a child develops, overt self-speech begins to turn inwards and become more internalized (Barkley, 2012). Internalization of speech is a foundational skill for problem solving and helping an individual work through a problem by providing self-directed instructions. Barkley (1997) reports that children with ADHD tend to develop the internalization of speech at a later age. In the classroom, children with ADHD can struggle to mentally complete their work. Being able to internally talk oneself through a dilemma can also be limited in children with ADHD and as such, the formulation of rules and moral reasoning may be underdeveloped (Barkley, 1997).

***Reconstitution.*** Reconstitution relates to how one reflects and assesses his or her behaviours. This skill is essential in ascertaining the steps required to reach a certain goal. The process requires an analysis phrase, where steps are broken down into parts, and a synthesis

phase, where parts of a process can be used or reconstructed to fit new situations or problems (Barkley, 1997). Minimal research has examined this construct in ADHD; however, Barkley (1997) posits that those with lower control over verbal, language, and motor skills as well as those with fewer creative problem-solving strategies may struggle with reconstitution.

Overall, the degree to which a child with ADHD experiences challenges in each of these four areas can create unique challenges. The diversity in EF profiles has been noted as heterogeneous (Pennington & Ozonoff, 1996; Willcut et al., 2005) and therefore, not all children with ADHD may present with the same types of struggles in EF ability.

**Challenges Associated with ADHD**

As part of an ADHD diagnosis, a child's symptoms need to interfere with daily functioning or propose a challenge for the child or the caregivers of the child (e.g., parents, teachers; APA, 2013). Symptoms of ADHD can negatively impact academic, occupational, emotional, behavioral, and social functioning (Barkley, 2014; Barry, Lyma & Klinger, 2002; Fergusson, Horwood, & Lynskey, 1993; Hinshaw, 1992; Loe & Feldman, 2007). Academically, research has demonstrated that students with ADHD score lower on standardized tests and have lower grades, generally struggle with completing school work, and have difficulty progressing to higher educational levels (Barry, Lyman, & Klinger, 2002; Fergusson, Horwood, & Lynskey, 1993; Loe & Feldman, 2007). Often, these academic struggles continue into the work field as adolescents with ADHD begin looking for employment (Halmoy, Fasmer, Gillberg & Haavik, 2009). Emotionally, individual with ADHD often have difficulty concealing their primary and initial emotional reaction and have higher motional lability than same-aged peers (Barkley, 2006). Compared to those without ADHD, they tend to be easily frustrated, quicker to become angry or impatient, over-reactive, and easily excited (Barkley, 2014). Of particular relevance to

the current project, peer relationships are a significant challenge for many individuals with ADHD (Tseng et al., 2014; Zalecki & Hinshaw, 2004)

**Social Challenges with ADHD.** Social functioning is a growing concern in regards to children with ADHD, especially in the ability to make and maintain friendships (Blachman & Hinshaw, 2002). It has been well-documented that children with ADHD are more likely to experience peer rejection as well as form fewer close friendships than their typically developing peers (Hoza et al., 2005; McQuade & Hoza, 2008). Peers may not see an individual's challenges as being associated with ADHD and instead may attribute these behaviours as being socially unacceptable. As a result, children with ADHD are more likely to be socially rejected by their peers (DuPaul et al., 2001; Mikami et al., 2007; Taylor et al., 2010). For example, Hoza and colleagues (2007) determined that children with ADHD are often rated lower by their classmates in social likability and that children with ADHD have fewer mutually reciprocated friendships. Additionally, Ronk, Hund, and Landau (2011) investigated how boys with ADHD engage with other peers while playing a game. Boys with ADHD relied more on incompetent entry strategies, such as disruptive attention-getting, and the more time the other boys spent with the child with ADHD, the more likely they were to report the child with ADHD as being less likeable (Ronk et al, 2011). A child with ADHD is often seen as less likable because of the behaviours he or she exhibits during social interactions.

Often, children with ADHD are described as interfering, aggressive, and intrusive, which can be perceived by other children as irritating and as a result, these behaviours are inconducive to building friendships (Abikoff et al., 2002, 2004; Mrug et al., 2007). Keown and Woodward (2006) report that boys with hyperactive symptom characteristics demonstrated higher rates of noncompliance, aggression, and lower rates of prosocial behaviours than their peers. Because

peers observe these social interactions and perceive them negatively, children with ADHD often become alienated and stigmatized because of their symptoms (de Boo & Prins, 2007; McKeague, Hennessy, O'Driscoll, & Heary, 2015; Wiener et al., 2012). Consequently, children may respond to the behavioural symptoms of those with ADHD with less understanding or sympathy. Misunderstanding can lead to the rejection of those who are different, and in some cases, others may respond with hostility towards those with socially unacceptable behaviours.

**Bullying**

Peer victimization, often referred to as bullying, is repetitive physical, verbal, or psychological harm caused by one peer to others where there is imbalance of power between the aggressor (i.e., the bully) and the target or targets (i.e., victim; Olweus, 1993; Twyman et al., 2010). Because the victim feels powerless to defend him or herself, feelings of helplessness arise and the victim has difficulty stopping the aggression. Physical aggression can include shoving, hitting, kicking, and destruction of personal property, whereas verbal aggression can include threatening, mocking, or insulting (Olweus, 2001). Both of these forms of aggression are considered overt in nature. Psychological harm is covert, or hidden, and includes shunning, ignoring, or spreading rumors (Storch & Ledley, 2005). This particular form of aggression targets the victim's social relationships (Crick & Grotpeter, 1996).

Peer aggression has been further complicated by the introduction of technology and has generated more opportunities for bullying in the online world, otherwise known as cyberbullying. By using emails, online forums, social media, texting, and other online platforms, a bully may use instant online platforms to express his or her aggression towards a target (Twyman et al., 2010). Due to the nature of the online world, the effects of cyberbullying are

far-reaching, immediate, and easily accessible by the victim and others (i.e., bystanders; Willard, 2007).

Regardless of the means, bullying has been linked to a plethora of negative outcomes (for a review, see Storch & Ledley, 2005). Those who bully are at a higher risk for engaging in delinquent behaviours, crime, alcohol abuse, and mental health disorders (Kaltiala-Heino, Rimpela, Rantanen, & Rimpela, 2000; Loeber & Dishion, 1983; Nansel et al., 2001, 2004; Olweus, 1993). Victims of bullying also have development risks. Several long-term negative outcomes for being bullied include issues with self-esteem, self-worth, depression, anxiety, self-harm, suicidality, and physical health problems (Callanhan & Joseph, 1995; Craig, 1998; Fisher et al., 2012; Gini & Pozzoli, 2009; Klomek et al., 2009; Meza, Owens, & Hinshaw, 2016; Neary, 1994; Storch & Ledley, 2005).

Bullying is often conceptualized as a dichotomy where one individual (i.e., the bully) acts aggressively towards another individual (i.e., the victim). However, it is rarely the case that a child fills one role exclusively (Olweus, 2001). The term "bully-victim" refers to an individual who has bullied others but has also been bullied himself or herself (Reynolds, 2003). Less is known about bully-victims; however, bully-victims tend to display more severe conduct problems and maladaptive behaviours (Forero, McLeallan, Rissel, & Bauman, 1999; Kumpulainen & Rasanen, 2000; Nansel et al., 2001). Georgiou and Stavrinides (2008) found that bully-victims tend to be more temperamental, more socially isolated, and described as being different in a negative way (i.e., appearance or behaviour) when compared to children solely identified as either a bully or a victim. Bully-victims are also at a higher risk for maladjustment and peer rejection than children who solely bully others or who are solely victims of a bully (Schwartz, 2000).

Determining the characteristics of children who are bullied and/or bully others has been a research priority in the bullying literature. Children that are more likely to experience peer victimization are those who are seen as socially odd, deviant, or different from their peers (Bibou-Nakou, Tsiantis, Assimopoulos, Chatzilambou, & Giannakopoulou, 2012; Georgiou & Stavrinides, 2008). Despite being a seemingly invisible disorder, ADHD symptoms can be observed through behaviours and therefore, peers may respond negatively to a child's ADHD symptoms in social settings.

## Bullying and ADHD

The neurological underdevelopment in children with ADHD often manifest in less socially desirable behaviours, which in turn, may explain why children with ADHD may be at a higher risk being involved with bullying. Examining the social roles that children with ADHD are most likely to fill has been an area of interest for researchers.

**Children with ADHD as the Victim.** The majority of studies investigating peer victimization and ADHD have concluded that those with ADHD are more likely to be a victim of bullying (Holmberg & Hjern, 2008; Humphrey, Storch, & Geffken, 2007; Taylor et al., 2010; Twymann et al., 2010; Unnever & Cornell, 2003; Wiener & Mak, 2009; Wiener et al., 2012). There are several hypotheses that could explain the higher levels of victimization. One hypothesis argues that to be successful in social relationships, a person must be able to attend to social cues to learn another's preference through observation, but attentional deficits often impedes this ability for those with ADHD to adequately learn these social nuances (Landau & Milich, 1988; Wheeler & Carlson, 1994; Zalecki & Hinshaw, 2004). For example, a child with ADHD may not attend to the non-verbal cues of sadness demonstrated by a peer. When a child with ADHD responds in an unexpected or inappropriate way, the peer may become further

frustrated or upset. As a result, the peer may decide to deliberately ignore the child with ADHD and may even start turning other children against the child with ADHD. Another explanation argues that difficulties in initiating and maintaining friendships makes children with ADHD an easier target for bullies because they may have lower peer status and fewer friends (Card & Hodges, 2008; Demaray & Malecki, 2003; Unnever and Cornell, 2003). Bullies tend to target those who are isolated or who have fewer friends. Given that children with ADHD struggle with keeping friends, they are at a disadvantage when trying to fend off a bully alone. Finally, the predominate hypothesis predicts that it is the observable ADHD behaviours that places those with ADHD at risk of becoming a victim (Bacchini, Affuso, & Trotta, 2008; Fite, Evans, Cooley, & Rubens, 2014; Mrug et al., 2007; Lebowitz, 2016; Sciberras, Ohan, & Anderson, 2012; Singh et al., 2010; Stormont, 2001; Taylor et al., 2010). For example, peers can find constant interruptions or intrusions of someone with ADHD to be irritating. Instead of letting go of the annoyance, a peer may try to draw negative attention to the behaviour by making fun of the child with ADHD. This hypothesis is based on mental health stigma research that argues that stigma, or the rejection of social acceptance due to one possessing an undesirable social trait (as defined by Goffman, 1963), can translate into prejudice and acts of discrimination, which can include bullying (Abikoff et al., 2002, 2004; de Boo & Prins, 2007; McKeague et al., 2015; Mrug et al., 2007; Wiener et al., 2012).

Peers can hold negative opinions of those with ADHD, especially regarding the manifestation of ADHD symptoms in a child's behaviours. Harris, Milich, Corbitt, Hoover and Brady (1992) demonstrated this negative bias through one of two scenarios. When the child was paired with a partner with no behavioural concerns, he or she was told that his or her partner was "disruptive and hyper". On the other hand, when a child was paired with a partner previously

diagnosed with hyperactive symptoms, the child was not given any behavioural information. From this expectancy manipulation experiment, Harris et al. (1992) found a self-fulfilling effect in that children paired with non-behavioural partners reported significantly more negative views of their partners compared to the children who were not given any information regarding their partners who had hyperactive or behavioural issues. Compared to children with other mental health difficulties, those with ADHD seem to be at a greater disadvantage in eliciting sympathy from their peers. Bellanca and Pote (2013) used several vignettes illustrating ADHD, depression, a learning disability, or a child with no mental health concerns. Of all the vignettes, children reported the most negative attitudes towards the vignette depicting ADHD and noted that they wanted greater social distance from the child described in the ADHD vignette. It is these negative perceptions that often precede acts of bullying towards those with ADHD.

Although there is limited research addressing how ADHD stigma translates to bullying those with ADHD, other bullying research in children and adults has demonstrated how a negative belief can result in acts of discrimination (Fevre et al., 2013; Lutgen-Sandvik, 2008; Malli, Forrester-Jones, & Murphy, 2015; Ragusa & Groves, 2015; Thornberg & Knutsen, 2011). For example, through child interviews regarding bullying incidents, Thornberg (2015a; 2015b) found that students who justify bullying often believe that bullying is the natural consequence of the victim demonstrating a peculiar trait. Thornberg (2015a; 2015b) further adds that bullies blame and dehumanize the victim by focusing on how different or unusual the victim appears. How a bully justifies their behaviour is often rooted in a negatively-held belief regarding a certain trait of the victim. For children with ADHD, their behaviour becomes the reason why bullies may feel justified in mistreating them. Bullies may even feel as though a child with ADHD deserves negative social interaction.

**Children with ADHD as the Bully.** In regards to bullying others, Unnever and Cornell (2003) reported that children with ADHD were also more likely to bully others. They hypothesized that children with ADHD may engage in more inappropriate aggression towards their classmates due to issues with self-control. The impulsive nature of ADHD paired with challenges in emotional regulation may be contributing factors in resisting the temptation to use maladaptive negotiation techniques (i.e., bullying) to reach an immediate goal (Haynie et al., 2001; Saylor & Amann, 2016; Unnever and Cornell, 2003). Children with ADHD lack the ability to inhibit a strong emotional response consistently (Barkley, 2010; Barkley & Fischer, 2010), which may result in an aggressive outburst towards others (Saylor & Amann, 2016). For children with ADHD, emotional dysregulation and impulsivity may be the underlying reason as to why they tend to bully others. However, other studies suggest that bullying by a child with ADHD may be associated with oppositional traits other than ADHD symptoms (Sciberras, Ohan & Anderson, 2012; Wiener & Mak, 2009). In addition, the comorbidity of oppositional defiant and conduct disorder with ADHD may explain why Unnever and Cornell (2003) found a significant correlation between ADHD and bullying behaviours compared to those without ADHD.

**Children with ADHD as the Bully-Victim.** It is challenging to determine which role a child fulfilled first – the bully or the victim. There are two primary explanations regarding how a child with ADHD may become a bully-victim. When a child with ADHD is victimized they may become frustrated and retaliate as he or she tries to process the social difficulty without thinking about the consequences of acting out (Saylor, Twyman, & Saia, 2008; Taylor et al., 2010). For example, a child with ADHD may physically shove or hit another peer who has been spreading rumors regarding him/her. Alternatively, if a child with ADHD impulsively reacts to a situation

with a disproportionately large outburst or inappropriate behaviour, others may negatively view the behaviour as aggressive and reject the child for his or her socially inappropriate reaction (Saylor & Amann, 2016). For example, a child with ADHD may think it is funny to constantly pick on a peer. The child with ADHD may even think that his/her peer is a friend, but the peer does not believe the jeering to be funny and, despite efforts to make it stop, the child with ADHD continues to engage in the unwanted behaviours. Consequently, the peer may purposefully try to ostracize the child with ADHD to create some distance but ends up leaving the child with ADHD feeling hurt and feeling like a victim over time.

Hence, children with ADHD may be more prone to both being a victim and also exhibiting bullying behaviours as compared to their peers. Across other studies, the general consensus is that children (Holmberg & Hjern, 2008) and adolescents (Taylor et al., 2010; Twymann et al., 2010) with ADHD are more likely to experience victimization as well as participate in bullying behaviours. Therefore, it is essential for researchers to assess factors that can help reduce the amount of bullying and victimization experienced by children due to ADHD symptoms.

As aforementioned in the stigma research, one of the most challenging issues when trying to reduce bullying or victimization in the ADHD population is a lack of understanding and knowledge about ADHD. The symptoms of ADHD, when not understood, can easily make a child with ADHD a target for being made fun of or being excluded. Peers can also be quick to judge the reason why a child with ADHD is acting a certain way and even feel like they are treating the child with ADHD appropriately. With accurate ADHD knowledge, those with and without ADHD may be more empowered to extend empathy and patience to each other, ideally, decreasing the amount of bullying incidents.

## Knowledge & Perceptions of ADHD

The general public is typically aware of physical health issues such as diabetes or cerebral palsy; however, knowledge regarding mental health is less pervasive in society (Hinshaw & Cicchetti, 2000; Hinshaw & Stier, 2008; Jorm, 2000). More troubling is the amount of misconception towards mental health that outweighs accurate knowledge (Jorm, 2000). Unfortunately, the general population often holds inaccurate views on the causes, symptoms, and available treatments for mental health disorders. These misconceptions can have an impact on how those in need of services seek help for their symptoms, as well as their willingness to try various treatment options (Hinshaw & Cicchetti, 2000; Jorm, 2000; 2012), with approximately only one third of those with mental disorder seeking treatment (Kessler et al, 1996; Regier et al., 1993). Advocates of mental health aim to educate the public in "mental health literacy" in hopes of developing a culture where people are willing to support and take steps in improving their mental health as well as others (Hinshaw & Cicchetti, 2000; Jorm 2000; 2012; Pinto-Foltz, Logsdon & Myers, 2011; Walker, et al., 2008). Jorm (2000) notes that although attempts have been made to increase public knowledge regarding other mental health disorders, such as depression, many disorders are clouded in a veil of misunderstanding and stigma.

**General Population ADHD Knowledge and Perceptions.** Unfortunately, ADHD is not exempt from misunderstanding or negative views (Bellanca & Pote, 2013; Harris et al., 1992; Moldavsky & Sayal, 2013; Walker et al., 2008). In the National Stigma Study, Pescosolido and colleagues (2008) assessed public knowledge of childhood mental illness using vignettes that described a child with either symptoms of depression, ADHD, or experiencing a typical daily frustration. The majority of respondents could correctly identify a child experiencing typical trouble (71.2%). However, only 58.5% could identify the depression vignette and a significantly

fewer participants could correctly identify the vignette depicting ADHD (41.9%). Furthermore, when respondents were asked about the seriousness of each disorder, 83.6% believed that depression was serious but only 38.4% believed that ADHD was a serious mental health issue (Pescosolido et al., 2008). When queried further, 32.9% believed that ADHD would improve without treatment whereas only 17.4% of the respondents believed that depression could improve without intervention. Pescosolido's et al. (2008) findings suggest that the general public has limited knowledge regarding the serious and legitimacy of ADHD as a mental health concern that requires treatment.

Similarly, Walker et al. (2008) demonstrated that these beliefs about ADHD percolated at a national level. More recent studies provided further support and found that children also perceived ADHD negatively and that they wanted more social distance from those exhibiting ADHD symptoms (Bellanca & Pote, 2013; O'Driscoll et al., 2012) and saw the peer with ADHD as being more personally responsible for their behaviours (O'Driscoll et al., 2012Understanding how others view those with ADHD is the first step in attempting to interrupt the stigmatizing process of misinformation, as these views and misconceptions promote peer rejection of those with ADHD.

**Parental and Child ADHD Knowledge.** To manage the symptoms of any childhood disorder well, a parent needs accurate information regarding the disorder and an understanding of treatment options. Generally, the same knowledge perquisite is true for informing proper ADHD management; however, even adolescents and their parents with reportedly high levels of ADHD knowledge may still believe various falsities about the disorder (Bussing et al., 2012). For instance, roughly a quarter falsely believed that a sugary diet caused ADHD (Bussing et al., 2012). In regard to treatment beliefs, Bussing et al. (2012) found that over half of the

adolescents surveyed (65%) believed that ADHD is overmedicated, a view shared by a large number of their parents (85%). This particular finding has implications for trying to improve accuracy of ADHD knowledge. If parental beliefs and knowledge regarding ADHD helps develop their child's view of ADHD, then improving parent understanding of ADHD may lead to better ADHD knowledge among children and adolescents. When trying to obtain accurate information regarding ADHD, both parents (51%) and teens (49%) rated the internet as their preferred source of information over a physician (40% of parents and 27% of adolescents; Bussing et al., 2012). Considering the amount of inaccurate information found online, this aspect of Bussing's research is alarming and implies a greater need for better psychoeducational programs that provide accurate ADHD information through a platform that can be accessed easily. The preference for online information, rather than professionals, also highlights the need for professionals to better engage with the public on the topic of ADHD and how to discern accurate information online. By becoming the primary source of information, mental health professions grant clients easier access to the most recent ADHD information and resources even if it means developing their own online resources. Parents who believed more ADHD misconceptions were found to be less accepting of medications that could help reduce ADHD symptoms, and more accepting of less-evidence based, dietary interventions (Sciutto, 2015).

In addition to how children with ADHD and their parents perceive ADHD, how others view the disorder can also influence how someone affected by ADHD thinks about the disorder. For example, in a North American sample of adolescents with ADHD, the more adolescents perceived public stigma regarding their ADHD, the less likely they would seek mental health services. Qualitative interviews with school-aged children (ages 9-14 years old) with ADHD revealed that the majority of interviewees reported being bullied because of their ADHD

diagnosis and their ADHD behaviours (Singh et al., 2010). Interestingly, the children expressed that taking ADHD medication at school exposed their diagnosis and that the verbal name calling that ensued when discovered would often lead to physical fights in relation to the verbal bullying. In addition, these children felt that there was a general lack of empathy and understanding regarding ADHD and that having ADHD gave them a bad reputation with peers, teachers, and their peers' parents (Singh et al., 2010).

In addition to the experiences of ADHD-related stigma in children, the majority of parents or caregivers of a child with ADHD (77%) also experience stigma relating to their child's behaviours (dosReis et al., 2010). This form of stigma is referred to as "courtesy stigma" and occurs when a person experiences stigma because he or she is associated with a stigmatized person (Norvilitis, Scime, & Lee, 2002). Historically, parents are often blamed for not being able to manage their child with a mental health disorder (Hinshaw, 2005; Lebowitz, 2016). As a result of this courtesy stigma, a parent's attitudes towards ADHD and treatment options are often shaped by the pressures placed on him or her by society's overwhelming, yet often misinformed, opinions on ADHD management (dosReis et al., 2010; Lebowitz, 2016). dosReis' et al. (2010) also found that 21% of caregivers of those with ADHD held negative beliefs about stimulant medications. Caregivers often cited media that presented children on stimulant medications as "drugged" or "zombielike" as their reason for these beliefs, when according to evidence-based research, stimulant medication paired with behavioural therapy is the most effective treatment for ADHD than medication or therapy alone (dosReis' et al., 2010).

**Connections between Bullying and ADHD Knowledge**

Many schools and other agencies rely professional development talks to increase awareness of an issue and provide knowledge to help prevent future problems. One could argue

that better ADHD knowledge may have a positive effect in curbing the ADHD-related risk associated with bullying. As of yet, no study exists looking at the link between ADHD knowledge and bullying/victimization; however, the following section outlines how knowledge may indirectly influence rates of peer victimization among children with ADHD.

**Stigma.** As noted, bullying is a discriminatory act by someone who holds negative beliefs about a stigmatized group towards someone who belongs to that group. Mental health literacy programs aim to reduce stigmatizing perspectives and behaviours; many of programs attempt to reduce stigma by providing knowledge (for a review, see Schachter et al., 2008). Carr et al. (2017) recently examined how mental health knowledge can reduce stigma and encourage help-seeking behaviours in Canadian preservice teachers. The improvements seen by increasing knowledge were still apparent when the researchers reassessed stigma and help-seeking behaviours at a 3-month follow-up. Another recent study used a randomized control trial to demonstrate how a mental health curriculum significantly increased mental health knowledge scores after the program was finished compared to the control condition (Milin et al., 2016). The researchers also found a significant drop in stigmatizing beliefs toward mental health disorders among the students involved in the program. Overall, these studies suggest that building knowledge among teachers and students can help reduce stigma. In turn, lowering stigmatizing beliefs may lower the ADHD-associated risk for peer victimization.

**Symptom Management.** Only half of those diagnosed with ADHD receive treatment and less than one third access specialty services that can help reduce ADHD symptoms (Jensen, 2002). Children and parents may forgo treatment because of the stigma they face when seeking the help. As knowledge increase and stigma decreases, the adverse effects created by stigma should theoretically diminish as well. Results from ADHD knowledge-based psychoeducational

programs demonstrated an increase in help-seeking behaviours (Carr et al., 2017) and helping parents and their children with ADHD manage symptoms more effectively through medication and/or behavioural strategies (Bai, et al., 2015; McCleary & Ridley, 1999; Sonuga-Barke et al., 2001; Svanborg et al., 2009). Parents of children with ADHD that are more knowledgeable about treatments or have better understanding of the underlying causes of symptoms may be more effective in responding to the child's ADHD needs. Consequently, more knowledgeable parents may be better equipped to provide strategies and interventions that work to reduce the challenging or invasive symptoms of ADHD in social contents. Reduction in ADHD symptoms may lower the risk of being a victim or a bully. In theory, fewer ADHD symptoms should reduce the risk of becoming a bully's target. The more a child learns strategies to help better control impulsive outbursts, the fewer times that child may react to an emotional upset with aggression towards others.

**Bullying Reduction.** Together, the current body of literature provides the foundational framework to justify an exploration into the link between ADHD knowledge and bullying experiences among children with ADHD. Given that ADHD symptoms have been associated with higher rates of bullying experiences (as either the bully or the victim), knowledge of ADHD is likely to have a cascading impact on bullying/victimizing experiences for children with ADHD. When knowledge decreases the negative perceptions regarding ADHD treatment, parents and children may be empowered to better manage symptoms. Hence, parental ADHD knowledge and attitudes are critical as parents are the gatekeepers in providing their children the most effective treatment through medication and/or behavioural strategies that, in turn, may impact social functioning. The resulting improvement in managing behavioural symptom may consequently help children with ADHD avoid becoming a victim or a bully. Therefore, ADHD

knowledge may have an indirect effect on bullying behaviours and may be a key contributing factor in influencing the pre-established relationship between ADHD symptoms and experiences of victimization and bullying.

## Current Study

Previous research has provided critical information regarding the long-term impact of bullying and how those diagnosed with ADHD are at a higher risk of bullying experiences (Bacchini, Affuso, & Trotta, 2008; Humphrey, Storch & Geffken, 2007; Sciberras, Ohan, Anderson, 2012; Taylor et al., 2010; Timmermanis & Wiener, 2011; Wiener & Daniels, 2016; Wiener & Mak, 2009). In addition, these researchers advocate for the necessity of bullying reduction and to find effective ways of combating peer victimization. Mental health awareness research has provided compelling support that knowledge may be one tool to combat misunderstanding of mental health disorders, including ADHD (Carr et al., 2017; Hinshaw & Cicchetti, 2000; Jorm 2000; 2012; Milin et al., 2016; Pinto-Foltz, Logsdon & Myers, 2011; Walker, et al., 2008). Taken together, it appears that a holistic approach to bullying reduction among the ADHD population may be to reduce stigma by providing more accurate ADHD information to families to help reduce the symptomology of ADHD. However, before stakeholders invest resources into developing psychoeducational groups tailored to preventing negative peer interactions between those with ADHD and their peers, it is important to determine whether a relationship between ADHD knowledge and bullying experiences exists. Therefore, as an initial first step, this study will explore whether parent ADHD knowledge is related to lower reports of bullying experiences of children with ADHD symptoms.

The purpose of this study is two-fold. First, the study aims to re-examine the link between bullying and ADHD. More specifically, the current project expands on previous

literature by examining the link between bullying experiences (i.e., being bullied or bullying others) and ADHD symptom severity. The majority of studies assessing ADHD bullying use previous diagnosis instead of assessing individual symptomology. Therefore, it is important to connect the symptoms of ADHD to bullying experiences rather than depending on a diagnostic label that could describe a range of ADHD symptom severities. Second, the study aims to better understand whether knowledge of ADHD (parent or child) attenuates the association among ADHD symptoms and bullying experiences of school-aged children.

To date, there has been limited research investigating the application of ADHD knowledge for bettering long term outcomes for those with a diagnosis; no studies have assessed the impact of ADHD knowledge in bullying experiences. Therefore, the current study addresses the following questions:

1. Are parent reported t-scores of ADHD symptoms (i.e., inattention and/or hyperactive/impulsive) related to the degree of victimization or degree of bullying behaviours reported by the child?
2. For children with ADHD, is parent ADHD knowledge related to his or her child's reports on experiencing victimization or bullying others? How are different types of ADHD knowledge of the parent (i.e., related to causes of ADHD, symptoms, and/or ADHD treatments) related to the degree of victimization or bullying experienced by the child.
3. For children with ADHD, is parental knowledge related to their symptom severity?
4. Does parental knowledge moderate the relationship between ADHD symptom severity and bullying experiences among children with ADHD?

Instead of using clinical diagnosis of ADHD, assessing the symptoms by t-scores for each child in the current study will help determine the degree to which ADHD symptoms are related

to bullying experiences. In this way, the hypothesis that bullying experiences stems from the physical manifestation of ADHD symptomology may be examined. In alignment with previous research (Bellanca & Pote, 2013; Harris et al., 1992), it is hypothesized that children exhibiting more ADHD symptoms will be associated with higher accounts of victimization and/or bullying. Furthermore, externalizing behaviours related to hyperactive and impulsive behaviours are more noticeable by peers than the inattentive symptoms and may have great social implications. In regards to bullying others, children that struggle with impulse control may bully others to unskillfully get what they need. Therefore, when the ADHD and control sample are grouped together, it is hypothesized that children with more hyperactive/impulsive symptoms will be more likely to report being bullied or being a bullying themselves.

Regarding research question two, given that increased knowledge has been found helpful in reducing ADHD stigma and in aiding parents in helping their children manage ADHD symptoms (Sonuga & Ridley, 1999; Sonuga-Barke, et al., 2001), it is hypothesized that if a parent has higher ADHD knowledge that his or her child with ADHD will be less likely to experience victimization or bully others. Parents with a clear understanding of ADHD and are less influenced by the misconceptions of ADHD may be more informed about the more effective ADHD treatments. Children with ADHD would benefit from having more knowledgeable parents to help them develop and improve social skills, or to use their knowledge in helping their child manage his or her ADHD symptoms in a more effective way. Furthermore, identifying areas of ADHD knowledge that can help children with ADHD experience less bullying behaviours (either as the bully or victim) is a critical step prior to developing a psychoeducational program. Thus, examining the relationship between the various areas of ADHD knowledge and bullying behaviours may highlight potential areas in ADHD knowledge

for future focus. Areas related to better understanding of how ADHD may be treated will likely have a greater impact on rates of victimization and bullying. Therefore, it is hypothesized that treatment and etiology scores will be significantly related to victimization scores compared to general ADHD knowledge or symptom knowledge.

Research question three aims to determine the relationship between parental knowledge in the ADHD group and ADHD symptom severity t-scores. Parents with more knowledge may have their child with ADHD on a more effective treatment plan that decrease symptoms related to victimization. Therefore, it is hypothesized that parents with higher overall ADHD knowledge accuracy will have children with lower t-scores for ADHD symptom severity.

Lastly, the final question is an extension of the previous questions and assesses whether a parent's ADHD knowledge level moderates the relationship between ADHD symptom severity and victim or bullying scores. Caution will need to be exercised when conducting the analysis, as ADHD symptoms (i.e., inattention and hyperactivity/impulsivity) can be highly correlated. However, regardless of which presentation is being analyzed, there are co-occurring hypothesis for this moderation model. First, it is hypothesized that lower ADHD symptoms (i.e., lower t-scores on the Conners 3-P) will predict lower reports of bullying (i.e., lower bullying and victim scores on the BVS). Second, that if higher levels of parental ADHD knowledge lowers ADHD symptom severity then bullying/victim scores will also be lower when parental knowledge is high. In other words, higher levels of parental knowledge will reduce the likelihood of bullying experiences because parents with more accurate ADHD knowledge may be able to help their child manage their ADHD symptoms better and consequently, lower reports of bullying.

# Chapter 3: Methods

## Participants

The current study consisted of 43 Canadian children between the age of 8-13 years old and their parents. Of these children, approximately half had received an ADHD diagnosis ($n$ = 23) by a physician or psychologist, with the remaining 20 included as control children. Within the ADHD group, the participants were predominately male (61% male) and had an average age of 10.57 years ($SD$ = 1.52). In comparison, children in the control group were predominately female (80%) and were on average 9.83 years old ($SD$=1.29). An independent t-test found no significant age difference between groups, $t(41) = -1.70$, $p = .10$. However, as the control group was predominately female, a chi-square test found an associate between group and gender, $\chi^2(1) = 7.34$, $p < .05$. The control group was mostly Caucasian (90%), whereas the ADHD group was slightly more diverse with roughly one-quarter of the families belonging to a minority group. A chi-square test found no significant associate between group and ethnicity, $\chi^2(4) = 6.89$, $p > .05$. Table 1 shows the demographic information for both the ADHD and non-ADHD groups.

Table 1

*Participant Demographic Information by Group*

| Variable | | ADHD (*n* = 23) | | | | Control (*n = 20)* | | | | *d* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *n* | *%* | *M* | *SD* | *n* | *%* | *M* | *SD* | |
| Age | | -- | -- | 10.57 | 1.52 | -- | -- | 9.83 | 1.29 | -- |
| Gender | | | | | | | | | | |
| | Male | 14 | 60.8 | -- | -- | 4 | 20.0 | -- | -- | -- |
| | Female | 9 | 39.1 | -- | -- | 16 | 80.0 | -- | -- | -- |
| Conners 3-P (t-scores) | | | | | | | | | | |
| | IA* | 23 | -- | 76.45 | 9.68 | 20 | -- | 56.55 | 9.12 | 2.12 |
| | HI* | 23 | -- | 78.91 | 12.65 | 20 | -- | 54.45 | 13.14 | 1.90 |
| BVS | | | | | | | | | | |
| | Victim | 23 | -- | 11.35 | 11.73 | 20 | -- | 5.30 | 10.33 | -- |
| | Bullying* | 23 | -- | 3.49 | 5.18 | 20 | -- | .34 | .67 | .85 |
| KADDS | | | | | | | | | | |
| | Overall | 23 | -- | 22.44 | 4.48 | -- | -- | -- | -- | -- |
| | Symptom | 23 | -- | 6.91 | 1.44 | -- | -- | -- | -- | -- |
| | Treatment | 23 | -- | 7.88 | 1.86 | -- | -- | -- | -- | -- |
| | Etiology | 23 | -- | 7.65 | 2.27 | -- | -- | -- | -- | -- |

*Note.* * = significant difference between the ADHD and Control group (α = .05)

**Measures**

Participating children were asked to complete several cognitive tasks and complete several questionnaires with a researcher regarding their ADHD knowledge, their general behaviours and bullying experiences. Separately, the participating parent independently filled in questionnaires regarding his or her knowledge of ADHD and the participating child's behaviours.

**Child Measures.** Each participating child completed a brief assessment of his or her cognitive abilities to determine inclusion into the study and if included, the child would then complete the Bullying Victimization Scale.

***Wechsler Abbreviated Intelligence Scale, 2nd Edition (WASI-II).*** The WASI-II (Wechsler, 2011) is an abbreviated version of the standardized Wechsler intelligence scales. It is designed and normalized for individuals aged 5 to 90 years old. The WASI-II collects information using four subtests similar to those found on the unabbreviated version. The vocabulary subtest asks the child to orally define various words and assesses the ability to articulate each word's meaning. On the similarities task, the child is asked to verbally explain a relationship or concept between two linked words. Together, vocabulary and similarities form the Verbal Comprehension Index. Block design assesses a child's visual spatial reasoning and ask children to recreate visually presented patterns by using smaller patterns on the blocks to create the larger picture. Matrix reasoning assesses how well a child can detect underlying patterns and rules and apply these rules to solve a novel problem. Together, block design and matrix reasoning comprise the Perceptual Reasoning Index. Altogether, these subtests generate a Full Scale Intelligence Quotient-4 (FSIQ-4).

The WASI-II was normed on 2,300 individuals within the United States according to the U.S. Census 2008. Both strong reliability and validity have been demonstrated in the WASI-II (Wechsler, 2011). The scores obtained using the WASI-II are highly correlated (r= 0.71 to 0.92) with the Wechsler Intelligence Scale for Children, 4th edition (WISC-IV; Wechsler, 2003) and the Wechsler Adult Intelligence Scale, 4th edition (WAIS-IV; Wechsler, 2008). Test-retest reliability measured twice within 12 to 88 days ranged from 0.87-0.95 within the child sample and thus demonstrates strong stability. Furthermore, internal test validity for the FSIQ-4 ranged from 0.94-0.97 (Wechsler, 2011). Across each subtest, strong interrater reliability is also demonstrated (0.94 to 0.95; Wechsler, 2011).

A Full Scale Intelligence Quotient score of 85 or higher was used as a benchmark to proceed with the study. This criteria is to ensure that the child was able to understand the types of questions being asked in the self-report, bullying measure and to ensure that results obtained were not influenced by lower cognitive abilities.

***Reynolds Bullying Victimization Scale (BVS).*** The BVS is a self-report that assess both bullying and victimization among peers (Reynolds, 2003). For each item, the child indicates the occurrence of either a situation where the child has either acted as a bully or a victim to bullying. Responses are on a five point Likert scale, where the answers range from never (0) to five or more times (3). The Bullying Scale is comprised of 23-items of the 46-item survey an covers both physical and relational aggression. A sample item that contributed to the Bullying Scale score is "In the past month, I picked on younger kids." The remaining 23-items generate the Victimization Scale score which assess the frequency in which bullying behaviours are directed towards the child. A sample item from the Victimization Scale is "In the past month, other kids pushed me around". Interpretation of theses scales occurs separately and are not combined to form a total score. This commonly used measure has demonstrated acceptable rates of reliability and validity. Internal consistencies of the BVS were 0.93 and median test-retest reliability was 0.84. A factor analysis was used, along with correlation studies, to confirm construct validity.

**Parent Measures.** The participating parent provided demographic information throughout the screening process and completed several measures that examined their knowledge and perspectives of ADHD and other information regarding their child.

***Knowledge of Attention Deficit Disorders Scale (KADDS).*** The Knowledge of Attention Deficit Disorders Scale (KADDS, see Appendix A; Sciutto, Terjesen, & Bender, 2000) is a 36-item scale that measures the knowledge of parents and teachers regarding ADHD. Each item is

presented as a factual statement and respondents indicate whether each statement is “True”, “False”, or “Don’t know”. The KADDS is designed to measure the following three domains of beliefs: symptom/diagnosis of ADHD, treatment of ADHD, and knowledge around the origin and prognosis of the disorder. An example of a symptom/diagnosis item is, “Children with ADHD often fidget or squirm in their seats”. An item assessing beliefs about ADHD treatment would be, “Parent and teacher training in managing a child with ADHD are generally effective when combined with medication treatment”. Example items that measures knowledge about the origin or outcomes of the disorder include, “Current research suggests that ADHD is largely the result of ineffective parenting skills” and “ADHD is more common in 1st degree biological relatives (i.e., mother and father) of children with ADHD than in the general population”. The item regarding the specific age (age 7) at which ADHD symptoms need to be present was removed from this measure because of the recent change in the DSM-5 diagnostic criteria which now stimulates that symptoms must be present before the child is 12 years old. The KADDS demonstrates adequate internal validity (0.81; Bender, 1996) and furthermore, the KADDS was sensitive enough to detect pre-post changes in scores following educational interventions that target increase ADHD knowledge (Sciutto et al., 2000).

***Conners 3rd Edition Parent Rating Scale (Conners 3-P).*** Clinicians often use the Conners 3-P as a way to gain information from various people regarding a child’s behaviours. For the purpose of research, the Conners 3-P can serve as a tool in quantifying ADHD symptomology as well as other often comorbid disorders (i.e. ODD, CD, SLD) by comparing the child of interest to his or her same-aged peers (Conners, 2008; Conners, 2016). In this current study, the Conners 3-P is used to determine ADHD symptom severity. The Conners 3-P has been normed on a large, American (U.S. and Canada) sample and covers the age range from 6 to 18

years old for the parent form (Conners, 2016). It has demonstrated internal consistencies values from .77 to .97(Conners, 2016). Inter-rater reliably coefficients ranged from .52 to .94, which is indicative of weak to strong ranges in reliability; Conners, 2016). In regards to test-retest reliability, these coefficients ranged from .71 to .98, which is indicative of fair to strong levels of reliability (Conners, 2016). The participating parent reported on their child's behaviours over the past month using a 3-point Likert Scale, which ranged from "Never/Seldom" to "Very Often/Very Frequently".

**Procedure**

Prior to seeing participants, all aspects of the study were approved by the Conjoint Faculties Research Ethics Board at the University of Calgary. Participants were recruited through a variety of methods including poster advertisements and utilizing a pre-existing database. Poster advertisements were placed in various clinics, coffee shops, and other community message boards throughout a large western Canadian city. In addition, a pre-existing database was used to randomly select from a pool of families with children diagnosed with ADHD and had indicated that they were interested in being contacted for future research. Other recruitment methods included the use of online social media sites (i.e., Facebook and Twitter) and promotion through various community advocate groups for ADHD such as the CanLearn Society and the Children and Adults with Attention Deficit Hyperactivity Disorder (CHADD) Calgary. Parents that expressed an interest in the current study completed a screening questionnaire (see Appendix B) over the phone to determine if their child met the basic inclusion criteria.

Upon arrival, parents were provided with a parking pass for the duration of the study at the University of Calgary. Informed consent and assent were reviewed and an opportunity for

questions was given (Appendix C). Once the consent was understood and agreed upon, parents signed and the child agreed to participate. At this time, parents waited in a quiet space to fill out their questionnaires. The participating child was accompanied by the researcher and completed the test measures and questionnaires in a nearby room. Due to potential reading difficulties, each question was read aloud to each child to ensure that they clearly understood the question before answering. All testing was carried out by trained researchers. Once finished, the participants were debriefed and the family was given another opportunity to ask any more questions. Upon completion, children were given an age-appropriate toy of their choice and parents received a $25 gift card (e.g., Toys R Us, Chapters, Cineplex) as a token of appreciation for their willingness to participate.

## Chapter Four: Results

Information collected from each participant was entered and analyzed using a statistical package program (IBM Statistical Package for the Social Science [SPSS] 20.0). The data was first checked for accuracy, distribution, and entry errors for each of the attention variables (each subscale of the Conners 3-P t-scores), the knowledge scores obtained from each child's parent, and the bullying and victimization scale as reported from each child participant. During this validation process, two scoring errors were identified and corrected, but no data entry errors were made. The data was analyzed for normality using visual inspections of histograms, boxplots, and Q-Q plots, as well as assessing skewness and kurtosis values. The majority of data sets were with acceptable ranges for normality with skewness values between -2 and +2 (Field, 2000 & 2009; Gravetter & Wallnau, 2014; Trochim & Donnelly, 2006) and kurtosis values between -7 to +7 (Byrne & Van de Vijver, 2010; Hair et al. 2010). The only set of values that did not meet the assumption of normality were the bullying scores on the BVS. The data points were positively skewed (skewness value = 2.48) and slightly leptokurtic (kurtosis value = 5.29) with many data points at zero, indicating many children did not endorse questionnaire items regarding bullying others. Consequently, analyses involving the bullying BVS measure required a non-parametric approach or method that can adjust for the violation of normality. The effects of outliers were reduced by first converting raw scores into standardized, z-score values, identifying outliers as values exceeding +/- 3.25 (Tabachnick & Fidell, 2013), and then winsorizing outliers to within the upper or lower boundary of +/-3.25. Winsorizing is the preferred method in handling outliers, as a simple deletion can bias results by removing that participant's responses and experiences altogether. Instead, reducing the effect of an extreme value to within roughly three standard deviations (+/- 3.25) allows for the data to reflect the general population without the negative

effects of having extreme values skew statistical calculations. Three values within the BVS data needed to be winsorized; two victimization scores and one bullying score were extremely elevated.

**Research Question One**

To examine how ADHD symptoms are related to experiences of bullying, correlation analyses were carried out to explore the relationships between t-scores for each category of interest on the Connors 3-P (i.e., inattention, hyperactive/impulsive) and the BVS victimization and bullying scores. Because there are two independent variables from the Conners 3-P being analyzed on the same dependant variable (i.e., the victim or bullying scores), a Bonferroni correction is necessary to reduce the risk of detecting a significant result by chance. When multiple independent variables are being analysed on the same dependant variable, the likelihood of detecting a significant result by chance is increased (Type I error). This conservative adjustment is needed to ensure that the null hypothesis is not rejected when no relationship is present. Therefore, the analyses were conducted using the Bonferroni adjusted alpha levels of .025 per test (.05/2) given that there are two independent variables being analysed for each dependant variable, the victimization or bullying score. Both children with and without ADHD diagnoses ($n$ = 43) were included in this correlation analysis to assess the range of ADHD symptoms across a population rather than just assessing a clinical population. For the victim score analysis, a Pearson correlation found no significant relationship between symptoms of inattention and child-reported victimization scores ($r$ = .30, $p$ = .05). There was also no significant relationship between symptoms of hyperactivity/impulsivity and victimization ($r$ = .25, $p$ = .11). In regards to the bullying analysis, a Spearman correlation was used because the bullying scores were positively skewed. Using the adjusted alpha score, both IA and HI

symptoms were significantly related to bullying scores ($r$=0.39, $p$ = .01; $r$=0.35, $p$ = .02; respectively). The severity of symptoms for both presentations of ADHD were positively correlated, meaning that as symptom severity increased, bullying scores also increased.

Table 2

*Correlation between Parental Conners 3-P T-Scores and Child Reported BVS Victim and Bullying Scores*

| | Inattention | Hyperactive/Impulsive |
|---|---|---|
| BVS Victim Score | .30 | .25 |
| BVS Bullying Score⬩ | .39** | .35* |

⬩ = Spearman correlation

* = p-value ≤ .02

** = p-value ≤ .01

**Research Question Two**

To determine whether parental ADHD knowledge is related to bullying experiences, a correlation analysis was used to determine the relationship between parental overall KADDS scores with their child's victim or bullying scores within the ADHD group. Overall knowledge scores were compared to the each of the variables on the BVS using either a Pearson correlation (for victim scores) or a Spearman correlation (for the bullying scores). Bullying behaviours reported by the children did not correlate with their parent's knowledge of ADHD ($M$ = 22.44, $SD$ = 4.48), $r$ = .14, $p$ = .51. Also, victimization scores ($M$ = 11.35, $SD$ = 11.73) were not significantly related to parental overall knowledge scores ($r$ = -.26, $p$ = .24).

A follow-up correlation analysis was conducted to determine if the individual subscales of the parental ADHD knowledge were related to a child's reports of bullying experience. Each of the three areas of ADHD knowledge (etiology, symptomatology, and treatment) were analyzed across the victimization and bullying scores to determine if these variables were related

(see Table 3). Given the four variables being analyzed, an adjusted Bonferroni alpha value of 0.012 was used. Overall knowledge ($M$ = 22.44, $SD$ = 4.48) was not significantly associated with victimization scores, $r$ = .26, $p$ = .24. Symptom knowledge ($M$ = 6.91, $SD$ = 1.44) was not significantly related to victimization scores, $r$ = -.14, $p$ = .52. There was also no significant relationship between treatment knowledge ($M$= 7.88, $SD$= 1.86) and victimization scores, $r$ = -.17, $p$ = .44. Finally, no significant relationship was found between etiology knowledge ($M$= 7.88, $SD$ = 1.86) and reports of victimization, $r$ = -.28, $p$ = .19. Bullying behaviours were also assessed against categories of parental ADHD knowledge using a Spearman's correlation. No subscales of knowledge were significantly related to admitted bullying behaviours by the children. Correlations between bullying and knowledge scores also produced insignificant results. Bullying scores were not correlated with overall knowledge scores, $r$ = .14, $p$ = .51. Specifically, the symptom knowledge subscale was not significantly associated with bullying scores, $r$ = .24, $p$ = .28. Similarly, treatment knowledge and bullying scores were unrelated, $r$ = .03, $p$ = .91. And finally, etiology knowledge also had no significant relationship to bullying scores, $r$ = .15, $p$ = .49.

Table 3

*Results of Parental KADDS Raw Scores and Child Reported BVS Victim and Bullying Scores*

| | KADDS | | | |
|---|---|---|---|---|
| | Overall Knowledge Score | Symptom Knowledge | Treatment Knowledge | Etiology Knowledge |
| BVS Victim Score | -.26 | -.14 | -.17 | -.28 |
| BVS Bullying Score⬩ | .14 | .24 | .03 | .15 |

⬩ = Spearman correlation

* = p-value ≤ .02

** = p-value ≤ .01

**Research Question Three**

In regards to the third research question investigating the relationship between knowledge and reports of ADHD symptom severity within the ADHD sample, the overall scores on the KADDS and the t-scores from the Conners 3-P for inattention and hyperactive/impulsive behaviours were analyzed using Pearson correlations. A Bonferroni correction was used to calculate an adjusted alpha value of 0.025. For symptom t-scores, there was no significant relationship between IA t-scores and knowledge, $r = -.32$, $p = .14$. There was also no significant relationship between hyperactive/impulsive behaviours and parental overall ADHD knowledge, $r = .06$, $p = .78$.

**Research Question Four**

Prior to examining how knowledge may moderate the relationship between ADHD symptom severity Conners 3-P t-scores) and bullying behaviours (BVS scores) within the ADHD group, research questions two and three aimed at providing support to proceed with a moderation model. Given the lack of an association between knowledge and bullying experiences and the low sample size, further analysis is not warranted. However, for the purpose of the current document, the moderation model is presented and tested below.

Various regressions were required to determine how unique each component predicts the outcome. To test the proposed general moderation model shown in Figure 1, the unique effects of the independent variables (inattention or hyperactive/impulsive t-scores), the moderator

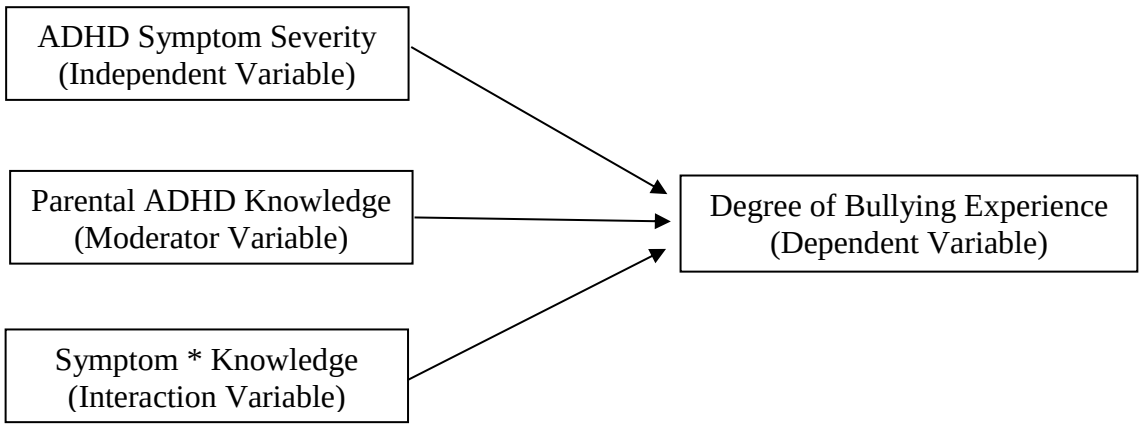


*Figure 1.* A general moderation model for knowledge as a moderator between ADHD symptom severity and degree of bullying experienced by children with ADHD.

variable (parental ADHD knowledge), and the interaction between independent variables and the moderator together need to be analyzed using a regression analysis while controlling for each variable. As Figure 2 depicts, two proposed moderation models are to be tested for each bullying experience (i.e., victimization, bullying) using either IA or HI as the independent variable for a total of four moderation models. The two symptom variables are conducted separately to avoid the issue of multicollinearity as the two independent variables are significantly related to each other ($r = .51$, $p = .01$) and separating the variables will provide insight to which model predicted bullying experiences better. The interaction variable is created by first standardizing the independent variable of interest with the moderator (i.e., knowledge score) and then computing the product of the newly standardized values.

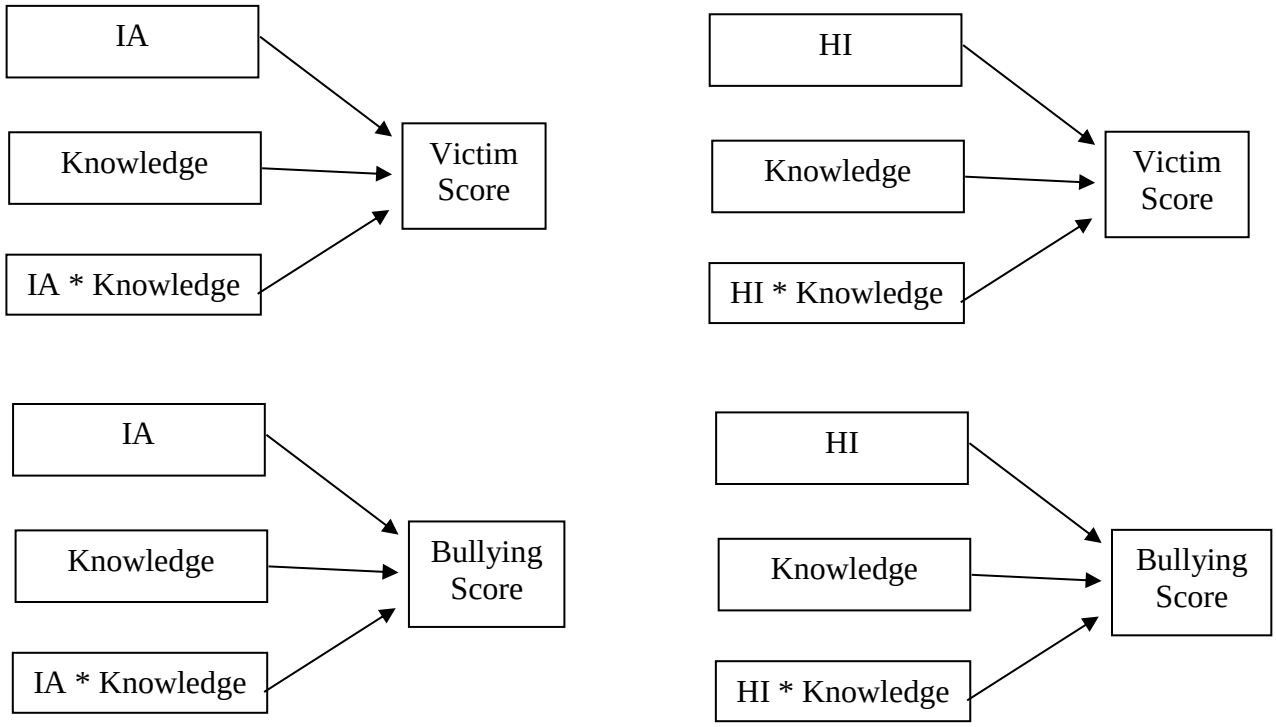


*Figure 2.* The four proposed moderation models investigating parental ADHD knowledge as a moderator between ADHD symptoms (IA or HI) and bullying experiences (victim or bully).

For victimization models (Figure 3), IA Conners 3-P t-scores, parental overall ADHD knowledge, and their interaction were added stepwise to a regression analysis to assess their predictive power on victim scores. The addition of the interaction produce almost no change in the $R^2$ value; therefore, knowledge is not a significant moderator between IA symptom scores and victimization scores ($\Delta R^2 < .001$, $F(3,22) = .91$, $p = .45$). Similarly, in a model examining ADHD knowledge as a moderator between HI symptoms and victimization (Figure 4), knowledge was also not a significant moderator ($\Delta R^2 = .08$, $F(3,22) = 1.18$, $p = .35$).

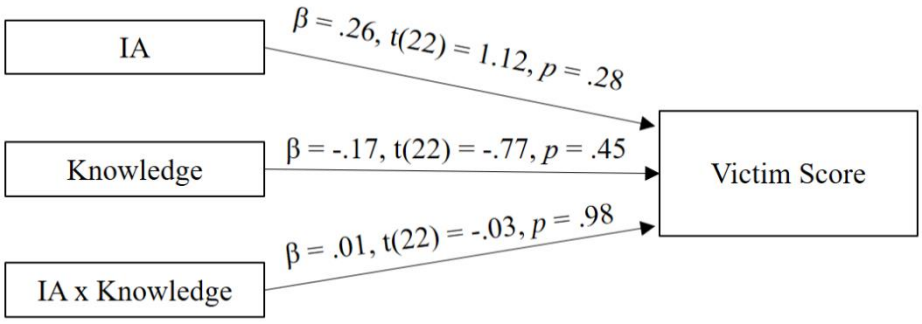


*Figure 3.* Moderation model of parental ADHD knowledge between IA symptoms and victim scores. Beta weights are standardized and demonstrate the change in victim score per unit of its associated variable.

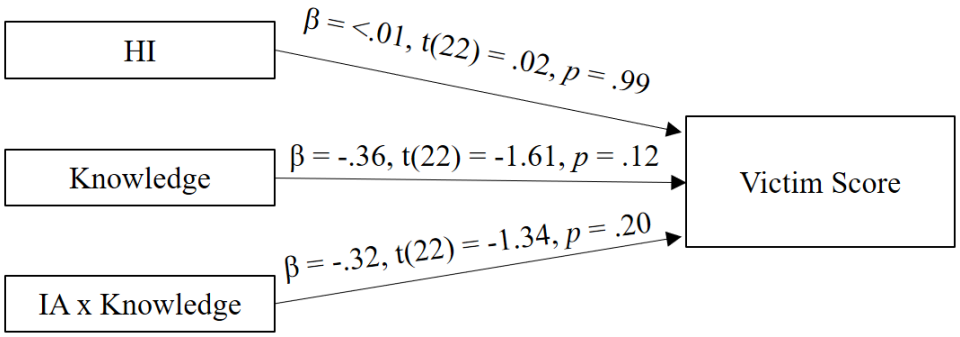


*Figure 4.* Moderation model of parental ADHD knowledge between HI symptoms and victim scores. Beta weights are standardized and demonstrate the change in victim score per unit of its associated variable.

For bullying models, knowledge was also examined as a potential moderator between IA symptoms and bullying scores (Figure 5). Parental ADHD knowledge did not significantly change the amount of variance accounted for when IA symptom severity was controlled for ($\Delta R^2$ <.01, $F(3,22) = .72$, $p = .55$). Assessing parental ADHD knowledge in a moderation model between HI symptoms and reported bullying behaviours (Figure 6), knowledge was not a significant moderator ($\Delta R^2$ <.04, $F(3,22) = .42$, $p = .74$).

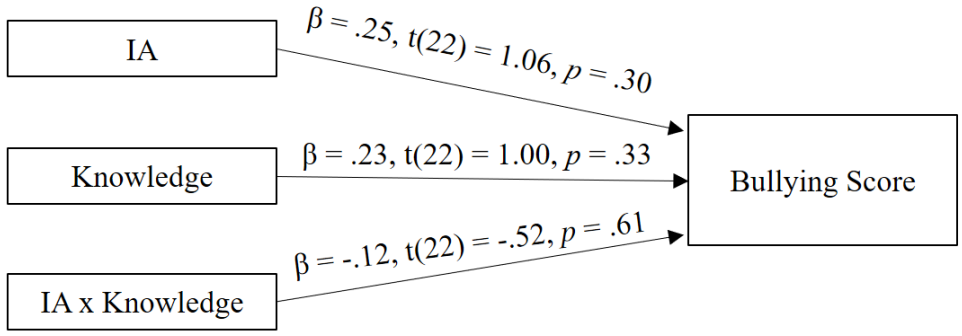


*Figure 5.* Moderation model of parental ADHD knowledge between IA symptoms and bullying scores. Beta weights are standardized and demonstrate the change in bullying score per unit of its associated variable.

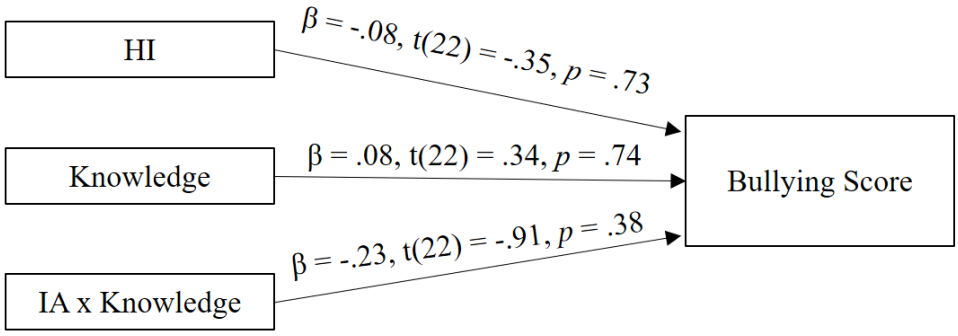


*Figure 6.* Moderation model of parental ADHD knowledge between HI symptoms and bullying scores. Beta weights are standardized and demonstrate the change in bullying score per unit of its associated variable.

# Chapter 5: Discussion

The purpose of this study was to explore the relationship between ADHD symptoms (i.e., inattention and hyperactivity/impulsivity), ADHD knowledge, and bullying experiences (as either a bully or a victim). Four research questions were proposed to better understand how each of the three components relate to one another. The first question aimed to expand on the existing literature in respects to ADHD and bullying by focusing on a child's severity of ADHD symptoms in relation to the child being involved with bullying. As a novel endeavour, this study is the first to test the relation between parental ADHD knowledge and symptom severity, as well as, parental ADHD knowledge and their child's experiences as either a bully or a victim. Research questions two and three aimed to identify relations between bullying and victimization with parental ADHD knowledge. Finally, the possibility of ADHD knowledge as a moderator between the relationship between ADHD symptoms severity and bullying experiences was also examined (question four) to determine if knowledge may play a role in reducing bullying for the ADHD population. The following sections discuss each of the relations examined in the present study.

## ADHD Symptoms and Bullying Experiences

The first research question sought to understand how ADHD symptom t-scores related to bullying experiences – as either a bully or a victim. Rather than using clinical diagnosis or cut-off scores that can mask the heterogeneous nature of ADHD, use of t-scores in a continuous manner allowed for a richer and more complete understanding of how the degree of symptom severity relates to rates of bullying or victimization. The broader hypothesis that children who exhibit more ADHD symptoms would be at a greater risk for bullying experiences (as a victim or

bully) than children who did not present with ADHD symptoms was partial supported by this study's findings.

In line with this study's hypothesis, parents who rated their children as having more HI symptoms were more likely to have their child disclose that they have participated in bullying others. This finding supports previous work indicating that children with weak impulse control may engage more in bullying (Haynie et al., 2001; Saylor & Amann, 2016; Unnever and Cornell, 2003). Although, from the current study, the child's rationale for bullying others can only be inferred. There are various reasons why an impulsive child may bully others. First, when children with ADHD are emotionally charged, it may be difficult for them to calmly articulate their needs to others and as a result, may rely more on the unskilled act of bullying to get what they desire (Haynie et al., 2001; Saylor & Amann, 2016; Unnever and Cornell, 2003). Second, because children with ADHD may lack skills in self-regulating their strong emotions, aggressive behaviours may erupt and target unsuspecting peers (Saylor & Amann, 2016). For instance, a child with ADHD who has a strong justice complex may consistently lash out at others whom he or she deems to be unfair. Instead of skillfully handling the situation by asking for help, or calming explaining his opinion, this child may not have the inhibitory control to prevent his or her first impulse of lashing out at the perceived perpetrator. Although not research as of yet, hyperactive symptoms may exacerbate this child’s reactive behavior towards his peers by increasing the urgency of addressing his peer’s wrongdoings or making him feel emotionally restless in the situation.

There were several unanticipated findings as well. Unexpectedly, parental reports of IA symptoms were also positively correlated with their child's self-disclosure of bullying behaviours, where children with severe inattentive symptoms were more likely to bully others.

Due to the lack of previous evidence in the literature linking inattentiveness to reports of bullying, hypothesises and consequential predictions focused on symptoms of hyperactivity and impulsiveness being the underlying factor for bullying by ADHD population. However, it is possible that children who struggle to attend to social cues may engage more in bullying behaviours not because they are trying to be malicious or acting on an impulse, but rather because they believe these behaviours serve a more positive purpose, such as social interaction. A child with ADHD may view these acts of bully not as intended harm, but rather, as joking around. Further, his or her lack of being able to attend to the social cues that indicate that certain behaviours are inappropriate may escalate social problems among peers. In other words, a child with inattentive symptoms may not attend to the social cues that are communicating that he or she has cross the social boundary of what is deemed socially acceptable or not. As a result, the child continues the cycle where he or she believes these behaviours are creating friendships when in reality the opposite is occurring.

It was also predicted that more externalizing behaviours (i.e., HI symptoms) would be more noticeable by peers and thus make children presenting these behaviours an easier target for bullies. Instead, the relation between IA symptoms and victimization scores, although not significant using the adjusted alpha score of 0.02, was treading towards significance with a p-value of .05. Despite not being statistically significant in this study given the conservative adjustments to the cut-off p-value, it would still be valuable to conduct future studies with a larger sample size that may produce a significant finding between IA symptoms and victimization scores. In the event that the relationship exists but is undetected, previous research suggests that the relationship between inattentive symptom severity and victimization may exist because a child with ADHD may not attend to social cues and be targeted because of his or her

lack of social aptness. Alternatively, indirect consequences of poor social skills may result in higher rates of victimization. For instance, being bullied has a higher likelihood of occurring when one does not have friends that can provide backup support or defend the victim. In other words, those who are less attentive may have fewer friends to act as a protective factor against being bullied.

In contrast, if the relationship does not exist after increasing the sample size, then an alternative explanation would need to explain why neither IA nor HI symptoms of ADHD relate to bullying despite ample empirical support that those with ADHD are at a higher-risk of being bullied. One alternative explanation could be that the label of having ADHD may result in stigma towards those with the disorder. For example, when adolescents with ADHD were asked to share about their experiences as a victim, a common response was that peers often begin teasing them when they were caught taking their ADHD medication or if a teacher asked them publicly if they took their ADHD medications that morning (Ferrin et al., 2012). Thus, bullying may be the result of the prejudice attitudes towards those with ADHD rather than the symptoms of ADHD itself. A third consideration is that both of these factors (i.e., symptoms and stigma) could result in increased levels of bullying those with ADHD, but the relationship may only be detected when both symptoms and stigmatizing beliefs are present. For example, upon interacting with a student with ADHD symptoms, peers may develop stigmatizing beliefs about ADHD that potentially could escalate into discriminatory acts against others with ADHD. In addition, peers holding stigmatizing beliefs about ADHD may be extra sensitive in detecting the disruptions that certain ADHD symptoms can have in a classroom, such as when a child with ADHD is being hyperkinetic or if a child with ADHD needs constant redirection from a teacher because he or she is daydreaming.

## Parental ADHD Knowledge

The remaining three research questions attempted to ascertain whether parental ADHD knowledge was related to a child's presentation of ADHD symptoms (question three) and thereby indirectly influencing rates of ADHD-associated bullying (question two). Questions two and three assessed each factor's (i.e., symptom or bullying experience) independent relation with parental ADHD knowledge, while question four aimed to determine if there was an interaction effect between all three components.

**ADHD Knowledge and Symptom Severity.** Psychoeducational programs that increase ADHD knowledge have demonstrated that increasing ADHD knowledge has a positive impact on ADHD treatment adherence (Bai, et al., 2015; McCleary & Ridley, 1999; Sonuga-Barke et al., 2001; Svanborg et al., 2009). Consequently, when the implementation of evidence-based ADHD treatments improves, ADHD symptoms become better managed. As such, the third research question sought to investigate the connection between overall parent ADHD knowledge and their child's ADHD symptom severity. It was hypothesized that having a parent with higher levels of ADHD knowledge would be related to how effective parents would be in managing their child's ADHD symptoms which would be indicated by lower IA and HI symptom severity scores. However, the findings of this study did not suggest a significant connection between parental ADHD knowledge and ADHD symptom severity. Although knowledge and awareness is often needed in order to make informed decisions, having accurate ADHD knowledge does not guarantee that individuals will act on or implement what they know to be beneficial.

There may be several barriers in translating knowledge into action. First, a parent may not have access to the most effective treatments. Despite knowing what treatment plan would be best for their child, parents may not be able to constantly provide stimulant medication or access

to a behavioural therapist. Limiting factors such as the family's financial situation, availability of desired interventions, or limited access to professionals who specialize in ADHD can all reduce the odds of parents being able to provide an appropriate intervention for their child with ADHD. As a result, a child's ADHD symptoms persist. Second, although a parent of a child with ADHD may have accurate ADHD knowledge, the parent may have personal attributes or characteristics that add a challenge in providing consistent interventions for his or her child. Given that ADHD is a highly inheritable disorder, parents of children with ADHD may also be struggling to manage their own symptoms. For instance, a parent with deficits in executive functioning, particularly in planning and organization, may forget to have his or her child's ADHD medication prescription renewed or may forget to give or remind his or her child to take their medication each morning. The lack of organization at the parental level could impact how well a child's ADHD symptoms are managed. Lastly, stigma regarding certain treatments may deter parents from supplying their child with an effective treatment. In a community that disapproves of giving a child stimulant medications, people may isolate or ostracize parents who choose to medicate their children. In this social climate, a parent may feel pressured to try other, more socially acceptable yet less effective, alternatives. The risk of losing one's support group may be a less desired outcome compared to having a child whose symptoms are not as managed as they could be. In other words, when the stigma-related risks regarding treatment outweighs the treatment's benefit, then parents may be less likely to try a certain treatment, despite evidence towards its efficacy. Research aiming to reduce the severity of ADHD symptoms through effective treatments will need to continue to investigate the barriers that limit the translation of knowledge into action.

**ADHD Knowledge and Bullying Experiences.** The second research question sought to determine whether a relationship between ADHD knowledge and bullying experiences as either a victim or a bully existed. Previous ADHD researchers have suggested that lowering socially undesirable ADHD symptoms may help children with ADHD develop stronger social aptness (Bibou-Nakou et al., 2012; Georgiou & Stavrinides, 2008). The same thought process could be argued for reducing the ADHD-associated risk of being bullied and/or bullying others. Decreasing ADHD symptom severity could lessen the negative social impact of having ADHD. Furthermore, as there is empirical evidence that increasing ADHD knowledge can improve treatment adherence and symptom management (McCleary & Ridley, 1999; Sonuga-Barke et al., 2001), then it is plausible that children with more knowledgeable parents may participate less in bullying others and being an unwilling victim themselves. Thus, parental ADHD knowledge may have an indirect effect on the level of bullying or victimization towards or by children with ADHD. However, in the current study, no significant relations were found between parental ADHD knowledge scores and victim or bullying scores. Again, the aforementioned reasons relating to the barriers that limit the utility of parental knowledge can help to explain why bullying and victimizations rates were not related to parental knowledge. Ultimately, high parental knowledge does not guarantee social skill development in how to reduce bullying and victimizing interactions among peers.

Given that lower ADHD symptom severity is related to fewer reports of bullying behaviours, it can be deduced that factors influencing symptom severity may have an indirect relationship with reports of bullying experiences. Thus, similar to the rationale for why higher levels of ADHD knowledge could empower parents to help manage their child's ADHD symptom severity and thereby reduce bullying, it could be argued that bullying could be reduced

indirectly if parental ADHD knowledge reduces symptom severity. Alternatively, if knowledge does not influence ADHD symptom severity, then the probability of bullying reduction through ADHD symptom management is not likely. Based on the lack of correlation between parental knowledge and ADHD symptom severity within this sample, it is not unexpected that a correlation between knowledge and bullying behaviours was also not supported. However, examining the independent relationship between bullying rates and parental ADHD knowledge is still beneficial. Besides reducing symptoms, there could have been other ways that parental ADHD knowledge could be associated with lower rates of victimization and bullying reported by children with ADHD. For example, parents with more accurate ADHD knowledge may be more aware of the social challenges their children with ADHD face. Consequently, parents can intentionally teach these social skills to their children in hopes of improving social etiquette. As a result, social skill building may help to reduce bullying-risk factors, such as helping children with ADHD build stronger friendships that deter bullies from targeting children with ADHD. Within the sample studied, it is evident that parental knowledge is not significantly related to reports of bullying. Hence, increasing parental knowledge in hopes of reducing bullying may not be as apparently beneficial as suggested by previous psychoeducational research.

**ADHD Knowledge as a Moderator.** The aim of question four was to investigate whether parental overall ADHD knowledge influenced the relationship between ADHD symptoms (IA or HI) t-scores and bullying/victim scores. Because IA and HI symptoms are highly correlated, each symptom was looked at separately in relation to knowledge's effect with victim scores and knowledge's effect with bullying scores, for a total of four moderation models. Based on the lack of correlations found between ADHD knowledge and bullying/victim scores or ADHD symptom t-scores, there would not be enough evidence to merit a moderation model.

However, to be thorough, the moderation analysis was conducted despite insufficient evidence for proceeding, in addition to a small sample size, which ultimately limits the likelihood of this moderation model in yielding significant findings. However, this moderation model can rule out any hidden interaction effect between ADHD symptom severity and knowledge on reports of bullying within this sample of children with ADHD. All models yielded non-significant results, but it may be beneficial to discuss how the lack of predictability demonstrated by these moderation models may affect future research directions. In particular, discussions would be beneficial if they were aimed at explaining the gap between how the relationship between ADHD symptoms and bullying scores was significant, and yet, ADHD symptoms are not predictive of reports of bullying others within the sample of children with ADHD regardless of parental knowledge scores.

From the ADHD sample, the beta weight values of ADHD symptom severity did not significantly predict bullying or victimization scores. There other considerations that may influence how these results can be interpreted. First, there is very little diversity in symptom scores within the ADHD group compared to the spread of scores for reported bullying experiences. Thus, the predictive power is limited by the homogenous IA and HI t-scores. Because there is little movement across one factor (i.e., symptom t-scores), the potential movement (as evidence in the beta weights) calculated between symptom score and bully or victim scores will be limited.

Second, because the symptoms were separated due to multicollinearity, the lack of significance may be because the interaction effect between both IA and HI symptoms is removed. In other words, children with a combination presentation type for ADHD may be more likely to report bullying experiences. However, this moderation model does not capture this

interaction. Other research studies have produced evidence that those with the combined presentation of ADHD may have higher risk factors and worse outcomes due to having both ADHD symptoms sets compound ADHD-associated challenges (Willcutt et al., 2012).

Third, the lack of significant results may be attributed to another, unmeasured factor that be influencing the predictive strength of ADHD symptoms in relation to bullying outcomes. Other factors that could be influencing the relationship between ADHD symptoms and bullying experience includes, but is not limited to, school climate, academic performance, other externalizing behaviours, community factors, and/or family functioning (for a meta-analysis of other possible predictors of bullying experiences, see Cook, Williams, Guerra, Kim, & Sadek, 2010).

Alternatively, the variables being assessed in the moderation models may simply not be significant predictors of the outcome variables. In other words, the main effect of ADHD symptoms on bullying experiences may not exist. From the moderation analysis, knowledge does not appear to be supressing or amplifying the predictive relationship. However, further analysis would need to be undertaken before making any firm conclusions, sample size may have played a significant role in these analyses.

**Implications**

The current study provides information regarding the relation between ADHD symptom severity, parental ADHD knowledge, and bullying experiences. By extending beyond the common method used in research of only using cut-off t-scores for ADHD, the current study's use of assessing relationships in terms of symptom severity rather than diagnostic inclusion allows for further understanding and greater utility of how ADHD symptoms relate to bullying. There are two primary ways in which this information may be useful for professionals and

school staff who work with children diagnosed with ADHD and their families. In addition to the primary implications for schools, this section also highlights two recommended areas of focus for psychoeducational program developers targeting families with ADHD. These additional areas of focus include: (1) improving ADHD knowledge, and (2) translating ADHD knowledge into skill development.

First, because the present study used the full spectrum of t-scores for HI and IA, connections between bullying experiences and symptom presentation and severity were analyzed. From these results, suggestions can be made regarding reducing bullying through better ADHD symptom management. Consequently, by providing teachers, school administrators, and professionals working with the ADHD population with specific evidence that demonstrates how symptoms are relate to bullying experiences, areas of need can be prioritized and specifically targeted. For instance, higher levels of inattention and hyperactivity were related to children with ADHD bullying other students. Inattentive symptoms were more related to bullying compared to hyperactive symptoms; therefore, finding stronger interventions for increasing attentional capacity and decreasing the inattentive symptoms has a better chance of lowering bullying experiences among those with ADHD. Hence, helping children with ADHD manage their symptoms can better promote positive school climates.

Second, the results of this study suggest that knowledge may not be enough to reduce ADHD symptoms and social challenges. The current study suggests that knowledge itself does not guarantee action. ADHD behaviours may not be the result of a lack in knowing what to do but rather the lack of ability to do what is expected in a given situation (Barkley, 2004). For instance, a person may know how to reach a goal, but there may be many barriers that make it challenging to use what is known. Some of these challenges may be external, such as access to

programming, pressures to avoid medication, or a general unwillingness to engage in ADHD coaching techniques. However, there are also internal factors that can impact how well a child can use acquired knowledge. Given the high heritability rate of ADHD, it is unsurprising that children with ADHD more often than not have at least one parent who also demonstrates ADHD symptoms. The same deficits seen in children with ADHD such as poor executive functioning skills or social skills may also be a challenge for parents. The combination of parents trying to help their child in an area that they themselves struggle with may limit the effectiveness of reducing ADHD problem symptoms. In addition, the social implications of giving a child stimulant medication may create an added pressure for the parents. As a result, parents may try a less effective treatments despite knowing that there are better ways to manage ADHD symptoms or they may simply believe that the controversial, pharmaceutical intervention is not in the best interest of their child. Hence, it is important for those working with children with ADHD and their parents to identify where the gap in knowledge or skill occurs and then to take steps to remediate the issue. With these challenges in mind, those developing psychoeducational programs can focus their efforts in helping to reduce the negative effects of unmanaged ADHD symptoms (e.g., bullying or victimization rates) by improving ADHD knowledge and increasing the translation of ADHD knowledge into a skill.

**Improving ADHD Knowledge.** With the potential for both children with ADHD and their parents to be negatively affected by the stigma perpetuated by inaccurate ADHD beliefs, it becomes imperative to find ways to promote higher levels of ADHD knowledge among those affected by ADHD and the population as a whole. The results from the prior studies imply that further psychoeducation may help to improve knowledge regarding ADHD in hopes of reducing stigma towards those diagnosed with ADHD (Bai, et al., 2015; McCleary & Ridley, 1999;

Sonuga et al., 2001; Svanborg et al., 2009). In addition, adding resources to help children with ADHD increase their knowledge of the disorder may also be beneficial for increasing their understanding of how ADHD impacts various situations. Improving the child's opinion on both medication and psychosocial interventions may also help to increase treatment compliance (MacKay & Corkum, 2006).

**Translating ADHD Knowledge into Skill Development.** Although knowledge is a necessity, it is the application of knowledge that promotes healthier peer relationships. Psychoeducation may need to consider other approaches in helping parents translate what they learn from programs in order to see improvements in their child's symptoms and social relationships. Hence, a two-prong approach may be needed. First, education to ensure accurate ADHD information, then the practice or hands-on assistance in developing a skill. For example, first teaching a child with ADHD to actively listen to another's point of view. Then, to practice through guided coaching on what to say or do to show that he or she is listening such as nodding, making good eye contact, and rephrasing or asking thoughtful, extension questions. Skill development may also encompass how to self-regulate in order to apply knowledge in an effective way during moments of frustration or boredom. In other words, psychoeducation needs to shift from knowledge-based acquisition to skill-based improvements. Additionally, for children with ADHD, assessing the execution of a skill rather than the knowledge of a skill will be of greater importance (Wheeler & Carlson, 1994). However, symptom severity may play a role in whether a lacking skills stems from a knowledge or a performance deficit. For instance, children with more inattentive symptoms may not have acquired the knowledge of certain social skills due to their attentional difficulties and hence, may benefit more from a knowledge-based program (Antshel & Remer, 2003; Wheeler & Carlson, 1994). Once both knowledge and skills

have been developed, teaching others how to help remind and support the child to employ skills at the needed time may also help to improve the challenges associated with ADHD.

**Limitations**

As with any research project, limitations exist within the present study. Results presented in this study should be interpreted while considering several limitations. First, the sample size used for each analysis was small (ADHD group $n = 23$; Control group $n = 20$). Having a small sample size can be problematic due to limited statistical power. A study's statistical power describes how likely a statistical analysis will detect differences or relationships among data points (Kerlinger & Lee, 2000). Because sample size directly impacts statistical power, having a smaller sample size makes finding significant differences harder to detect among the sample (Cohen, 1992). In other words, small sample sizes increase the risk of making a Type II error by failing to reject the null hypothesis when there is an actual relationship between the two variables, but that the relationship was masked. Given that the present study had a smaller sample size and was underpowered, the chance of detecting a significant relationship is reduced.

Second, limitations impacting the generalizability also exist in the present study. Despite efforts to recruit a range of diverse families, the recruitment process may have been indicative of recruiting a more homogeneous sample on certain variables than intended. First, the large majority of participants were Caucasian families. Despite efforts to recruit from a variety of locations (i.e., medical offices, schools, coffee shops, agencies, and online), the ethnic representation is less diverse than the general population. The dissemination of recruitment material among those who are familiar and perhaps more similar could have also contributed to limiting the diversity of sample. There may also be some cultural barriers that limit the

likelihood of recruiting participants from cultural groups such as a disbelief in mental illness or cultural pressures to not disclose anything that may be perceived by others as a weakness.

Another limitation in the present study that impacts generalizability is the issue of gender representation and comparisons. Given that ADHD is more commonly diagnosed in males than females at a rate of 2:1 (APA, 2013); it is not surprising that the ADHD group had a higher representation of males. However, a limitation of this study is that the control group was primarily composed of females. Ideally, the control group would be more evenly matched in terms of gender so that the differences identified between the control group and ADHD group are not a confounding product of gender differences (e.g., boys being more or less likely to be involved in bullying experiences than girls).

Third, another limitation pertains to measure reliability, particularly with how personal experiences of bullying or victimization translate to a certain score on the BVS. Although the BVS is a well-established and accepted measure in research, self-reports come with the limitation of only gaining the participants perspective of a situation. Seeing that bullying scenarios require at least two individuals, how one child interprets a social exchange and reports about a situation may not reflect how another, more objective, individual would describe the bullying events. Underreporting of socially undesirable actions, such as bullying, must also be taken into consideration. Lower self-disclosure rates may occur in children with ADHD because they often have a higher self-perception of their own abilities and tend to dismiss personal challenges (Hoza et al., 2004; Owens et al., 2007). Conversely, children with ADHD may be more likely to disclose unflattering personal information or they may unaware that a particular behaviour is socially inappropriate and impulsively share with others. The uncertainty of whether certain behaviours are being over or underreported is complex, and hence, it is important

for researchers to include methods of confirmation (i.e., multiple informants) or to be cognisant of how a population may respond on self-reported measures.

Overall, each of the limitations noted has an impact on the capacity of data collected to be analysed for meaningful relationships between the variables. Consequently, these limitations impact the study's external validity. Hence, the generalizability of these findings and need to be considered when attempting to make conclusions regarding the results. To help correct for these limitations, replication or continuation of this study with a larger sample size would be advised.

**Future Direction of Research**

In both the general population and in clinical groups such as ADHD, bullying research is a rapidly growing field. By using a continuous measure of ADHD symptom severity, rather than a categorical label, the present study was able to contribute to the field in a novel way. However, the results of this study leaves many future avenues to explore. A logical starting place for future research is to address the limitations of the current study, and afterwards, incorporating findings from this study into larger the context of bullying and ADHD.

First, this study would benefit from replication with a larger and more diverse sample. By increasing the sample size, the power of the study to find significant and meaningful relationships also increases. Increasing the sample size will also improve the likelihood of representing the population's diversity more accurately. A larger sample size can also negate the effect of extreme values or outliers.

Afterwards, other areas needing improvement can be addressed. Ways in which to collect information can be optimized. For example, updating the KADDS to a more modern version that reflects current best-practices would be beneficial. In addition, using other sources or questionnaires to assess bullying besides the self-reported BVS measure would help better

capture bullying incidents rather than relying on the child to disclose sensitive information. Involving schools and teachers may also introduce a more accurate depiction of bullying incidences as well.

To explore the impact of bullying more thoroughly, other measures such as the *Bullying and Ostracism Screening Scale (BOSS)*, may be more beneficial in flushing out the details regarding bullying experiences. For example, determining if those with ADHD are more prone to certain types of bullying, such as physical, verbal, ostracism, or cyber. There are a plethora of factors that one can assess bullying in the ADHD population. It may be beneficial to look at other profile characteristics besides ADHD symptomatology, such as executive functioning deficits, child ADHD knowledge or perspective taking, to name a few.

Beyond addressing the limitations of the current study, there are several ways that the presented research can be extended that would benefit the ADHD population in regards to bullying. Investigating the effectiveness of social skills training may be one endeavour. By understanding that although knowledge is necessary, knowledge itself is not sufficient in reducing ADHD symptoms or bullying experiences. Moving forward, social skill programs and psychoeducational programs may have a greater impact helping children with ADHD in their social skills if program curriculums shifted from using knowledge as a measure of participant success and rather focus on skill practice, acquisition, and mastery in skill achievement. As previous literature suggests, knowledge is still an important tool for reducing ADHD stigma among parents and their children (Bai et al., 2015; McCleary & Ridley, 1999; Sonuga-Barke et al., 2001; Svanborg et al., 2009). By giving people more accurate information, parents may feel more empowered to access interventions that may be perceived by certain groups within the population. Again, practical steps in managing the negative emotions associated with experience

stigma may be an added piece of knowledge that parents could benefit from, and consequently, children with ADHD may benefit from parents feeling more prepared to advocate for their child's needs.

Additionally, professional development regarding psychoeducation that helps empower more parents by providing specific resources and support may be also beneficial. This study supports the stance that psychoeducation needs to move beyond providing generic knowledge about ADHD. Although, knowledge is still important, the application of knowledge also needs to be prioritized to helping families access resources that can help children with ADHD. Introducing accountability and follow-up session with specific solution-focused troubleshooting may also be beneficial to families. In addition, professional development for other individuals who can have a positive influence on children with ADHD should also be identified. By creating a support team for children who may not be receiving the supports they need from home may also help in creating a more positive, social community for children who struggle with peer relationships, such as those with ADHD. Future research investigating the factors that increase ADHD psychoeducation's efficiency in reducing ADHD symptom severity will help in creating better supports for children with ADHD.

**Conclusions**

The aim of the present study was to examine the relation between ADHD symptom severity, ADHD knowledge, and bullying behaviours and whether knowledge plays a moderating role in ADHD symptom severity and bullying experiences. Although a connection between ADHD symptom severity and bullying was found within this study's sample, the specific aims assessing knowledge's role in this relationship did not prove significant. Yet,

finding no significant relationships still provides the scientific community with a guide to what future, better powered studies may reveal.

It also highlights the need for professionals to move beyond providing knowledge as the sole way to intervene and rather to focus other factors such as skill development. Inevitably, research studies will need to continue narrowing in on what factors can have a positive effect on reducing the involvement of children with ADHD as a bully or being the victim of a bully. Ultimately, the present study is the launching point in which researchers can further explore the effectiveness of psychoeducational sessions using ADHD knowledge as a tool to help reduce bullying and ideally, create healthier, positive social environments for the children.

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APPENDIX A

Knowledge of Attention Deficit Disorders Scale (KADDS)

Please answer the following questions regarding Attention-Deficit/Hyperactivity Disorders (ADHD) by circling your response. If you are unsure of an answer, respond Don't Know (DK), DO NOT GUESS. Please DO NOT leave any items BLANK.

**True (T), False (F), or Don't Know (DK) (circle one):**

| | | | |
|---|---|---|---|
| 1. Most estimates suggest that ADHD occurs in approximately 15% of school age children. | T | F | DK |
| 2. Current research suggests that ADHD is largely the result of ineffective parenting skills. | T | F | DK |
| 3. Children with ADHD are frequently distracted by extraneous stimuli. | T | F | DK |
| 4. Children with ADHD are typically more compliant with their fathers than with their mothers. | T | F | DK |
| 5. In order to be diagnosed with ADHD, the child's symptoms must have been present before age seven. | T | F | DK |
| 6. ADHD is more common in the 1st degree biological relatives (i.e. mother, father) of children with ADHD than in the general population. | T | F | DK |
| 7. One symptom of children with ADHD is that they have been physically cruel to other people. | T | F | DK |
| 8. Antidepressant drugs have been effective in reducing symptoms for many children with ADHD. | T | F | DK |
| 9. Children with ADHD often fidget or squirm in their seats. | T | F | DK |
| 10. Parent and teacher training in managing a child with ADHD are generally effective when combined with medication treatment. | T | F | DK |
| 11. It is common for children with ADHD to have an inflated sense of self-esteem or grandiosity. | T | F | DK |
| 12. When treatment of a child with ADHD is terminated, it is rare for the child's symptoms to return. | T | F | DK |
| 13. It is possible for an adult to be diagnosed with ADHD. | T | F | DK |
| 14. Children with ADHD often have a history of stealing or destroying other people's things. | T | F | DK |
| 15. Side effects of stimulant drugs used for treatment of ADHD may include mild insomnia and appetite reduction. | T | F | DK |

| | | | |
|---|---|---|---|
| 16. Current wisdom about ADHD suggests two clusters of symptoms: One of inattention and another consisting of hyperactivity/impulsivity. | T | F | DK |
| 17. Symptoms of depression are found more frequently in children with ADHD than in children without ADHD. | T | F | DK |
| 18. Individual psychotherapy is usually sufficient for the treatment of most children with ADHD. | T | F | DK |

| | | | |
|---|---|---|---|
| 19. Most children with ADHD "outgrow" their symptoms by the onset of puberty and T subsequently function normally in adulthood. | | F | DK |
| 20. In severe cases of ADHD, medication is often used before other behavior T modification techniques are attempted. | | F | DK |
| 21. In order to be diagnosed as ADHD, a child must exhibit relevant symptoms in two or more settings (e.g., home, school). | T | F | DK |
| 22. If a child with ADHD is able to demonstrate sustained attention to video games or TV for over an hour, that child is also able to sustain attention for at least an hour of class or homework. | T | F | DK |
| 23. Reducing dietary intake of sugar or food additives is generally effective in reducing the symptoms of ADHD. | T | F | DK |
| 24. A diagnosis of ADHD by itself makes a child eligible for placement in special education. | T | F | DK |
| 25. Stimulant drugs are the most common type of drug used to treat children with ADHD | T | F | DK |
| 26. Children with ADHD often have difficulties organizing tasks and activities. | T | F | DK |
| 27. Children with ADHD generally experience more problems in novel situations than in familiar situations. | T | F | DK |
| 28. There are specific physical features which can be identified by medical doctors (e.g., pediatrician) in making a definitive diagnosis of ADHD. | T | F | DK |
| 29. In school age children, the prevalence of ADHD in males and females is equivalent. | T | F | DK |
| 30. In very young children (less than 4 years old), the problem behaviors of ADHD children (e.g. hyperactivity, inattention) are distinctly different from age- appropriate behaviors of children without ADHD. | T | F | DK |
| 31. Children with ADHD are more distinguishable from children without ADHD in a classroom setting than in a free play situation. | T | F | DK |
| 32. The majority of children with ADHD evidence some degree of poor school performance in the elementary school years. | T | F | DK |

| | | | |
|---|---|---|---|
| 33. Symptoms of ADHD are often seen in children without ADHD who come from inadequate and chaotic home environments. | T | F | DK |
| 34. Behavioral/Psychological interventions for children with ADHD focus primarily on the child's problems with inattention. | T | F | DK |
| 35. Electroconvulsive Therapy (i.e. shock treatment) has been found to be an effective treatment for severe cases of ADHD. | T | F | DK |
| 36. Treatments for ADHD which focus primarily on punishment have been found to be the most effective in reducing the symptoms of ADHD. | T | F | DK |

APPENDIX B

**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?

_____

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 C

Informed Consent Form


**Name of Researcher, Faculty, Department, Telephone & Email:** Laura Flanigan, Jacqueline Glazier, Laura Henley & Melissa Yue

Graduate Students

School and Applied Child Psychology, Faculty of Education

**Supervisor:**
Dr. Emma Climie

School and Applied Child Psychology, Werklund School of Education

**Title of Project:** "Knowledge is Power": Public, Parent, Teacher, and Child Understanding of ADHD

**Sponsor:**
University of Calgary Research Grant Competition (URGC) Carlson
Family Research Award in ADHD

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 general knowledge and the experience of individuals with ADHD. Specifically, we are interested in how knowledge of ADHD influences the social-emotional well-being of individuals with ADHD, and will be exploring these areas in relation to factors such as cognitive abilities, self-perceptions, perceptions towards ADHD as a disorder, and family/child's knowledge about the disorder. Many of these factors will be evaluated in working directly with your child, however, in order to obtain multiple perspectives about their emotional experience as well as family's knowledge about the disorder, additional information will be gathered from parents/guardians.

**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 for one session of 2-3 hours. Within this session, your child will work one-on-one with a researcher to complete a number of tasks that evaluate your child's cognitive abilities and social and emotional experience. 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 behavior. There will be breaks (as needed) 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 given the opportunity at that time to consent to your continued participation.

Your participation in this study is entirely 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 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.

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 cognitive 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 how knowledge of ADHD affects children. There is surprisingly little research examining the impact of knowledge of ADHD on the social-emotional well-being of individuals with ADHD. The researchers involved in this study believe that it is important to understand this link because lack of knowledge of ADHD may be contributing to these children having 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 also be covered. 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 filing cabinet in a locked room. Data will be entered onto a password-protected computer without you 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.

***Signatures***

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

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) _____

Parent Name: (please print) _____

Parent Signature: _____ Date: _____

Researcher Name: (please print)_____

Researcher Signature: _____ Date: _____

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

Laura Flanigan, Jacqueline Glazier, Laura Henley & Melissa Yue

School and Applied Child Psychology,

Werklund School of Education

Dr. Emma Climie

Werklund School of Education,

If you have any concerns about the way you've been treated as a participant, please contact the Research Ethics Analyst, Research Services Office, University of Calgary.

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.