

**The Impact of Internalizing Symptoms on Impairment for Children with ADHD: A
Strength-Based Perspective**

Sarah Catherine Bethune

Thesis submitted to the University of Ottawa in partial fulfillment of the requirements for the
Master's degree in Education with a concentration in Counselling Psychology.

Faculty of Education

University of Ottawa

Abstract

Background/Purpose: ADHD is frequently associated with functional deficits across social, familial, and academic contexts (Pelham, 2005). Children with ADHD and internalizing symptoms typically experience higher levels of functional impairment compared to their counterparts with exclusively ADHD (Bishop et al., 2019). Positive parenting practices and child strengths have been found to play a protective role for children with ADHD (Healy et al., 2011; McCrimmon et al., 2018). This study aims to investigate the influence of internalizing symptoms on functional impairment for children with ADHD. Child strengths and parenting strengths have been examined to identify moderating effects of the aforementioned constructs.

Methods: Data were collected in a community mental health centre using the Child and Adolescent Needs and Strengths questionnaire (CANS) and the Child Strengths and Difficulties questionnaire (SDQ). Participants included 209 children and their caregivers seeking mental health services between the ages of 5 and 11 with an ADHD diagnosis. To examine the moderating effects of parenting and child strengths, ordinary least squares regression models were tested using the PROCESS macro for SPSS (v3.5; Hayes, 2018).

Results: Results suggest that levels of internalizing symptoms influence functional impairment in children with ADHD. Child strengths moderate the relationship between internalizing symptoms and functional impairment when internalizing symptoms are medium to high.

Conclusion: Findings from this study demonstrate that facilitating child strengths can help mitigate functional impairment for children who experience ADHD and internalizing symptoms.

Acknowledgments

Firstly, I am appreciative to have been able to work alongside my supervisor, Dr. Maria Rogers throughout this process. Your knowledge, expertise and unwavering support has been a valuable part of my development as a researcher and has been crucial to the completion of this thesis. Thank you for trusting my ability to carry-out this work and for your understanding throughout the pandemic.

I am grateful to my committee, Dr. Jessica Whitley and Dr. David Smith. Your knowledge and feedback have been a great contribution to the development of this study.

My gratitude extends to my friends and colleagues, Julia Renauld and Emily Rice. Thank you for your consistent support, taking the time to talk through ideas with me and reviewing my work. I am happy we were able to go through this process together.

Thank you to my family and in particular my grandparents, Dooley and Lucie who have provided me with the financial means to complete this degree.

Thank you to my partner, Eamonn who has always demonstrated interest in my academic endeavours. Your emotional support and assistance with technical issues has not gone unnoticed.

Table of Contents

Abstract.....	ii
Acknowledgements.....	iii
List of Appendices.....	vi
Introduction	1
Theoretical Framework	3
Literature Review.....	6
ADHD and Functional Impairment.....	6
ADHD and Internalizing Symptoms	7
Risk and Protective Factors	10
Family Factors	10
Child Factors.....	13
The Current Study.....	14
Methods.....	15
Participants	16
Data Collection and Measures.....	17
Data Analysis	21
Results.....	22
Preliminary Analyses	22
Model 1: Internalizing Symptoms and Parenting Strengths.....	23
Model 2: Internalizing Symptoms and Child Strengths	23
Discussion.....	24
ADHD and Internalizing Symptoms	24

Parenting Strengths	24
Child Strengths	25
Contribution to Theory	26
Contribution to the Literature.....	27
Contribution to Clinical Practice	28
Limitations of the Study	29
Strengths of the Study.....	30
Future Research.....	30
Conclusion.....	32
References.....	33

List of Appendices

Appendix A: Measures.....	43
Appendix B: Simple Slopes	48

The Impact of Internalizing Symptoms on Impairment for Children with ADHD: A Strength-
Based Perspective

Introduction

Attention Deficit Hyperactivity disorder (ADHD) is one of the most prevalent and well researched childhood psychological disorders (Sciberras et al., 2017). In recent years, research in this area has focused heavily on functional impairment, as children with ADHD typically experience challenges beyond the core symptoms described in the *Diagnostic and Statistical Manual for Mental Disorders, 5th ed. (DSM-5; APA, 2013)*. Specifically, ADHD is frequently associated with functional deficits across social, familial and academic contexts (Pelham, 2005).

Children with ADHD experience high rates of comorbid internalizing symptoms such as feelings of anxiety and difficulties with mood (Pfiffner & McBurnett, 2006; Stringaris et al., 2009). Comorbid internalizing issues are more likely to lead to negative outcomes and higher levels of functional impairment (Becker et al., 2019). Negative parenting practices have been linked to the exacerbation of these issues (Kaiser et al., 2011; Pfiffner & McBurnett, 2006), whereas positive parenting practices have been found to serve as a protective factor, reducing the level of impairment experienced by children with ADHD (Dvorsky et al., 2016; Schei et al., 2015). There is some evidence that individual child- level strengths can facilitate resiliency (Dvorsky et al., 2016; McCrimmon et al., 2018; Ray et al., 2017). However, more research must be done to determine whether these strengths can mitigate functional impairment. Guided by the cumulative risk and transdiagnostic models (Achenbach, 1966; Rutter, 1981), the proposed study will investigate the influence of internalizing symptoms on levels of functional impairment for children with ADHD in a clinical sample. Child and parent strengths will be examined to identify moderating effects on the aforementioned constructs. Findings from this study will offer insight

regarding the role of internalizing symptoms on functional impairment for children in a referred sample. Additionally, this study has the potential to provide basis for creating specific strength-based interventions for children with ADHD and their caregivers that can be utilized in clinical settings.

ADHD

Attention Deficit Hyperactivity Disorder (ADHD) is defined as a persistent pattern of inattention and/ or hyperactivity-impulsivity that interferes with functioning and development (APA, 2013). Inattention can be described as difficulty sustaining attention, listening when being spoken to directly, following through with instructions, organizing tasks and activities, forgetfulness and distractibility. Hyperactivity/impulsivity is characterized as fidgeting, restlessness, excessive talking and interrupting or intruding on others. ADHD is a neurodevelopmental disorder, often manifesting early on in development. Thus, symptoms must be present before the age of 12 in order to receive a diagnosis (APA, 2013).

Under the umbrella of ADHD, individuals can be diagnosed with a predominately inattentive presentation, hyperactive/impulsive presentation, combined presentation and ADHD not otherwise specified or unspecified. ADHD is more commonly diagnosed in males than females at approximately a 2:1 ratio (APA, 2013). This disparity could be due referral bias and gender differences in the presentation of ADHD (Ohan & Visser, 2009). For example, girls are typically diagnosed with the inattentive presentation of ADHD, whereas boys tend to exhibit more externalizing symptoms (Gershon, 2002; Ohan & Visser, 2009).

Although there is no one clear cause for ADHD, researchers suggest it is often a result of gene-environment interactions (Thapar et al., 2013). ADHD is highly heritable disorder. As such, it is common for multiple members of the same family to exhibit symptoms associated with

ADHD (APA, 2013; Thapar et al., 2013). Other factors that have been associated with an increased likelihood of developing ADHD include premature birth, low birth weight and maternal nicotine use (Sciberras et al., 2017). In a minority of cases, symptoms can be influenced by poor diet or exposure to environmental toxins (APA, 2013).

ADHD is a common issue, as it is prevalent in 5.4% of youth in Ontario (Hauck et al., 2017). Furthermore, the percentage of ADHD diagnoses have been increasing in recent years (McMartin et al., 2014). Research by Hauck and colleagues (2017), suggests that children with ADHD are more likely to visit their general practitioner regarding mental health concerns. Similarly, children with ADHD tend to experience high levels of psychopathology (Pliszka, 2003; Thuele et al., 2012). This includes comorbidity with other neurodevelopmental disorders such as learning disorders or language and motor delays (APA, 2013). ADHD has been frequently associated with externalizing disorders such as conduct disorder and oppositional defiant disorder (Banaschewski et al., 2018). It has also been linked to internalizing issues such as anxiety and depression (Pfiffner & McBurnett, 2006). Individuals with ADHD are more likely to experience additional deficits such as low frustration tolerance, difficulty regulating emotions, poor executive functioning skills and risk-taking behaviours (Castagna et al., 2019). Given the high rate of comorbidity associated with ADHD, it is unsurprising that many children experience impairments in their social, academic, and family functioning (Pelham et al., 2005).

Theoretical Framework

This study will be conceptualized using both the cumulative risk and transdiagnostic models (Achenbach, 1966; Rutter, 1981).

The Cumulative Risk Model

The cumulative risk model suggests that psychological health is influenced by the number of risk factors that are present in an individual's life. Risk factors are often referred to as individual or environmental factors that increase the probability of developing undesirable outcomes (Appleyard et al., 2005). Some examples of potential risk factors are negative parenting practices, difficult temperament and low socioeconomic status (Evans et al., 2013). Individuals who are exposed to a high number of risk factors are more likely to experience negative outcomes. Whereas, individuals who are exposed to few risk factors, are more likely to be resilient to psychological distress. Cumulative risk is estimated by summing the quantity of risk factors present, regardless of the severity of the risk (Evans et al., 2013). Previous research has provided evidence that children who are exposed to multiple risk factors are more likely to experience developmental consequences (Rutter, 1981; Sameroff, 2006). For example, a study conducted by Appleyard and colleagues (2005) demonstrated that cumulative risk exposure in childhood (e.g., child maltreatment, family disruption) was associated with increased behavioural issues in adolescents. Although human beings can be successful at managing a small number of stressors, regardless of their severity, they tend to have difficulty processing and adapting to several life stressors simultaneously (Evans et al., 2013).

This study will utilize the cumulative risk model as a framework to understand the cumulative effect of family factors, individual characteristics, and comorbid psychological symptoms on level of impairment experienced by children with ADHD. In line with the cumulative risk model, it is expected that the higher number of risk factors that the child is exposed to (e.g. negative parenting, internalizing symptoms), the lower their level of functioning.

The Transdiagnostic Model

The transdiagnostic model proposes that psychological distress should be perceived dimensionally rather than categorically (Achenbach, 1966; Krueger & Eaton, 2015). In other words, it differs from the DSM-5 and the ICD 10, in that it considers underlying latent liabilities that may be contributing to multiple disorders (Krueger & Markon, 2006). This model operates under the assumption that due to these latent liabilities, comorbidity is the norm, rather than the exception (Krueger & Eaton, 2015; Krueger & Markon, 2006). Moreover, it is the manifestation of latent liabilities that results in specific disorders (Krueger & Eaton, 2015). There are several benefits of using a transdiagnostic lens to understand psychological disorders. Firstly, psychological symptoms are conceptualized on a spectrum. This provides a broader view of how psychological distress may be influencing an individual's functioning. It also provides an explanation for the co-occurrence of multiple disorders.

The internalizing-externalizing model is the most common and well researched transdiagnostic model of psychopathology (Eaton et al., 2015; Krueger & Markon, 2006). Internalizing and externalizing dimensions have differing latent liabilities, while also being highly correlated (Krueger & Markon, 2006). The internalizing dimension includes a general liability toward negative affect and has often been divided into sub-liabilities, fear, and distress, while the externalizing model has a general liability towards disinhibitory issues (Krueger & Markon, 2006; Achenbach, 1966; Krueger & Eaton, 2015). The internalizing dimension accounts for the comorbidity among depression, generalized anxiety disorder (GAD), dysthymia, panic disorder, social anxiety disorder, specific phobias and PTSD, among others. The externalizing dimension provides an insight to the liability that underlies substance abuse disorders, antisocial behaviour, behavioural issues and impulsivity related disorders (Krueger & Eaton, 2015). The internalizing-externalizing model can be advantageous in understanding how certain root psychological

factors contribute to the comorbidity of several disorders. Research suggests that the internalizing-externalizing model is more stable than the categorical model over time and across sociodemographic factors such as age, gender, ethnicity and sexual orientation (Eaton et al., 2012; Eaton et al., 2013; Eaton, 2014; Krueger et al., 2003).

ADHD is currently determined using a categorical approach, whereby individuals meet a certain criterion based on their symptoms (APA, 2013). The transdiagnostic approach to conceptualizing ADHD differs, in that it considers the underlying liabilities of ADHD, as well as viewing symptoms of ADHD on a dimension. In the literature, ADHD has been associated with both externalizing and neurodevelopmental spectrums (Carragher et al., 2014; Mikami et al., 2019; Castellanos-Ryan et al., 2014). Although research in this area is relatively recent, there is evidence that ADHD shares latent liabilities with neurodevelopmental disorders such as autism spectrum disorder (ASD) and other externalizing disorders such as conduct disorder and substance abuse issues in adulthood (Castellanos-Ryan et al., 2014; Mikami et al., 2019). This model can be helpful in providing insight into high rates of comorbidity that are often found in individuals with ADHD. Given that the externalizing and internalizing spectrums are highly correlated, it is unsurprising that many children with ADHD experience comorbid internalizing symptoms.

This study utilizes the transdiagnostic model, as it provides a basis for examining the influence of internalizing symptoms on functional impairment, regardless of having to meet criteria for a formal diagnosis. Examining symptoms dimensionally offers a more comprehensive view of the experiences of children with ADHD than the current categorical approach.

Literature Review

ADHD and Functional Impairment

Functional impairment has been conceptualized as the real-world consequences of a disorder (Becker, 2006). Functional impairment does not refer to specific symptoms, rather it refers to the individual's day-to-day level of functioning. While there is some evidence suggesting that a relationship exists between symptom severity and functional impairment, many studies have demonstrated that these factors are not completely overlapping (Barkley et al., 2006; Healey et al., 2010). Thus, symptoms cannot be used as a measurement of impairment (Willcut et al., 2012).

There is consensus in the literature that the functional deficits experienced by children with ADHD go beyond the core symptoms of the disorder (Barkely, 2002; Nijmeijer et al., 2008; Sasser et al., 2017). Many children with ADHD experience issues with academic, social and family functioning (Meltzer et al., 2003; Pelham et al., 2005). Some examples include difficulty completing schoolwork, low academic achievement, poor social and communication skills, lack of friendships and issues with family cohesion (Becker et al., 2006; DuPaul, 2007; Escobar et al., 2005; Klimkeit et al., 2006; Wu & Gau, 2013). Functional impairments are one of the primary reasons for clinical referral (Becker et al., 2011). As such, it is clear that these deficits are contributing a significant amount of distress to children and their families (Barkley, 2006).

In order to effectively treat children with ADHD in a clinical setting, it is essential to gain a better understanding of why children experience various levels of functional impairment, despite sharing the same diagnosis of ADHD. This study will examine the role of comorbid internalizing symptoms and various risk and protective factors that may be influencing functional impairment across several domains.

ADHD and Internalizing Symptoms

Internalizing symptoms encompass a variety of difficult emotions, thoughts and beliefs that are directed inward by the individual (Merikangas et al., 2010; Pfiffner & McBurnett, 2006). Internalizing issues can be experienced through emotional distress, frustration, cognitive distortions, feelings anxiousness or sadness, self-harm, and somatization among others (Merikangas et al., 2010). Internalizing problems in children have often been associated with sleep difficulties, peer problems, social isolation, low self-esteem, low academic achievement, higher rates of suicidality and family conflict (Becker et al., 2012; Breaux et al., 2020; Karustis et al., 2000; Loe & Feldman, 2007; Pfiffner & McBurnett, 2006). As expected by the transdiagnostic model, previous literature suggests that children with ADHD experience a high rate of comorbid internalizing issues (Connor & Ford, 2012; Melegari et al., 2018). As a result, it is important to consider how these symptoms may affect the child's level of functioning. The literature review below will focus primarily on the comorbidity between ADHD and internalizing symptoms. Despite our focus on a transdiagnostic approach, much of the literature is centered around specific disorders. As such, this literature review will focus on anxiety and mood disorders, as they are the most prevalent and frequently researched (Melegari et al., 2018).

ADHD and Comorbid Anxiety

It is predicted that 25-50% of children with ADHD also experience symptoms of anxiety (Jarrett & Ollendick 2008). Children with the ADHD combined presentation are 6.5 times more likely to develop GAD, compared to those without ADHD (Melegari et al., 2018; Willcut et al., 2012). Similarly, longitudinal research suggests that ADHD is a risk factor for developing an anxiety disorder later in life (Tai et al., 2013; Weiss et al., 2011). The combination of these disorders is likely to contribute to poor social skills, academic difficulties and poorer overall health (Bishop et al., 2019). A study by Castagna and colleagues (2019), suggests that children

who are diagnosed with both anxiety and ADHD have additional issues with executive functioning. As a result, they have added difficulty with working memory, impulsivity and the ability to think in a flexible manner (Castagna et al., 2019).

ADHD and Comorbid Mood Disorders

There is also a link between ADHD and mood disorders. Specifically, children with ADHD have a higher likelihood of developing major depressive disorder (Connor & Ford, 2012; Stringaris et al., 2009). It has been found that symptoms of depression in children with ADHD are often as severe as those who experience depression as a primary concern (Connor & Ford, 2012). Emotion regulation has been utilized to understand the underlying mechanisms that increase the probability of depression for individuals with ADHD. Difficulties with emotion regulation mediate the relationship between ADHD and depression (Seymour et al., 2012). Emotion regulation is a skill that is often lacking in children with ADHD. These findings provide a potential explanation for why many children with ADHD develop comorbid mood disorders, self-injurious behaviours and low frustration tolerance (Connor & Ford, 2012).

Much like the comorbidity between ADHD and anxiety, the combination of ADHD and mood disorders have been found to create greater impairment within the individual (Coutinho et al., 2018). Children with both ADHD and depression tend to present with social withdrawal, irritability, aggression, social difficulties, low self-esteem and academic underperformance (Coutinho et al., 2018).

Implications of Comorbidity

It has been found that individuals with ADHD and internalizing symptoms often experience higher levels of functional impairment compared to their counterparts with exclusively symptoms of ADHD (Bishop et al., 2019). These findings highlight the importance

of investigating the impacts of comorbidity on child development. Moreover, there is some evidence suggesting that internalizing symptoms can change the expression of ADHD. For example, comorbid ADHD and anxiety has been associated with further inattentiveness, issues with working memory and less impulsivity (Melegari et al., 2018). Understanding the comorbidity between several disorders can help clinicians better comprehend the impact and developmental trajectories of the disorders as well as formulate appropriate treatment plans (Caye et al., 2016; Connor & Ford, 2012).

Risk and Protective Factors

There are several factors that are likely to influence the relationship between internalizing symptoms and level of functional impairment in children with ADHD. As mentioned previously, risk factors increase the chances of undesirable outcomes (Appleyard et al., 2005), whereas protective factors buffer against risk and are expected to result in resiliency (Climie & Mastoras, 2015). Examining risk and protective factors provides greater insight into the trajectories of ADHD. Furthermore, this perspective emphasizes factors that contribute to adjustment and well-being, instead of solely problematic symptoms (Climie et al., 2013). Having a more balanced viewpoint provides opportunity to create strength-based interventions that may facilitate well-being and decrease functional impairment (Climie & Mastoras, 2015). This study will be focusing on family and child factors in relation to functional outcomes. Parenting practices have been found to influence the manifestation of functional impairment (Pressman et al., 2006), while certain child characteristics have been found to mitigate risk for children with ADHD (Dvorsky et al., 2016; McCrimmon et al., 2018).

Family Factors

Negative Parenting Practices. In the literature, negative parenting practices often refers to authoritarian parenting, inconsistent discipline, negative parental control, harsh punishments and unresponsive parenting (Ellis & Nigg, 2009; McRae et al., 2020). These parenting practices have commonly been associated with poor outcomes for children, especially those with ADHD (Kaiser et al., 2011). For example, parents who use inconsistent discipline are more likely to have children who meet the criteria of an ADHD diagnosis, regardless of comorbid behavioural issues such as conduct or oppositional defiant disorder (Ellis & Nigg, 2009). Additionally, negative parenting practices appear to play a role in the development of comorbid disorders. Children who are exposed to negative parenting practices such as harsh, disengaged or inconsistent parenting, are more likely to develop further externalizing symptoms and internalizing symptoms (Anuola & Nurmi, 2005; Deault, 2010; Kaiser et al., 2011; McCrae et al., 2020; Piffner & McBurnett, 2006).

Not only are negative parenting practices linked to additional symptoms, they are also associated with lower levels of child functioning. A study by Kaiser et al. (2011) demonstrated that parenting practices have a significant impact on the child's social skills regardless of the severity of their ADHD symptoms. Likewise, children who experience negative parenting are more likely to demonstrate aggressive behaviours towards peers (Kaiser et al., 2011). As such, it is expected that they will experience additional peer rejection and social difficulties (Fenesy et al., 2019).

Parenting Stress. Parenting stress is a strong predictor of negative parenting and child outcomes (Hawes et al., 2013; McCrae et al., 2020). Previous literature has described a bi-directional relationship between parenting stress and symptoms of ADHD. More specifically, parents of children with ADHD are more likely to experience high levels of parenting stress in

comparison to parents of children without ADHD (Healey et al., 2010; Theule et al., 2012). Externalizing and internalizing symptoms in children with ADHD have also been found to be strong predictors of parenting stress (Podolski & Nigg, 2001; Theule et al., 2012). The more stress that the parent experiences, the more likely they are to engage in negative parenting practices and in turn, influence their child's outcomes (Anuola & Nurmi, 2005). The bi-directional relationship between child symptoms and parenting practices is a cyclical pattern that must be considered when thinking about case conceptualization and working with families in a clinical setting.

Parental Mental Health. Previous research has demonstrated a relationship between parental mental health and parenting practices. Given that ADHD is highly heritable, it is common to see traits of ADHD in parents, as well as their children (Faraone et al., 2005). Parenting with ADHD can become more of a challenge. In fact, many parents with ADHD tend to exhibit negative parenting practices such as difficulty coping with their child's emotions, inconsistent parenting and further issues with problem solving (Johnston et al., 2012; Murray & Johnston, 2006). Moreover, parental ADHD has been identified as a risk factor for child outcomes (Freitag et al., 2012). A longitudinal study conducted by Wustner et al. (2019), found that parents who had mental health problems were more likely to have children with higher rates of ADHD symptoms and increased levels of severity. However, an improvement in family climate was correlated with a decrease in ADHD symptoms over time (Wustner et al., 2019). Taken together, these findings demonstrate that parenting practices and family climate can play a large role in the presentation of ADHD symptoms and functional impairment.

Positive Parenting. Positive parenting is described as authoritative, warm, supportive, consistent and responsive to the child's needs (McCrae et al., 2020). Positive parenting practices

have been found to increase resilience in children with ADHD (Arsenio & Ramos-Marcuse, 2014; Dvorsky & Langberg, 2016; Schei et al., 2015). For example, parents who engage in positive parenting are more likely to have children with less severe symptoms of ADHD and fewer internalizing and externalizing behaviours (Healey et al., 2010; McRae et al., 2020). Positive parenting is associated with overall wellbeing, less aggression and defiance, better problem solving and emotion regulation skills (Arsenio & Ramos-Marcuse, 2014; Demaray et al., 2005; Mastoras et al., 2018). Additionally, research demonstrates that positive parenting predicts stronger social functioning in children with ADHD (Kaiser et al., 2011). It is suggested that these practices are particularly relevant to developmental outcomes during early childhood (Dvorsky & Langberg, 2016). By understanding the role of positive parenting practices, clinicians will be better able to create strength-based treatment plans that may highlight or facilitate these skills.

Child Factors

While it is clear that parenting practices influence child outcomes, there is less research addressing individual characteristics of the child in relation to their level of functioning.

Child Protective Factors. Much of the literature on individual characteristics and resiliency for children with ADHD focuses on social functioning (Dvorsky & Langberg, 2016; McCrimmon et al., 2018; Ray et al., 2017). In fact, perceived peer acceptance, the ability to foster positive peer relationships, participation in social activities and the ability to share emotional intimacy are protective factors that buffer against functional impairment (Dvorsky & Langberg, 2016; McCrimmon et al., 2018; Ray et al., 2017). A study conducted by Dvorsky and Langberg (2016), demonstrated that children with ADHD who felt accepted by their peers were more likely to have higher grades in school and reduced symptoms of inattention and depression.

Feelings of self-efficacy, autonomy, competence and positive self-perception were also found to be protective factors for children with ADHD (Dvorsky & Langberg, 2016; Hechman, 1991; McCrimmon et al., 2018). Moreover, a positive view of oneself has been linked to the ability to adapt to life stressors and in turn, protect against the development of internalizing symptoms such as depression (Dvorsky & Langberg, 2016). Finally, a study conducted by McCrimmon et al. (2018), suggested that interventions for children with ADHD should include facilitating emotional intelligence (EI), as EI may contribute to building resilience. Examples of EI include self-awareness, decision making and communication skills.

Objectives of the Current Study

Given that ADHD is one of the most prevalent psychological disorders among children, it is essential to explore the complexities of the disorder and how it affects their day-to-day lives (Sciberras et al., 2017). Recent literature on ADHD has focused on functional impairment (Bishop et al., 2019; Deault, 2010; Sasser et al., 2017). Research in this area has become increasingly relevant, as children with ADHD often experience additional challenges that are not directly associated to their diagnosis (Healey et al., 2010). For example, children with ADHD tend to experience functional impairment in several areas of their lives including issues with social, familial and academic functioning (Pelham et al., 2005). Furthermore, there is a high rate of comorbidity among children with ADHD. In line with the transdiagnostic model, children report experiencing further internalizing and externalizing issues. The vast body of research in this area demonstrates that comorbid conditions are likely to pose a barrier to positive outcomes (Becker et al., 2015; Breaux et al., 2020; Ter-Stepanian et al., 2019).

Decades of research has focused on the detrimental impact of family stress and negative parenting for children with ADHD (Kaiser et al., 2011; McCrae et al., 2020). Contrarily, there is

evidence suggesting that positive parenting practices can facilitate strengths and serve as a protective factor against impairment (Healey et al., 2010; McCrae et al., 2020). There is some research demonstrating that individual strengths aid the development of resilience in children with ADHD, however studies in this area have been limited (McCrimmon et al., 2018).

While numerous studies have considered these variables, no study has investigated them together in this context. Guided by the cumulative risk model and transdiagnostic models, this study aims to gain a more comprehensive understanding of functional impairment in children with ADHD in a clinical sample, particularly, to understand the effects of comorbid internalizing symptoms on levels of impairment. This study adopts a strength-based perspective by examining individual and family characteristics that have the potential to serve as protective factors, mitigating the risk of functional impairment. Examining protective factors provides a perspective that is less frequently discussed in the literature and will help inform strength-based interventions.

Research Questions

The proposed research will explore the following questions:

- 1) Is there a relationship between internalizing symptoms and functional impairment for children with ADHD?
- 2) Do family strengths and child strengths moderate this relationship?

Methods

This study employs a cross-sectional research design to examine the relationship between internalizing symptoms and impairment in school-aged children with ADHD in a clinical sample. Additionally, the current study adopts a strength-based perspective by attempting to

understand whether family or child strengths can moderate this relationship. This study was approved by the University of Ottawa Research Ethics Board.

Participants

Data derive from a pre-existing database of measures administered by Crossroads Children's Mental Health Centre (CCMHC). CCMHC is a not for profit, urban mental health centre located in Ottawa, Ontario which provides services at no cost to clients. Clients who utilize CCMHC services are self-referred or referred from various community agencies such as Children's Aid Society, school-based mental health services, hospitals, the Arson Prevention Program for Children or the police. CCMHC provides a diverse range of services for children and families. Children who utilize these services are often identified by their parents and or their teachers as experiencing emotional, behavioural, or social difficulties.

The sample for this study included 250 participants whose parent or guardian reported a diagnosis of ADHD determined by a professional in the community. Participants whose parents did not report a diagnosis of ADHD and do not meet the cut off score of 7 out of 10 on the hyperactivity/impulsivity scale of the SDQ have been excluded from the analysis. The original sample was 250 participants. After screening for inclusion criteria, the current sample is 209 children receiving mental health services between the ages of 5 and 11 ($M = 8.15$ years, $SD = 1.68$) with an ADHD diagnosis. The majority of the sample was male (75%), Caucasian (85.6%) and spoke English as their first language (91.4%). CCMHC tends to serve low-income families. 21% of the sample had a total family income of less than \$60,000 and were considered low income ($N = 44$). It should be noted that approximately half of the sample did not disclose their income. However, the 2019-2020 annual report from CCMHC suggests that 28% of families who utilize their services have a combined family income of less than \$30,000, 16% had a total

family income of between \$30,000 and \$59,000. (CCMHC, 2020, p.14). Although these statistics do not reflect the sample directly, they are indicative of clients at CCMHC. The most recent census conducted in Ottawa in 2016, suggests that the median family income is meaningfully higher than the total family income seen at CCMHC (Ottawa, 2016).

Most participants were diagnosed with the combined presentation of ADHD (90.9%, $N=190$) and parents reported that 47% of the sample had at least one comorbid disorder ($N= 98$). Approximately 50% of the sample was taking medication at the time that data was being collected.

Data Collection and Measures

This study applies secondary data collected by CCMHC. Specifically, the data used in this study have been gathered from clinicians and parents between April 2017 and January 2020. All participants partake in an intake interview and are administered a battery of scales upon registration with CCMHC. This consists of basic demographic data, information regarding the presenting problem, the Child and Adolescent and Childs Needs and Strength Questionnaire (CANS) and the SDQ. The SDQ is completed by the parent and the CANS is completed by the clinician. Diagnostic information is collected by CCMHC through two pathways. During the initial intake interview at CCMHC, clinicians asked parents whether their child had been diagnosed by a professional in the community. This diagnosis was later supported using the cut off score of 7 out of 10 on the hyperactivity/impulsivity scale of the SDQ (Algorta et al., 2016; Cuffe et al., 2009). Children who did not meet both criteria were excluded from the study by researchers. Measures used in this study are included in Appendix A.

Strengths and Difficulties Questionnaire

The SDQ is an internationally used, brief screening measure assessing psychosocial difficulties and strengths in children and adolescents aged 4-16 years old (Goodman, 1997; Stone et al., 2010). It is a multi-informant questionnaire that can be completed by teachers, parents or the child themselves if they are above the age of 11 (Stone et al., 2010). This study utilizes solely the parent reported version of the SDQ. Although it would be advantageous to use multiple informants, the parent version of the SDQ has been found to have acceptable internal consistency and predictive value regarding the child's wellbeing over time ($\alpha = 0.66$; Biel et al., 2015; Becker et al., 2015; van Widenfelt et al., 2003). Moreover, parents are likely to have a good understanding how their child is impacted across different domains.

The SDQ consists of 25-items divided into 5 subscales including emotional symptoms (e.g., Often complains of headaches), conduct problems (e.g., Often fights with other children), hyperactivity/inattention (e.g., Easily distracted, concentration wanders), peer problems (e.g., Rather solitary, tends to play alone), and prosocial behaviour (e.g., Considerate of other people's feelings; Goodman, 1997). The SDQ is scored on a 3- point Likert scale ranging from 0 "not true" to 2 "certainly true". A total difficulty score is calculated by adding the sum of all scores excluding the prosocial subscale (Stone et al., 2010). The impact supplement score is used to measure the overall impact of psychosocial difficulties on the child's life. The parent rated version of the SDQ includes 5 items that are scored on a Likert scale ranging from 0 "Not at all", 0 "Only a little", 1 "A medium amount" and 2 "A great deal" with a maximum overall score of 10. Items focus on the child's overall distress, interference with home life, friendships, classroom learning and home activities (Stone et al., 2010). The impact score on the SDQ was intended to measure functional impairment and several studies have used this score to understand level of functioning in children (Biel et al., 2015; Goodman, 2001).

The SDQ has satisfactory reliability and validity across samples from various countries including Canada (Aitken et al., 2015; Goodman 2001; Marquis & Flynn, 2009; Yao et al., 2009). There is evidence of internal consistency within the subscales ($\alpha=0.80-0.95$) and the total impact score ($\alpha=0.80$; Aitken et al., 2015; Goodman, 2001). The interrater agreement is above average. The test-retest reliability for the total difficulties scale with an eight-week interval is satisfactory ($r=0.71$), as is the test-retest reliability for the emotional problems scale ($r=0.70$; Goodman, 2001; Yao et al., 2009). The SDQ has demonstrated concurrent validity with the Rutter Questionnaire and the Achenbach Child Behaviour Checklist (CBCL; Goodman & Scott, 1999; Stone et al., 2010). Construct validity remains the same regardless of gender, age or ethnicity (Stone et al., 2015).

The current study utilizes the emotional problems subscale to examine internalizing behaviour. The impact supplement score is used to examine the child's level of functional impairment across multiple areas and is the outcome variable for this study. Furthermore, the hyperactivity/impulsivity scale is used to strengthen the reliability of the child's existing ADHD diagnosis. The hyperactivity/impulsivity scale consists of two items relating to hyperactivity, two items assessing inattention and one item pertaining to impulsivity. Previous studies have found that the hyperactivity/impulsivity sub score on the parent version of the SDQ is a statistically valid tool for differentiating individuals with ADHD from those without, irrespective of age or gender (Algorta et al., 2016; Hall et. Al., 2019; Rimvall et al., 2014). This remains true regardless of whether the individual has comorbid disorders such as ODD or other externalizing symptoms (Algorta et al., 2016). As such, the SDQ is able to discriminate between ADHD and other psychological disorders and can be justifiably used to confirm existing diagnoses of ADHD in this sample.

The Child and Adolescent Needs and Strengths Questionnaire

The CANS assessment is designed to evaluate the needs and strengths of children and families across multiple areas. It is a communimetric tool, meaning that it can be adapted to fit the needs of the specific agency, while remaining valid and reliable (Lyons, 2009). Agencies are able to pick which items they want to include in their CANS assessment, based on their setting, treatment options and utility for clinical decision making (Anderson et al., 2003). In this study, a short form version of the CANS was used. This version contains 28 items that address the needs of CCMHC directly (Anderson et al., 2003). Moreover, it highly resembles the CANS-MH, a measure designed to be administered in community mental health agencies (Anderson et al., 2003). The CANS is intended to be used in a clinical setting to determine level of action required on behalf of the clinician and guide treatment options (Anderson et al., 2003). However, the CANS-MH is also a reliable measure of psychosocial needs and strengths when used by researchers (Lyons et al., 2000). In fact, archival reviews have been found to be valid and reliable when investigating characteristics of children with mental health difficulties (Burchard & Schaefer, 1992). The CANS has demonstrated evidence of reliability (0.90), face validity and construct validity (Lyons, 2004).

The CANS is completed by clinicians based on information provided by caregivers during the interview. When measurement is approached using a communication perspective, interrater reliability is essential (Lyons et al., 2000). As such, clinicians are trained in administering and interpreting the CANS correctly. The questionnaire is scored on a 4-point Likert scale. For parenting strengths, “0” represents no evidence, “1” represents watch/prevent, “2” represents act and “3” represents a need for immediate or intensive action. For child strengths, “0” represents centerpiece, “1” represents useful, “2” represents identified and “3”

represents not yet identified. In both cases, the lower the number, the more strengths the child or parents possess.

Prior to this research, a factor analysis was conducted on the 28 items of the CANS as a part of a different project. The purpose of the factor analysis was to create composite variables that accurately reflect parenting and child strengths. Results suggested that the 28 items loaded into four main domains; parenting (problem solving, parental responsiveness, discipline skills, impact of one's own behaviour on child, parent/child relationship, knowledge of child needs, family stress, ability to communicate), externalizing symptoms (impulse control, school discipline, danger to others, aggression towards objects and oppositional behaviour), child strengths (adaptability to change, self-expression, positive peer relationships and family) and internalizing symptoms (anxiety, self-injurious behaviour, mood disturbance, suicide risk).

These composite variables were adjusted to reflect how strongly they fit together conceptually and statistically. In this study, the "family" item was dropped from child strengths variable, as it did not fit what we were trying to measure conceptually. Particularly, we were interested in the intra-individual aspects of child strengths. The "family stress" and "ability to communicate" items were removed from the parenting strengths variable, as doing so increased the reliability of the variable.

Child strengths, including adaptability to change, self-expression and positive peer relationships and parenting strengths, encompassing problem solving, parental responsiveness, discipline skills, impact of one's own behaviour on child, parent/child relationship, knowledge of child needs will be utilized in this study. Cronbach's alpha for the three child strengths items and the six parenting strengths items were 0.65 and 0.88 respectively.

Data Analysis

Descriptive statistical analyses were conducted using SPSS to better understand the characteristics of this sample. The purpose of this analysis was to investigate the relationship between internalizing symptoms and functional impairment for children with ADHD. Furthermore, we aimed to understand whether child strengths and parenting strengths have moderating effects on this relationship. In other words, whether these strengths influence the magnitude of the child's level of functional impairment. In order to examine the moderating effects of child strengths and parenting strengths, ordinary least squares regression models were tested using the PROCESS macro for SPSS (v3.5; Hayes, 2018; Hayes & Rockwood, 2017). This tool was selected, as it automatically centers the independent variables, creates interactions terms, and produces simple slopes for continuous moderator variables (Saidi & Branscum, 2019). In this case, simple slopes were examined at the mean and ± 1 *SD* for significant moderators. Internalizing symptoms will be used as an independent variable, parenting and child strengths are the moderating variables and overall impairment is the dependent variable. Significance is determined at the 0.05 probability level (Lin et al., 2020). The analysis includes an examination of two models: Internalizing symptoms, child strengths and functional impairment and internalizing symptoms, parenting strengths and functional impairment.

Results

Preliminary Analyses.

Table 1, included below demonstrates the means, standard deviations, ranges, and correlations between variables. The level of functional impairment experienced by participants was positively significantly correlated with their internalizing symptoms ($r = .25$) and need for child strengths ($r = .23$). Results indicate a weak positive correlation between child and parenting

strengths ($r = .17$). It should be noted that low scales indicate no clinical concern, whereas, rising scores indicate potential clinical issues.

Table 1

Descriptive Statistics and Correlations

Variable	<i>n</i>	M	SD	Min	Max	1	2	3	4
1.Internalizing Symptoms	209	5.24	2.69	0	10	--	0.25**	0.15*	-0.02
2.Functional Impairment	209	6.34	2.37	0	10		--	0.23**	0.11
3.Child Strengths	209	5.54	1.71	0	9			--	0.17*
4.Parenting Strengths	209	5.83	2.91	0	18				--

* $p < .05$ ** $p < .01$.

Model 1: Internalizing Symptoms and Parenting Strengths.

We first investigated whether there was a relationship between internalizing symptoms and level of functional impairment experienced by children with ADHD and if parenting strengths moderate this relationship. Results suggests that in this model, internalizing symptoms significantly influenced functional impairment ($\beta = 0.22$, $t = 3.67$, $p < .01$). Parenting strengths was nearing significance as a predictor for functional impairment. ($\beta = 0.10$, $t = 1.89$, $p = .059$). There was no significant moderation effect ($\beta = -0.02$, $t = -1.01$, $p = .30$). Despite an insignificant moderation effect, this model was significant ($R^2 = 0.08$, $F(3,205) = 5.98$ $p < .01$).

Model 2: Internalizing Symptoms and Child Strengths.

We next investigated whether there was a relationship between internalizing symptoms and level of functional impairment experienced by children with ADHD and whether child

strengths moderate this relationship. Results suggested that internalizing symptoms significantly influenced functional impairment ($\beta = 0.19, t = 3.26, p = .001$). Child strengths was a significant predictor of functional impairment ($\beta = 0.27, t = 2.96, p = .003$). There was a significant moderation effect ($\beta = 0.08, t = 2.19, p = .03$). This model was significant ($R^2 = 0.12, F(3,205) = 9.39, p < 0.01$). Table 2 below, provides a visual representation of results.

Table 2.

Moderation Analysis

Mod 1: Variable	β	t	p	LLCI	ULCI
Internalizing Symptoms	0.22	3.67	.0000	6.02	6.64
Parent Strengths	0.10	1.89	.059	-0.00	0.21
Interaction	-0.02	1.01	.30	-0.06	0.21
Mod 2: Variable	β	t	p	LLCI	ULCI
Internalizing Symptoms	0.19	3.26	.001	0.07	0.30
Child Strengths	0.27	2.96	.003	0.09	0.45
Interaction	0.08	2.19	.03	0.00	0.15

To better interpret the nature of the moderated relationship between internalizing symptoms and functional impairment, simple slopes were examined at the mean at ± 1 *SD* for child strengths. This means that participants were separated in to three categories: Those who scored below the mean (low internalizing symptoms), around the mean (moderate internalizing symptoms) and above the mean (high internalizing symptoms). Results suggested that child strengths have an effect when internalizing symptoms are moderate ($\beta = 0.19, t = 3.26, p < .01$) and high ($\beta = 0.32, t = 3.89, p < .01$). Figure 1 and Figure 2, included in Appendix B, depicts the plotted simple slopes for both model 1 and model 2 respectively.

Discussion

The purpose of this study was to investigate the relationship between internalizing symptoms and functional impairment in children with ADHD. Additionally, we wanted to explore whether child strengths and parenting strengths influence the impacts of internalizing symptoms, thus reducing levels of functional impairment. Results suggest that that the higher the level of internalizing symptoms, the more functional impairment the child is likely to experience. In other words, children who demonstrated high levels of internalizing symptoms exhibited more severe issues with social, classroom, leisure and family functioning. Results from this study are in accordance with current literature suggesting that children with ADHD who have internalizing comorbidities experience higher levels of functional impairment (Bishop et al., 2019).

In this sample, parenting strengths did not moderate the association between internalizing symptoms and functional impairment. Therefore, parenting practices, whether positive or negative did not have a significant effect on the association between internalizing symptoms and children's functioning. The relationship between parenting strengths and functional impairment was nearing significance, meaning that parenting practices have a marginal impact on functioning, however the impact does not differ based on the level of internalizing symptoms. Based on the existing literature, it is surprising that parenting strengths did not play a more prominent role in contributing to both the child's level of functioning and influencing the association between the independent and dependent variables. For example, there is a clear consensus in the literature that negative parenting practices often lead to issues in children's functioning across several domains (Kaiser et al., 2011; Wustner et al., 2019). Alternatively, positive parenting has been associated with children's resilience and better social functioning (Dvorsky & Langberg, 2016; McRae et al., 2020). There are several reasons that this mild

discrepancy between existing literature and our current results could have occurred. As previously mentioned, data in this study are collected in an intake session upon meeting the family for the first time. It is possible that clinicians have not had enough time with the family to get an accurate impression of the parents' skills. In fact, the mean for parenting strengths is quite low. As mentioned previously, low scores indicate less of a clinical concern. Given the sample, it would be expected that the baseline clinical concern or need for parenting and child strengths would be high. Parents in this sample may have high levels of parenting strengths. Alternatively, there could be an issue with clinicians' evaluation of parenting strengths. It may also be interesting to investigate whether timing of the administered measures influences the results of this study. For instance, it is possible that clinicians are able to better assess parenting skills after a few sessions of meeting the family and observing their interactions. Many families seek support from CCMHC due to concerns relating to their child. Parents may find it easier to communicate about their child's difficulties and strengths, rather than their own. Previous literature examining parenting skills use primarily self-report measures and observational methods (Deault et al., 2010; Kaiser et al., 2011; Park et al., 2012). Therefore, it is possible that the difference in measurement yields varying results.

Child strengths was a significant moderator in the relationship between internalizing symptoms and functional impairment. Follow up analyses indicate that child strengths exert an increasing influence on functional impairment as internalizing symptoms become moderate and high. Specifically, children who have a high level of strengths, experience less overall impairment, despite having high internalizing symptoms. Alternatively, children who demonstrate low level of strengths, are more likely to experience functional impairment across several domains. These results indicate that child-level strengths are able to protect against

functional impairment and should be considered when treating the individual. Results are in accordance with previous research that suggests that personal strengths such as emotional intelligence, ability to adapt to stressors and peer acceptance can facilitate resilience (Dvorsky & Langberg., 2016; McCrimmon et al., 2018; Ray et al., 2017). It is important to note that results from this study cannot be generalized, as data is collected from a clinical sample. Families who seek services from CCMHC are more likely to be experiencing high levels of impairment and additional comorbidities. Although these results are not representative of children with ADHD in the general population, they can be helpful in understanding the experiences of children and their families who seek professional services. Although these results are directly relevant to this population, it could be speculated that results would be similar for children who do not have ADHD, as parenting and child strengths may be helpful for all children, not solely those with a specific diagnosis.

Contributions to Theory

The current study was conceptualized using the transdiagnostic model and the cumulative risk model (Achenbach, 1966; Rutter, 1981). The transdiagnostic model was beneficial in framing research questions and understanding both ADHD and internalizing issues dimensionally. Utilizing this model proved to be a valuable way of examining children's experiences in a broader way. Specifically, this study encompassed the experiences of children with internalizing symptoms, regardless of whether they met criteria for a specific disorder such as anxiety or depression.

Results from this study suggests that the more internalizing symptoms a child experiences, the more likely they are to report functional impairment. This pattern can be understood through the cumulative risk model which suggests the more risk that the child is

exposed to, the more likely they are to have undesirable outcomes (Appleyard et al., 2005). In this case, risk can be conceptualized as symptoms and challenges associated with having ADHD and further internalizing symptoms. Results from this study add to the existing body of literature supporting the cumulative risk model. It should be noted that child strengths significantly moderated the relationship between internalizing symptoms and functional impairment.

Although risk is often associated with outcomes, results from this study emphasizes that there are protective factors that can reduce the impact of cumulative risk (Masten & Powell, 2003, p.10)

Contributions to the Literature

Results from this study contribute to the current body of literature on functional impairment and ADHD in children. As previously mentioned, the finding that children with internalizing symptoms experience higher levels of functional impairment supports existing evidence regarding ADHD and comorbidities (Bishop et al., 2019; Melegari et al., 2018).

The result demonstrating that child strengths moderate the relationship between internalizing symptoms and functional impairment, adds to the current literature suggesting that child-level strengths can be a protective factor for children with ADHD (McCrimmon et al., 2018). That being said, child strengths are often conceptualized differently depending on the study. For example, some studies have considered variables such as peer relationships, emotional intelligence, and self-perceptions as child strengths (Dvorsky & Langberg., 2016; McCrimmon et al., 2018; Ray et al., 2017), whereas this study focuses on positive peer relationships, self-expression, and adaptability to change. Past literature in combination with the results of this study demonstrate that regardless of how child-level strengths are conceptualized, there is growing evidence that they have a protective value for children with ADHD. As this area of

research is relatively small, future research should consider continuing to investigate ADHD from a strength-based perspective.

As mentioned above, nearing significant results concerning parenting strengths contradicts literature on parenting skills and ADHD, even though parenting strengths are defined similarly across studies (Kaiser et al., 2011; McRae et al., 2020). While there are several speculations regarding this discrepancy, it should be acknowledged that clinician rated parenting skills is a perspective that is less frequently seen in the literature. As such, it might be worth exploring clinicians' viewpoints further to investigate whether it has clinical utility.

Given that data from this study derive from a community mental health centre, results are representative of families seeking support. Children in this sample have several comorbidities, as typically seen in children with ADHD and family income is congruent with the norms of a not-for-profit organization (Banaschewski et al., 2018; Pfiffner & McBurnett, 2006). It is important to understand the needs of families so that they can be better served and understood in clinical settings.

Contributions to Clinical Practice

Functional impairment is one of the primary reasons that families seek mental health support (Becker et al., 2011). The current study provides insight into the experiences of children with ADHD and factors that impact their day-to-day lives, beyond the core symptoms of ADHD. Much of the research in this area has focused on the challenges faced by children with ADHD and their families. This study provides a more balanced perspective by examining both the challenges that children face, along with the potential strengths that can play a role in their outcomes. Understanding the child's experience from this perspective can help clinicians, teachers and parents shift their attention to seeking opportunities for growth within the child and

nurturing their strengths. Additionally, results from this study highlight the importance of conceptualizing a presenting issue from a strength-based lens and utilizing strength-based interventions. Previous research suggests that children with ADHD in a classroom setting who learn how to identify and utilize their strengths, are more likely to experience enhanced engagement, sense of self-worth and motivation (Goldstein et al., 2013). Helping teachers, parents and clinicians understand both the deficits associated with ADHD and the strengths of the child can promote resilience and an overall sense of wellbeing (Climie & Mastoras, 2015). This perspective supports the philosophy of CCMHC and their emphasis on collaborative and strength-based approaches. Results from this study reflect the experiences of children at CCMHC and should be considered when creating treatment plans at CCMHC or similar clinical settings.

Limitations of the Study

This research was done in the context of a community agency. There are some inherent limitations attached with conducting research in this setting. This study utilized secondary data that had already been collected as a part of the intake process at CCMHC. Accordingly, researchers did not have autonomy over measures used or the data collection process. Clinicians were collecting data for clinical, not research purposes. As such, there was less of an emphasis on a precise interview and data collection process. It would have been beneficial to have a rigorous interview with the family and more thorough measures. For example, rather than relying on a parent reported diagnosis of ADHD and ratings on the SDQ, researchers could have also conducted their own assessment of ADHD, which is common in most ADHD research (Fenesy et al., 2019).

Variables in this study are quite broad. Researchers were unable to separate scores on the four items of functional impairment (social, family, leisure, classroom). It may have been interesting to see if children experience more functional impairment in certain domains rather than others. Items in the SDQ and the CANS measuring peer relationships were worded similarly and were included in both child strengths and functional impairment variables. Having peer relationships accounted for in the moderator and outcome variables may have influenced the results due to shared variance. Shared variance may have resulted in some relationships not being detected. Additionally, there are some disadvantages of using the same informants (i.e., parents) to measure both the independent and dependent variables in this study. Any bias present in the rating of internalizing symptoms, will also be present when rating functional impairment. This could account for an inflated correlation between internalizing symptoms and functional impairment. As mentioned previously, functional impairment includes classroom functioning. Information that parents receive regarding their child's functioning at school is likely to be communicated by the teacher, adding another layer of interpretation, potentially reducing the accuracy of that item.

Strengths of the Study

Alongside the limitations of around working with data collected for clinical purposes by a community agency, there are also several advantages. Firstly, this study is situated in a real-world context and is representative of families who are seeking support. In other words, this study has ecological validity. Utilizing data from a community agency allowed us to understand individuals in a clinical setting who may have lower SES, more comorbidities and complex challenges. This is important, as it is common for children with ADHD to experience several comorbid symptoms. Additionally, it allows us to better understand the heterogeneous nature of

ADHD and cumulative risk (Pelham et al., 2005; Rutter, 1981). This sample is different than what would typically be seen in data collected in a University setting, as these samples are often more controlled and typically reflect a high SES population. Using secondary data allows for a large sample size, increasing the reliability of results. There are some advantages to having multiple informants in this study. Having a different informant for the moderator variables (i.e., the clinician) provides a different perspective, potentially reducing bias and creating a more accurate depiction of the child's experience.

Future Questions

Given that child strengths were a significant moderator in the relationship between internalizing symptoms and functional impairment, future research should focus on individual child strengths more closely to examine if any particular strengths are more impactful than others. Additionally, it could be interesting to examine child strengths in different contexts, to better understand the extent of the generalizability of this result. For example, it is possible that child strengths play a role in mitigating negative outcomes in other relationships.

Further research should be conducted to better understand the discrepancy between the literature regarding parenting practices and the insignificant results of this study. Specifically, taking a multi-informant approach would allow for a more rigorous process. Given that most studies on parenting strengths are measured using self-report and observational methods, it may be beneficial to examine whether clinician rated parenting strengths offers a different perspective. Future studies should consider a longitudinal research design to better understand the impact of parenting practices and accurately capture the reciprocal relationship between the child and their caregiver.

As mentioned previously, variables in this study are broad. Future research should focus on narrowing in on the types of impairment that children experience to gain a better understanding of the impact of protective factors. Future research should examine differences between children who have comorbidities versus those who do not, the impacts of medication and gender differences.

Lastly, the literature on ADHD indicates that children are more likely to experience functional impairment and comorbidities (Healey et al., 2010). Additionally, parents are more likely to be stressed which can lead to negative parenting practices (McCrae et al., 2020). It may be interesting to investigate whether results would be similar if this study was conducted using a non-ADHD sample, or whether there is something in particular about the experience of having ADHD that lead to these findings.

Conclusion

The current study demonstrated that the more internalizing symptoms children with ADHD experience, the more likely they are to report functional impairment. Nonetheless, child strengths protect against functional impairment in children with ADHD and moderate to high internalizing symptoms. These results highlight the importance of adopting a strength-based approach to case conceptualization and interventions. Future research should focus on further investigating the influence of child strengths in different contexts.

References

- Achenbach, T. M. (1966). The classification of children's psychiatric symptoms: A factor-analytic study. *Psychological Monographs: General and Applied*, 80(7), 1–37.
- Aitken, M., Martinussen, R., Wolfe, R. G. & Tannock, R. (2015). Factor structure of the strengths and difficulties questionnaire in a Canadian elementary school sample. *Assessment for Effective Intervention*, 40(3), 155-165. DOI: 10.1177/1534508414560347
- Algorta, G. P., Dodd, A. L. & Stringaris, A. (2016). Diagnostic efficiency of the SDQ for parents to identify ADHD in the UK: A ROC analysis. *European Child and Adolescent Psychiatry*, 25, 949-957. DOI: 10.1007/s00787-015-0815-0
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: American Psychiatric Publishing Inc.
- Anderson, R., Lyons, J. S., Giles, D., Price & J.A., Estle, G. (2003). Reliability of the child and adolescent needs and strengths-mental health (CANS-MH) scale. *Journal of Child and Family Studies*, 12(3), 279-289.
- Aunola, K. & Nurmi, J. (2005) The role of parenting styles in children's problem behavior. *Journal of Child Development*, 76, 1144–1159. DOI:10.1111/j.1467-8624.2005.00840
- Appleyard, K., Egeland, B., van Dulmen, M. H. M. & Sroufe, A. L. (2005). When more is not better: the role of cumulative risk in child behavior outcomes. *Journal of Child Psychology and Psychiatry*, 46(3), 235-245. DOI: 10.1111/j.1469-7610.2004.00351.x
- Arsenio, W. & Ramos-Marcuse, F. (2014). Children's moral emotions, narratives, and aggression: Relations with maternal discipline and support. *The Journal of Genetic Psychology*, 175(6), 528-546. DOI: [10.1080/00221325.2014.982497](https://doi.org/10.1080/00221325.2014.982497)
- Banaschewski, T., Coghill, D. & Zuddas, A. (2018). Attention Deficit Hyperactivity Disorder. Oxford, United Kingdom: Oxford Press.
- Barkley RA. Attention-Deficit/Hyperactivity Disorder: A Handbook for Diagnosis and Treatment. 3rd edition (2006). New York, NY: Guilford Press
- Barkley RA. (2002). Major life activity and health outcomes associated with attention-deficit/hyperactivity disorder. *Journal of Clinical Psychiatry*, 63(12), 10–5.
- Becker, S. P., Luebke, A. M., Stoppelbein, L., Greening, L. & Fite, P. J. (2012). Aggression among children with ADHD, anxiety, or co-occurring symptoms: Competing exacerbation and attenuation hypotheses, *Journal of Abnormal Child Psychology*, 40, 527-542. DOI: 10.1007/s10802-011-9590-7

- Becker A., Steinhausen, H. C., Baldursson G., Dalsgaard, S., Lorenzo, M., Ralston, S. J., Dopfner, M. & Rothenberger, A. (2006). Psychopathological screening of children with ADHD: Strengths and Difficulties Questionnaire in a pan-European study. *European Child & Adolescent Psychiatry*, 15, 56–62. DOI: 10.1007/s00787-006-1008-7
- Becker, K. D., Chorpita, B. F. & Daleiden, E. L. (2011). Improvements in symptoms versus functioning: How do our best treatments measure up? *Administration and Policy in Mental Health and Mental Health Services Research*, 38, 440-458. DOI: 10.1007/s10488-010-0332-x
- Becker, S. P., Langberg, J. M., Evans, S. W., Girio- Herrera, E. & Vaughn, A. J. (2015). Differentiating anxiety and depression in relation to the social functioning of young adolescents with ADHD. *Journal of Clinical Child and Adolescent Psychology*, 44(6), 1015-1029. DOI: 10.1080/15374416.2014.930689
- Biel, M. G., Kahn, N. F., Srivastava, A., Mete, M., Banh, M. K., Wissow, L. S. & Anthony, B. J. (2015). Parent Reports of Mental Health Concerns and Functional Impairment on Routine Screening with the Strengths and Difficulties Questionnaire. *Academic Pediatrics*, 15(4), 412-420. DOI: 10.1016/j.acap.2015.01.007
- Bishop, C., Mulraney, M., Rinehart, N. & Sciberras, E. (2019). An examination of the association between anxiety and social functioning in youth with ADHD: A systematic review. *Psychiatry Research*, 273, 402-421. DOI: 10.1016/j.psychres.2019.01.039
- Breaux, R., Langberg, J. M., Swanson, C. S., Eadeh, H. & Becker, S. P. (2020). Variability in positive and negative affect among adolescents with and without ADHD: Differential associations with functional outcomes, *Journal of Affective Disorders*, 274, 500-507. DOI: [10.1016/j.jad.2020.05.027](https://doi.org/10.1016/j.jad.2020.05.027)
- Burchard, J. & Schaefer, M. (1992). Improving accountability in a service delivery system in children's mental health. *Clinical Psychology Review*, 12, 867–882.
- Carraher, N., Krueger, R. F., Eaton, N. R., Markon, K. E., Keyes, K. M., Blanco, C., Saha, T. D. & Hasin, D. S. (2014). ADHD and the externalizing spectrum: direct comparison of categorical, continuous and hybrid models of liability in nationally representative sample. *Social Psychiatry and Psychiatric Epidemiology*, 49(8), 1307-1317. DOI: 10.1007/s00127-013-0770-3
- Castagna, P., Calamia, M., Roye, S., Greening, S. G. & Davis, T. E. (2019). The effects of childhood inattention and anxiety on executive functioning: inhibition, updating and shifting. *ADHD Attention Deficit and Hyperactivity Disorders*, 11, 423-432.
- Castellano-Ryan, N., Struve, M., Banaschewski, T., Barker, G. J...Conrod, P. J. (2014). Neural and cognitive correlates of common and specific variance across externalizing problems in young adolescence. *American Journal of Psychiatry*, 171(12), 1310-1319. DOI: 10.1176/appi.ajp.2014.13111499

- Caye, A., Swanson, J., Thapar, A., Sibley, M...Rohde, L. A. (2016). Life span studies of ADHD- Conceptual challenges and predictors of persistence and outcome. *Current Psychiatry Reports*, 18(111). 1-11. DOI: 10.1007/s11920-016-0750-x
- Climie, E. A., & Mastoras, S. M. (2015). ADHD in schools: Adopting a strengths-based perspective. *Canadian Psychology/Psychologie canadienne*, 56(3), 295–300. DOI: [10.1037/cap0000030](https://doi.org/10.1037/cap0000030)
- Climie, E. A., Mastoras, S. M., McCrimmon, A. W. & Schwean, V. L. (2013). Resilience in childhood disorders. In Prince- Embury, S. & Saklofske, D. H. (Eds.), *Resilience in Children, Adolescents, and Adults* (pp. 113-131). Springer.
- Connor, D. F., Ford, J. D. (2012). Comorbid symptom severity in attention-deficit/hyperactivity disorder: A clinical study, *Journal of Clinical Psychiatry*, 73(5), 711-717. DOI: 10.4088/JCP.11m07099
- Coutinho, D., Farias, A. C., Felden, E. & Cordeiro, M. L. (2018). ADHD comorbid with major depression on parents and teachers perceptions. *Journal of Attention Disorders*. 1-11. DOI: [10.1177/1087054718815574](https://doi.org/10.1177/1087054718815574)
- Crossroads Children's Mental Health Centre (2020). *CCMHC Annual Report 2019-2020*. https://crossroadschildren.ca/content/user_files/2020/10/CCMHC-Annual-Report-2019-2020.pdf
- Cuffe, S. P., Moore, C. G., McKeown, R. (2009). ADHD and health services utilization in the national health interview survey. *Journal of Attention Disorders*, 12(4). 330-340. DOI: 10.1177/1087054708323248
- Deault, L. (2010). A systematic review of parenting in relation to development of comorbidities and functional impairments in children with attention-deficit/ hyperactivity disorder (ADHD). *Journal of Child Psychiatry and Human Development*, 41. 168-192. DOI: 10.1007/s10578-009-0159-4
- Demaray, M. K., Malecki, C. K., Davidson, L. M., Hodgson, K. K. & Rebus, J. P. (2005). The relationship between social support and student adjustment: A longitudinal analysis. *Psychology in the Schools*, 42(7). 25-49.
- Dupaul, G. J. (2007). School-based interventions for students with attention-deficit hyperactivity disorder: current status and future directions. *School Psychology Review*, 36(2). 183-194. DOI: 10.1080/02796015.2007.12087939
- Dvorsky, M. R. & Langberg, J. M. (2016). A review of factors that promote resilience in youth with ADHD and ADHD symptoms. *Clinical Child and Family Psychology Review*, 19. 368-391. DOI: 10.1007/s10567-016-0216-z

- Eaton, N. R., Rodriguez-Seijas, C., Carragher, N., & Krueger, R. F. (2015). Transdiagnostic factors of psychopathology and substance use disorders: A review. *Social Psychiatry and Psychiatric Epidemiology*, 50(2), 171–182.
- Eaton, N. R., Keyes, K. M., Krueger, R. F., Balsis, S., Skodol, A. E., Markon, K. E., ... Hasin, D. S. (2012). An invariant dimensional liability model of gender differences in mental disorder prevalence: Evidence from a national sample. *Journal of Abnormal Psychology*, 121(1), 282–288.
- Eaton, N. R., Keyes, K. M., Krueger, R. F., Noordhof, A., Skodol, A. E., Markon, K. E., ... Hasin, D. S. (2013). Ethnicity and psychiatric comorbidity in a national sample: Evidence for latent comorbidity factor invariance and connections with disorder prevalence. *Social Psychiatry and Psychiatric Epidemiology*, 48, 701–710.
- Eaton, N. R. (2014). Transdiagnostic psychopathology factors and sexual minority mental health: Evidence of disparities and associations with minority stressors. *Psychology of Sexual Orientation and Gender Diversity*, 1(3), 244–254.
- Ellis, B. & Nigg, J. (2009). Parenting practices and attention-deficit/hyperactivity disorder: New findings suggest partial specificity of effects. *Journal of Child and Adolescent Psychiatry*, 48(2), 146–154. DOI: 10.1097/CHI.0b013e31819176d0
- Escobar, R., Soutullo, C.A., Hervas, A., Gastaminza, X., Polavieja, P. & Gilaberte, I. (2005). Worse quality of life for children with newly diagnosed attention-deficit/hyperactivity disorder, compared with asthmatic and healthy children. *Pediatrics*, 116(3). DOI: [10.1542/peds.2005-0386](https://doi.org/10.1542/peds.2005-0386)
- Evans, G. W., Whipple, S. S. & Li, D. (2013). Cumulative Risk and Child Development. *American Psychological Association*, 139(6), 1342–1396. DOI: 10.1037/a0031808
- Faraone, S. V., Perlis, R. H., Doyle, A. E., Smoller, J. W., Goralnick, J. J., Holmgren, M. A. & Sklar, P. (2005). Molecular genetics of attention-deficit/hyperactivity disorder. *Biological Psychiatry*, 57(11), 1313–1323. DOI: [10.1016/j.biopsych.2004.11.024](https://doi.org/10.1016/j.biopsych.2004.11.024)
- Feneshy, M. C., Teh, S. E., Lee, S. (2019). Negative parenting moderates the prospective association of ADHD symptoms and youth social problems. *Journal of Abnormal Child Psychology*, 47, 1583–1597. DOI: 10.1007/s10802-019-00542-5
- Freitag, C. M., Hanig, S., Schneider, A., Seitz, C., Palmason, H., Retz, W. & Meyer, J. (2012). Biological and psychosocial environmental risk factors influence symptom severity and psychiatric comorbidity in children with ADHD. *Journal of Neural Transmitters*, 119, 81–94. DOI: 10.1007/s00702-011-0659-9
- Gershon, J. (2002). A meta-analytic review of gender differences in ADHD. *Journal of Attention Disorders*, 5(3), 143–154. DOI: 10.1177/108705470200500302

- Goldstein, S., Brooks, R., & DeVries, M. (2013). *Translating resilience theory for application with children and adolescents by parents, teacher, and mental health professionals*. In S. Prince-Embry (Ed.), *Translating resiliency theory for children, adolescents, and adults* (pp. 73-90). New York, NY: Springer.
- Goodman, R. (1997). The Strengths and Difficulties Questionnaire: A Research Note. *Journal of Child Psychology and Psychiatry*, 38(5), 581-586.
- Goodman, R. & Scott, S. (1999). Comparing the strengths and difficulties questionnaire and the child behavior checklist: Is small beautiful? *Journal of Abnormal Child Psychology*, 27, 17-24.
- Goodman, R. (2001). Psychometric properties of the strengths and difficulties questionnaire. *Journal of American Academy of Child and Adolescent Psychiatry*, 40(11), 1337-1345.
- Hall, C. L., Guo, B., Valentine, A. Z., Groom, M. J., Daley, D., Sayal, K. & Hollis, C. (2019). The validity of the strengths and difficulties questionnaire (SDQ) for children with ADHD symptoms. *PLOS One*, 14(6). DOI: 10.1371/journal.pone.0218518
- Hauck, T. S., Lau, C., Wing, L., Kurdyak, P. & Tu, K. (2017). ADHD treatment in primary care: Demographic factors, medication trends and treatment predictors. *The Canadian Journal of Psychiatry*, 62(6), 393-402
- Hawes, D. J., Dadds, M. R., Frost, A. D. J., Russell, A. (2013). Parenting practices and prospective levels of hyperactivity/inattention across early-and middle-childhood. *Journal of Psychopathological Behaviour Assessment*, 35, 273-282. DOI: 10.1007/s10862-013-9341-x
- Hayes, A. F. & Rockwood, N. J. (2017). Regression-based statistical mediation and moderation analysis in clinical research: Observations, recommendations and implementation. *Behaviour Research and Therapy*, 98, 39-57. DOI: 10.1016/j.brat.2016.11.001
- Healey, D. M., Flory, J. D., Miller, C. J. & Halperin, J. M. (2011). Maternal positive parenting style is associated with better functioning in hyperactive/inattentive preschool children. *Infant and Child Development*, 20, 148-161. DOI: 10.1002/icd.682
- Hechtman, L. (1991). Resilience and vulnerability in long term outcomes of attention deficit hyperactive disorder. *Canadian Journal of Psychiatry*, 36(6), 415- 421.
- Jarrett, M. A. & Ollendick, T. H. (2008). A conceptual review of the comorbidity of attention-deficit/hyperactivity disorder and anxiety: Implications for future research and practice. *Clinical Psychology Review*, 28(7), 1266-1280. DOI: [10.1016/j.cpr.2008.05.004](https://doi.org/10.1016/j.cpr.2008.05.004)
- Johnston, C., Mash, E. J., Miller, N. & Ninowski, J. E. (2012). Parenting in adults with attention-deficit/hyperactivity disorder (ADHD). *Clinical Psychology Review*, 32(4), 215-228. DOI: [10.1016/j.cpr.2012.01.007](https://doi.org/10.1016/j.cpr.2012.01.007)

- Kaiser, N. M., McBurnett, K. & Pfiffner, L. J. (2011). Child ADHD severity and positive and negative parenting as predictors of child social functioning: Evaluation of three theoretical models. *Journal of Attention Disorders*, 15(3). 193-203. DOI: 10.1177/1087054709356171
- Karustis, J. L., Power, T. J., Rescorla, L. A., Eiraldi, R. B. & Gallagher, P.R. (2000). Anxiety and depression in children with ADHD: Unique associations with academic and social functioning. *Journal of Attention Disorders*, 4(3), 133-149. DOI: [10.1177/108705470000400301](https://doi.org/10.1177/108705470000400301)
- Klimkeit, E., Graham, C., Lee, P., Morling, M., Russo, D. & Tonge, B. (2006). Children should be seen and heard: Self-report of feelings and behaviors in primary-school-age children with ADHD. *Journal of Attention Disorders*, 10(2). 181-191. DOI: 10.1177/1087054706289926
- Krueger, R. F., Chentsova-Dutton, Y. E., Markon, K. E., Goldberg, D. P., & Ormel, J. (2003). A cross-cultural study of the structure of comorbidity among common psychopathological syndromes in the general health care setting. *Journal of Abnormal Psychology*, 107, 216–227.
- Krueger, R. F., Eaton, N. R (2015). Transdiagnostic factors of mental disorders. *World 200*
- Krueger, R. F., Markon, K. E. (2006). Reinterpreting comorbidity: A model-based approach to understanding and classifying psychopathology. *Annual Review of Clinical Psychology*, 2, 111–133.
- Lin, L., Liu, J., Cao, X., Wen, S., Xu, J., Xue, Z. & Lu, J. (2020). Internet addiction mediates the association between cyber victimization and psychological and physical symptoms: Moderation by physical exercise. *BMC Psychiatry*, 20(144). 1-8. DOI: 10.1186/s12888-020-02548-6
- Loe, M. I., Feldman, H. M. (2007). Academic and educational outcomes of children with ADHD. *Journal of Pediatric Psychology*, 32 (6). 643-654. DOI:10.1093/jpepsy/jsl054
- Lyons, J. S., Uziel-Miller, N.D., Reyes, F., & Sokol, P.T. (2000). Strengths of children and adolescents in residential settings: Prevalence and associations with psychopathology and discharge placement. *Journal of the American Academy of Child and Adolescent Psychiatry*, 39,1-6.
- Lyons, J. S., Weiner, D. A. & Lyons, M. B. (2004). Measurement as Communication in Outcomes Management: The Child and Adolescent Needs and Strengths (CANS). In Maruish, M. E. (Eds.), *The use of psychological testing for treatment planning and outcomes assessment* (pp. 461-476). Lawrence Erlbaum Associates
- Lyons, J.S. (2009). *Communitrics: A theory of measurement for human service enterprises*. New York: Springer.

- Marquis, R. A. & Flynn, R. J. (2009). The SDQ as a mental health measurement tool in a Canadian sample of looked-after young people. *Vulnerable Children and Youth Studies*, 4(2). 114-121. DOI: 10.1080/17450120902887392
- Masten, A. S. & Powell, J.L. (2003). A resilience framework for research, policy, and practice. In S. S. Luthar (Eds.), *Resilience and Vulnerability Adaptation in the Context of Childhood Adversities* (pp. 1-25). Cambridge University Press.
- Mastoras, S. M., Saklofske, D. H., Schwean, V. L. & Climie, E. A. (2018). Social support in children with ADHD: An exploration of resilience. *Journal of Attention Disorders*, 22(8). 712-723. DOI: 10.1177/1087054715611491
- McCrae, E., Stoppelbein, L., O'Kelley, S., Fite, P. & Smith, S. (2020). Comorbid internalizing and externalizing symptoms among children with ADHD: The influence of parental distress, parenting practices and child routines, *Child Psychiatry & Human Development*. DOI:10.1007/s10578-020-01019-z
- McCrimmon, A. W., Climie, E. A. & Huynh, S. (2018). The relation between emotional intelligence and resilience in at-risk populations. *Developmental Neurorehabilitation*, 21(5). 326-335. DOI: 10.1080/17518423.2017.1387873
- McMartin, S., Kingsbury, M., Dykxhoorn, J. & Colman, I. (2014). Time trends in symptoms of mental illness in children and adolescents in Canada. *CMAJ*, 186(18). 672-678.
- Melegari, M. G., Bruni, O., Sacco, R., Barni, D., Sette, S. & Donfrancesco, R. (2018). Comorbidity of attention deficit hyperactivity disorder and generalized anxiety disorder in children and adolescents. *Psychiatry Research*, 270, 780-785. DOI: 10.1016/j.psychres.2018.10.078
- Meltzer, H., Gatward, R., Goodman, R. & Ford, T. (2003). Mental health of children and adolescents in Great Britain. *International Review of Psychiatry*, 15(1-2). 185-187. DOI: 10.1080/0954026021000046155
- Merikangas, K., He, J., Burstein, M., Swanson, S., Avenevoli, S., Cui, L., Beniet, C., Georgiades, K. & Swendsen, J. (2010). Lifetime prevalence of mental disorders in US Adolescents: Results from the national comorbidity study-adolescent supplement (NCS-A). *Journal academic child adolescent psychiatry*, 5(17).
- Mikami, A. Y., Miller, M., Lerner, M. D. (2019). Social functioning in youth with attention-deficit/hyperactivity disorder and autism spectrum disorder: transdiagnostic commonalities and differences. *Clinical Psychology Review*, 68. 54-70. DOI: 10.1016/j.cpr.2018.12.005
- Murray, C., & Johnston, C. (2006). Parenting in mothers with and without attention-deficit/hyperactivity disorder. *Journal of Abnormal Psychology*, 115(1), 52-61. DOI: 10.1037/0021-843X.115.1.52

- Nijmeijer J.S., Minderaa R.B., Buitelaar J.K., Mulligan, A., Hartman, C. A. & Hoekstra, P. J. (2008). Attention-deficit/ hyperactivity disorder and social dysfunctioning. *Clinical Psychology Review*, 28(4). 692-708. DOI: 10.1016/j.cpr.2007.10.003.
- Ohan, J. L., Visser, T. A. W. (2009), Why is there a gender gap in children presenting for attention deficit/hyperactivity disorder services? *Journal of Clinical Child & Adolescent Psychology*, 38(5). 650-660. DOI: 10.1080/15374410903103627
- Ottawa. (2016). *Living* [Infographic]. Ottawa.ca. <https://ottawa.ca/en/living-ottawa/statistics-and-demographics>
- Pelham, W.E. Jr., Fabiano, G. A., Massetti, G. M. (2005). Evidence-based assessment of attention deficit hyperactivity disorder in children and adolescents. *Journal of Clinical Child & Adolescent Psychology*, 34, (3). 449-476. DOI: [10.1207/s15374424jccp3403_5](https://doi.org/10.1207/s15374424jccp3403_5)
- Pfiffner, L. J., McBurnett, K. (2006). Family correlates of comorbid anxiety disorders in children with attention deficit/hyperactivity disorder. *Journal of Abnormal Child Psychology*, 34. 725-735. DOI: 10.1007/s10802-006-9060-9
- Pliszka, S. R. (2012). Psychiatric comorbidities in children with attention deficit hyperactivity disorder, *Pediatric Drugs*, 5, 741-750. DOI: 10.2165/00148581-200305110-00003
- Podolski, C. & Nigg, J. T. (2001). Parent stress and coping in relation to child ADHD severity associated child disruptive behavior problems. *Journal of Clinical Child & Adolescent Psychology*, 30(4). 503-513. DOI: [10.1207/S15374424JCCP3004_07](https://doi.org/10.1207/S15374424JCCP3004_07)
- Ray, A. R., Evans, S. W. & Langberg, J. M. (2017). Factors associated with healthy and impaired social functioning in young adolescents with ADHD. *Journal of Abnormal Child Psychology*, 45. 883-897. DOI: 10.1007/s10802-016-0217-x
- Rimvall, M. K., Elberling, H., Rask, C. U., Helenius, D., Skovgaard, A. M. & Jeppesen, P. (2014). Predicting ADHD in school age when using the strengths and difficulties questionnaire in preschool age: A longitudinal general population study, CCC2000. *European Journal of Child and Adolescent Psychiatry*, 23. 1051-1060. DOI: 10.1007/s00787-014-0546-7
- Rutter, M. (1981). Stress, coping and development: Some issues and some questions. *Journal of Child Psychology and Psychiatry*, 22(4). 323-356.
- Saidi, G. F. & Branscum, P. (2019). Gender differences for theory-based determinants of muscle-strengthening physical activity in college-aged students: A moderation analysis. *TBM*. 1-11. DOI: 10.1093/tbm/ibz058
- Sameroff, A. (2006). *Identifying Risk and Protective Factors for Healthy Child Development*. In A. Clarke-Stewart & J. Dunn (Eds.), *The Jacobs Foundation series on adolescence*.

- Families count: Effects on child and adolescent development* (p. 53–76). Cambridge University Press. DOI: [10.1017/CBO9780511616259.004](https://doi.org/10.1017/CBO9780511616259.004)
- Sasser, T., Schoenfelder, E. N. & Stein, M. A. (2017). Targeting functional impairments in the treatment of children and adolescents with ADHD. *CNS Drugs*, *31*, 97-107. DOI: [10.1007/s40263-016-0400-1](https://doi.org/10.1007/s40263-016-0400-1)
- Schei, J., Novik, T. S., Thomsen, P. H., Indredavik, M. S., Jozefiak, T. (2015). Improved quality of life among adolescents with attention-deficit/hyperactivity disorder is mediated by protective factors: A cross sectional survey. *BMC Psychiatry*, *15*(108). 1-10. DOI: [10.1186/s12888-015-0491-0](https://doi.org/10.1186/s12888-015-0491-0)
- Sciberras, E., Mulraney, M., Silva, D. & Coghill, D. (2017). Prenatal risk factors and the etiology of ADHD- Review of existing evidence. *Current Psychiatry Reports*, *19*(1). 1-8. DOI: [10.1007/s11920-017-0753-2](https://doi.org/10.1007/s11920-017-0753-2)
- Seymour, K. E., Chronis-Tuscano, A., Halldorsdottir, T., Stupica, B., Owens, K. & Scaks, T. (2012). Emotion regulation mediates the relationship between ADHD and depressive symptoms in youth. *Journal of Abnormal Child Psychology*, *40*, 595-606. DOI: [10.1007/s10802-011-9593-4](https://doi.org/10.1007/s10802-011-9593-4)
- Stone, L. L., Otten, R., Engels, R. C., Vermulst, A. A. & Janssens, J. M. (2010). Psychometric properties of the parent and teacher versions of the strengths and difficulties questionnaire for 4- to 12- year olds: A review. *Clinical Child and Family Psychology Review*, *13*, 254-274. DOI: [10.1007/s10567-010-0071-2](https://doi.org/10.1007/s10567-010-0071-2)
- Stone, L. L., Jassens, J. M., Vermulst, A. A., Maten, M. V., Engels, C. M. E. & Otten, R. (2015). The strengths and difficulties questionnaire: psychometric properties of the parent and teacher version in children aged 4-7. *BMC Psychology*, *3*(4). 1-12. DOI: [10.1186/s40359-015-0061-8](https://doi.org/10.1186/s40359-015-0061-8)
- Stringaris, A. & Goodman, R. (2009). Mood lability and psychopathology in youth. *Psychological Medicine*, *39*, 1237-1245. DOI: [10.1017/S0033291708004662](https://doi.org/10.1017/S0033291708004662)
- Tai, Y., Gau, C., Gau, S. & Chiu, H. (2012). Prediction of ADHD to anxiety disorders: An 11-year national insurance data analysis in Taiwan. *Journal of Attention Disorders*, *17*(8). 660-669. DOI: [10.1177/1087054712437581](https://doi.org/10.1177/1087054712437581)
- Ter- Stepanian, M., Martin-Storey, A., Bizier-Lacroix, R., Dery, M., Lemelin, J., Temcheff, C. E. (2019). Trajectories of verbal and physical peer victimization among children with comorbid oppositional defiant problems, conduct problems and hyperactive-attention problems. *Child Psychiatry & Human Development*, *50*, 1037-1048. DOI: [10.1007/s10578-019-00903-7](https://doi.org/10.1007/s10578-019-00903-7)

- Thapar, A., Cooper, M., Eyre, O. & Langley, K. (2013). Practitioner review: What have we learnt about the causes of ADHD? *The Journal of Child Psychology and Psychiatry*, 54(1), 3-16. DOI: 10.1111/j.1469-7610.2012.02611.x
- Thuele, J., Wiener, J., Tannock, R. & Jenkins, J. M. (2012). Parenting stress in families of children with ADHD: A meta-analysis. *Journal of Emotional and Behavioral Disorders*, 21(1). 3-17.
- Van Widenfelt, B. M., Goedhart, A. W., Treffers, P.D.A. & Goodman, R. (2003). Dutch Version of the Strengths and Difficulties Questionnaire (SDQ). *European Journal of Child and Adolescent Psychiatry*, 12, 281-289. DOI: 10.1007/s00787-003-0341-3
- Weiss, M., Gibbins, C. & Hunter, J. D. (2011). Attention- deficit hyperactivity disorder and anxiety disorders in adults. In Buitelaar, J. K., Kan, C. C. & Asherson, P. (Eds.), *ADHD in Adults*. (pp. 130-137). Cambridge University Press.
- Willcutt, E. G., Nigg, J. T., Pennington, B. F., Solanto, M. V., Rohde, L. A., Tannock, R., Loo, S. K., Carlson, C. L., McBurnett, K., & Lahey, B. B. (2012). Validity of DSM-IV attention deficit/hyperactivity disorder symptom dimensions and subtypes. *Journal of Abnormal Psychology*, 121(4), 991–1010. DOI: [10.1037/a0027347](https://doi.org/10.1037/a0027347)
- Wustner, A., Otto, C., Schlack, R., Holling, H., Klasen, F. & Ravens-Sieberer, U. (2019). Risk and protective factors for the development of ADHD symptoms in children and adolescents: Results of the longitudinal BELLA study. *PLOS ONE*, 14(3). 1-19. DOI: 10.1371/journal.pone.0214412
- Wu, S. Y., Gau, S. S. (2013). Correlates for academic performance and school functioning among youths with and without persistent attention-deficit/hyperactivity disorder. *Research in Developmental Disabilities*, 34. 505-515. DOI: 10.1016/j.ridd.2012.09.004
- Yao, S., Zhang, C., Zhu, X., Jing, X., McWhinnie, C. M. & Abela, J. (2009). Measuring adolescent psychopathology: Psychometric properties of the self-report strengths and difficulties questionnaire in sample of Chinese Adolescents. *Journal of Adolescent Health*, 45. 55-62. DOI: 10.1016/j.jadohealth.2008.11.006

Appendix A: The Child and Adolescent Needs and Strengths Questionnaire (CANS) & The
Strengths and Difficulties Questionnaire (SDQ)

CHILD AND ADOLESCENT NEEDS AND STRENGTHS (CANS)®					CCC MINI - CANS SCHOOL AGE				
Please ✓ appropriate use: ☐ Intake ☐ Admission/Reassessment ☐ Discharge									
Date:									
Youth's Name		DOB		Gender		Mother Tongue			
Mental Health Needs									
	0= No Evidence	1=watch/prevent	2=causing problems	3=causing severe or dangerous problems					
1. Anxiety	☐	☐	☐	☐					
2. Mood disturbance	☐	☐	☐	☐					
3. Attention/Hyperactivity	☐	☐	☐	☐					
4. Impulse Control	☐	☐	☐	☐					
5. Oppositional Behaviour	☐	☐	☐	☐					
6. Conduct Behaviour	☐	☐	☐	☐					
7. Adjustment to Trauma	☐	☐	☐	☐					
8. Attachment Difficulties	☐	☐	☐	☐					
9. Parent-Child Relations	☐	☐	☐	☐					
Risk Behaviours									
0 = no evidence		1 = history, watch/prevent			2=Recent, Act		3=Acute, Act Immediately		
	0	1	2	3		0	1	2	3
10. Suicide Risk	☐	☐	☐	☐	13. Aggression – Objects	☐	☐	☐	☐
11. Self Injuring Behaviours	☐	☐	☐	☐	14. Cruelty to Animals	☐	☐	☐	☐
12. Other Self Harm	☐	☐	☐	☐	15. Danger to Others	☐	☐	☐	☐
Educational Needs									
0 = no evidence		1 = watch/prevent			2=Act		3=Act Now/Intensive		
	0	1	2	3		0	1	2	3
16. School attendance	☐	☐	☐	☐	17. School discipline	☐	☐	☐	☐
Child/Youth Individual Strengths									
0 = centerpiece		1 = useful			2=Identified		3=Not Yet Identified		
	0	1	2	3		0	1	2	3
18. Peer Relations	☐	☐	☐	☐	20. Adaptability to Change	☐	☐	☐	☐
19. Self expression	☐	☐	☐	☐	21. Family	☐	☐	☐	☐
Parents/Family/Caregiver Needs and Strengths									
0 = no evidence		1 = watch/prevent			2=Recent/Act		3=Act Now/Intensive		
	0	1	2	3		0	1	2	3
22. Discipline/Parenting skills	☐	☐	☐	☐		☐	☐	☐	☐
23. Problem-solving	☐	☐	☐	☐		☐	☐	☐	☐
24. Knowledge of child	☐	☐	☐	☐		☐	☐	☐	☐
25. Parental responsiveness	☐	☐	☐	☐		☐	☐	☐	☐
26. Ability to communicate	☐	☐	☐	☐		☐	☐	☐	☐
27. Understanding impact of own behaviour on children	☐	☐	☐	☐		☐	☐	☐	☐
Family Needs and Strengths									
0 = no evidence		1 = watch/prevent			2=Recent/Act		3=Act Now/Intensive		
	0	1	2	3		0	1	2	3
28. Family stress	☐	☐	☐	☐		☐	☐	☐	☐

Scoring the Strengths & Difficulties Questionnaire for age 4-17 or 18+

The 25 items in the SDQ comprise 5 scales of 5 items each. It is usually easiest to score all 5 scales first before working out the total difficulties score. 'Somewhat True' is always scored as 1, but the scoring of 'Not True' and 'Certainly True' varies with the item, as shown below scale by scale. For each of the 5 scales the score can range from 0 to 10 if all items were completed. These scores can be scaled up pro-rata if at least 3 items were completed, e.g. a score of 4 based on 3 completed items can be scaled up to a score of 7 (6.67 rounded up) for 5 items.

Note that the items listed below are for 4-17-year-olds, but the scoring instructions are identical for the similarly-worded '18+' SDQ

Table 1: Scoring symptom scores on the SDQ for 4-17 year olds

	Not True	Somewhat True	Certainly True
<u>Emotional problems scale</u>			
ITEM 3: Often complains of headaches... (<i>I get a lot of headaches...</i>)	0	1	2
ITEM 8: Many worries... (<i>I worry a lot</i>)	0	1	2
ITEM 13: Often unhappy, downhearted... (<i>I am often unhappy...</i>)	0	1	2
ITEM 16: Nervous or clingy in new situations... (<i>I am nervous in new situations...</i>)	0	1	2
ITEM 24: Many fears, easily scared (<i>I have many fears...</i>)	0	1	2
<u>Conduct problems Scale</u>			
ITEM 5: Often has temper tantrums or hot tempers (<i>I get very angry</i>)	0	1	2
ITEM 7: Generally obedient... (<i>I usually do as I am told</i>)	2	1	0
ITEM 12: Often fights with other children... (<i>I fight a lot</i>)	0	1	2
ITEM 18: Often lies or cheats (<i>I am often accused of lying or cheating</i>)	0	1	2
ITEM 22: Steals from home, school or elsewhere (<i>I take things that are not mine</i>)	0	1	2
<u>Hyperactivity scale</u>			
ITEM 2: Restless, overactive... (<i>I am restless...</i>)	0	1	2
ITEM 10: Constantly fidgeting or squirming (<i>I am constantly fidgeting...</i>)	0	1	2
ITEM 15: Easily distracted, concentration wanders (<i>I am easily distracted</i>)	0	1	2
ITEM 21: Thinks things out before acting (<i>I think before I do things</i>)	2	1	0
ITEM 25: Sees tasks through to the end... (<i>I finish the work I am doing</i>)	2	1	0
<u>Peer problems scale</u>			
ITEM 6: Rather solitary, tends to play alone (<i>I am usually on my own</i>)	0	1	2
ITEM 11: Has at least one good friend (<i>I have one good friend or more</i>)	2	1	0
ITEM 14: Generally liked by other children (<i>Other people my age generally like me</i>)	2	1	0
ITEM 19: Picked on or bullied by other children... (<i>Other children or young people pick on me</i>)	0	1	2
ITEM 23: Gets on better with adults than with other children (<i>I get on better with adults than with people my age</i>)	0	1	2
<u>Prosocial scale</u>			
ITEM 1: Considerate of other people's feelings (<i>I try to be nice to other people</i>)	0	1	2
ITEM 4: Shares readily with other children... (<i>I usually share with others</i>)	0	1	2
ITEM 9: Helpful if someone is hurt... (<i>I am helpful if someone is hurt...</i>)	0	1	2
ITEM 17: Kind to younger children (<i>I am kind to younger children</i>)	0	1	2
ITEM 20: Often volunteers to help others... (<i>I often volunteer to help others</i>)	0	1	2

20 June 2016

2

Total difficulties score: This is generated by summing scores from all the scales except the prosocial scale. The resultant score ranges from 0 to 40, and is counted as missing if one of the 4 component scores is missing.

'Externalising' and 'internalising' scores: The externalising score ranges from 0 to 20 and is the sum of the conduct and hyperactivity scales. The internalising score ranges from 0 to 20 and is the sum of the emotional and peer problems scales. Using these two amalgamated scales may be preferable to using the four separate scales in community samples, whereas using the four separate scales may add more value in high-risk samples (see Goodman & Goodman, 2009 *Strengths and difficulties questionnaire as a dimensional measure of child mental health. J Am Acad Child Adolesc Psychiatry* 48(4), 400-403).

Generating impact scores

When using a version of the SDQ that includes an 'impact supplement', the items on overall distress and impairment can be summed to generate an impact score that ranges from 0 to 10 for parent- and self-report, and from 0 to 6 for teacher-report.

Table 2: Scoring the SDQ impact supplement

	Not at all	Only a little	A medium amount	A great deal
<u>Parent report:</u>				
Difficulties upset or distress child	0	0	1	2
Interfere with HOME LIFE	0	0	1	2
Interfere with FRIENDSHIPS	0	0	1	2
Interfere with CLASSROOM LEARNING	0	0	1	2
Interfere with LEISURE ACTIVITIES	0	0	1	2
<u>Teacher report:</u>				
Difficulties upset or distress child	0	0	1	2
Interfere with PEER RELATIONS	0	0	1	2
Interfere with CLASSROOM LEARNING	0	0	1	2
<u>Self-report report:</u>				
Difficulties upset or distress child	0	0	1	2
Interfere with HOME LIFE	0	0	1	2
Interfere with FRIENDSHIPS	0	0	1	2
Interfere with CLASSROOM LEARNING	0	0	1	2
Interfere with LEISURE ACTIVITIES	0	0	1	2

Responses to the questions on chronicity and burden to others are not included in the impact score. When respondents have answered 'no' to the first question on the impact supplement (i.e. when they do not perceive themselves as having any emotional or behavioural difficulties), they are not asked to complete the questions on resultant distress or impairment; the impact score is automatically scored zero in these circumstances.

Cut-points for SDQ scores for age 4-17: original 3-band solution & newer 4-band solution

Although SDQ scores can be used as continuous variables, it is sometimes convenient to categorise scores. The initial bandings presented for the SDQ scores were 'normal', 'borderline' and 'abnormal'. These bandings were defined based on a population-based UK survey, attempting to choose cutpoints such that 80% of children scored 'normal', 10% 'borderline' and 10% 'abnormal'.

More recently a four-fold classification has been created based on an even larger UK community sample. This four-fold classification differs from the original in that it (1) divided the top 'abnormal' category into two groups, each containing around 5% of the population, (2) renamed the four categories (80% 'close to average', 10% 'slightly raised', 5% 'high' and 5% 'very high' for all scales except prosocial, which is 80% 'close to average', 10% 'slightly lowered', 5% 'low' and 5% 'very low'), and (3) changed the cut-points for some scales, to better reflect the proportion of children in each category in the larger dataset.

Note that these cut points have not been validated for use with the 18+ SDQ, so we suggest that it is safest to use continuous scores rather than categories for this measure

Table 3: Categorising SDQ scores for 4-17 year olds (not validated for 18+)

	Original 3-band categorisation			Newer 4-band categorisation			
	Normal	Borderline	Abnormal	Close to average	Slightly raised (/slightly lowered)	High (/Low)	Very high (very low)
<u>Parent completed SDQ</u>							
Total difficulties score	0-13	14-16	17-40	0-13	14-16	17-19	20-40
Emotional problems score	0-3	4	5-10	0-3	4	5-6	7-10
Conduct problems score	0-2	3	4-10	0-2	3	4-5	6-10
Hyperactivity score	0-5	6	7-10	0-5	6-7	8	9-10
Peer problems score	0-2	3	4-10	0-2	3	4	5-10
Prosocial score	6-10	5	0-4	8-10	7	6	0-5
Impact score	0	1	2-10	0	1	2	3-10
<u>Teacher completed SDQ</u>							
Total difficulties score	0-11	12-15	16-40	0-11	12-15	16-18	19-40
Emotional problems score	0-4	5	6-10	0-3	4	5	6-10
Conduct problems score	0-2	3	4-10	0-2	3	4	5-10
Hyperactivity score	0-5	6	7-10	0-5	6-7	8	9-10
Peer problems score	0-3	4	5-10	0-2	3-4	5	6-10
Prosocial score	6-10	5	0-4	6-10	5	4	0-3
Impact score	0	1	2-6	0	1	2	3-6
<u>Self-completed SDQ</u>							
Total difficulties score	0-15	16-19	20-40	0-14	15-17	18-19	20-40
Emotional problems score	0-5	6	7-10	0-4	5	6	7-10
Conduct problems score	0-3	4	5-10	0-3	4	5	6-10
Hyperactivity score	0-5	6	7-10	0-5	6	7	8-10
Peer problems score	0-3	4-5	6-10	0-2	3	4	5-10
Prosocial score	6-10	5	0-4	7-10	6	5	0-4
Impact score	0	1	2-10	0	1	2	3-10

Note that both these systems only provide a rough-and-ready way of screening for disorders; combining information from SDQ symptom and impact scores from multiple informants is better, but still far from perfect.]

Appendix B: Simple Slopes

Figure 1.

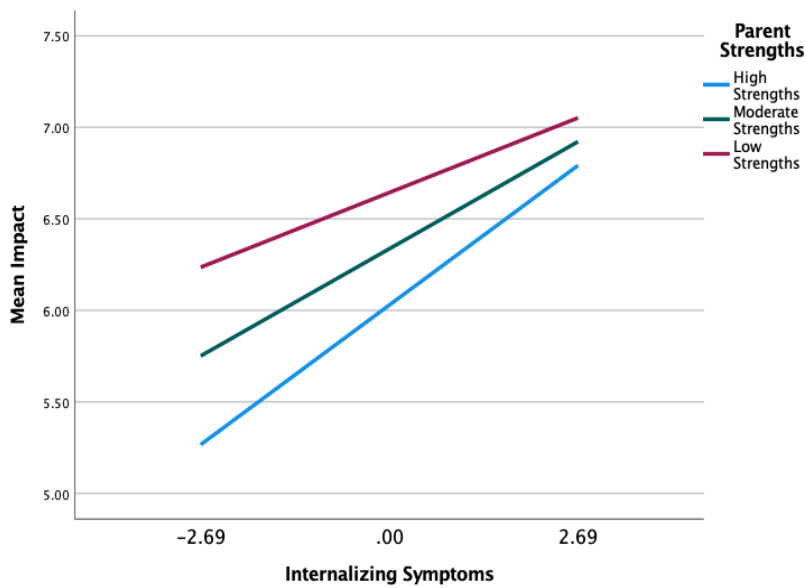


Figure 2.

