Functional Impairment in School-Aged South African Children with ADHD: Design, implementation, and evaluation of a targeted intervention

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Supervisor: Professor Kevin G. F. Thomas

Mareli Fischer

FSCMAR006

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ABSTRACT

Despite the fact that Attention-Deficit/Hyperactivity Disorder (ADHD) is a globally prevalent psychiatric disorder with significant lifelong impact on the quality of life of diagnosed individuals, there is little Africa-based research considering (a) the functional impact of the disorder within the population or (b) locally appropriate interventions that might alleviate that impact. Study 1 was a needs assessment project that described the functional impairment experienced by a South African sample of school-aged children with ADHD ($N = 99$). The specific focus was on identifying the areas of life where those children faced the most severe challenges related to their symptoms. I used the Mini International Neuropsychiatric Interview for Children (MINI-Kid) as a diagnostic tool, and the Child Behavior Checklist (CBCL), the Strengths and Difficulties Questionnaire (SDQ), and the Impairment Rating Scale (IRS) as measures of functional impairment. Each of these was administered to the parent of a child with ADHD. Results indicated that although ADHD-diagnosed children experienced significant impairment in all domains of functioning (including family relationships, social interactions, activities/hobbies, and home life), they experienced especially severe difficulties in the school environment. Study 2, which built on the results from Study 1, described the design, implementation, and testing of a psychosocial intervention (an 8-week parent-training group) targeting the identified domains of ADHD-related functional impairment. Participants (parents of school-aged ADHD-diagnosed children) were pseudo-randomly assigned to an intervention group ($n = 62$), a non-structured support group ($n = 66$), or a waitlist control group ($n = 50$). The same diagnostic process and measures of functional impairment as in Study 1 were used to establish the child's pre-intervention functioning. The measures were re-administered immediately post-intervention and, for the intervention group only, 6 months later. Results indicated that participants assigned to the intervention condition rated their child's functional impairment as significantly improved following their participation in the 8-week parent-training process, and these improvements were sustained at the 6-month follow-up measurement point. Although analyses detected no significant between-group differences in functional impairment at baseline, at the post-intervention measurement point ratings from intervention-group participants were significantly lower than those of participants assigned to the two control groups. The major conclusion, therefore, is that this parent-training intervention is effective in relieving broad-based ADHD-related functional impairment in low-income and low-resource settings. Studying functional impairment and interventions in this way will pave

the way for evidence-based, cost-effective treatment plans focused on alleviating the myriad of personal and societal challenges associated with ADHD.

CHAPTER 1
GENERAL INTRODUCTION

The research described in this doctoral dissertation had the broad aims of: (1) Investigating functional impairment as experienced by South African school-aged children diagnosed with Attention-Deficit/Hyperactivity Disorder (ADHD), and (2) Designing and testing a psychosocial intervention targeting domains where most functional impairment is reported in ADHD-diagnosed children.

ADHD is one of the most common neurobehavioral disorders of childhood. This clinically heterogeneous disorder often results in financial liabilities and other stressors for families, and in adverse academic, psychological, interpersonal, and vocational outcomes for the diagnosed individual (Liu, 2020; Fawns, 2021). The current edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013) organizes symptoms of ADHD into two categories: Inattention and hyperactivity/impulsivity. Behavioral deficits and functional impairment associated with symptoms of ADHD arise relatively early in childhood, before the age of 12 years, and persist throughout the lifetime.

Despite the fact that ADHD is such a prevalent psychiatric disorder, with significant lifelong impact on the functioning and quality of life of diagnosed individuals, there is little Africa-based research considering either the impact of the disorder within the population or locally appropriate interventions that might alleviate that impact. In South Africa, more than 70% of the population uses the state-funded public healthcare system; relatively few citizens can afford privately funded medical care (Stats-SA South African General Household Survey, 2017). Availability of care for both mental health and physical ailments is not equal across these two sectors. For instance, in the public sector there are long waiting lists for referral to specialist providers. This means delayed access to care and intervention, which in turn results in poorer prognosis and increased risk of functional and other impairment. Hence, there is a significant need for accessible and effective interventions within this context.

The dissertation encompasses two major studies. Study 1 took the form of a needs assessment project that investigated and described the functional impairment experienced by a South African sample of children with ADHD. This study also described the areas of life where those children faced the most severe challenges related to their symptoms. I interviewed children and their parents individually, first to confirm the ADHD diagnosis, and then to gather information (via self-report paper-and-pencil questionnaires) about functional

impairment, comorbid psychiatric disorders, socioeconomic status, medication regimen, schooling experience, and other sociodemographic characteristics.

Study 2, which built on the results from Study 1, describes the design of an intervention (an 8-week parent-training group) targeting those functional areas where most impairment was reported and then goes on test the efficacy of that intervention. I chose a group format for the intervention for two main reasons: First, to make participation accessible to more parents simultaneously, and second because parent-training interventions for ADHD have been established as a recommended psychosocial intervention for the disorder.

In Study 2, the same diagnostic process and measures of functional impairment as in Study 1 were used to establish participants' pre-intervention functioning. The measures were re-administered immediately post-intervention, and then again 6 months later. The study design also involved two control groups, namely a non-structured support group, and a waitlist group. Participants in these groups completed the same measures as intervention-group participants.

The structure of the dissertation is as follows. The current chapter (**Chapter 1**) is a general introduction to the current research. **Chapter 2** is a literature review that provides a critical consideration of published literature on ADHD-related functional impairment and on treatment interventions for the disorder. **Chapter 3** presents the general methodology used for Study 1 and Study 2 (i.e., it describes methods common to the two studies). **Chapter 4** presents Study 1, **Chapter 5** presents Study 2. **Chapter 6** is a general discussion tying the two studies together and providing some overall conclusions and reflections.

CHAPTER 2
LITERATURE REVIEW

The fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association [APA], 2013) estimates that 3–7% of children will at some point in their lives be diagnosed with ADHD. Independent epidemiological literature suggests that the general population prevalence rate for ADHD among children and adolescents has remained stable, at about 5%, over the past three decades (Banaschewski et al., 2017; Cortese & Coghill, 2018). Although this estimate emerges almost exclusively from data collected in high-income countries (HICs), there is no firm reason to suspect that prevalence rates might have fluctuated substantially over the past several decades in low- and middle-income countries (LMICs).

Clinical Presentation of ADHD

The DSM-5 organizes symptoms of ADHD into two categories: inattention and hyperactivity/impulsivity. Behavioral deficits associated with these symptoms arise relatively early in childhood (i.e., typically before the age of 12 years) and persist throughout the lifetime (Faraone et al., 2021). The evolution of core ADHD symptoms over the diagnosed individual's lifespan can be either progressive or constant (Austerman, 2015). Notably, the DSM-5 has moved away from classification systems contained in previous editions of the manual: Rather than diagnosing static subtypes of ADHD (e.g., hyperactive type, inattentive type), the DSM-5 instead acknowledges the ever-changing nature of an individual's presentation of core ADHD symptoms over time. Hence, use of the term "presentation" indicates which core symptoms are displayed currently (Antshel & Barkley, 2020; Cortese & Coghill, 2018; Epstein & Loren, 2013; Faraone et al., 2021).

Following this rubric, the DSM-5 recognizes three different ADHD presentations: (1) predominantly inattentive, (2) predominantly hyperactive/impulsive, and (3) combined. Individuals with a *predominantly inattentive presentation* are characterized as having difficulties in organizing or finishing tasks, executing daily routines, attending to details, and following instructions or conversations. Individuals with a *predominantly hyperactive presentation* typically show behavioral patterns that include fidgeting and talking excessively and being unable to sit still (e.g., for a meal or while doing homework; younger children may run, jump, or climb constantly). Individuals with this presentation also tend to show impulsive behaviors (e.g., interrupting others, grabbing objects, and making inappropriate verbal outbursts). For instance, the child may find it difficult to wait his/her turn or to listen

to directions, and impulsive behavior may also lead to them sustaining more injuries and accidents than their peers. Individuals with a *combined presentation* of core symptoms display relatively equal amounts of inattentive and hyperactive/impulsive core symptoms. Appendix A presents a complete description of the DSM-5 diagnostic criteria for ADHD.

Biological Sex and ADHD Presentation

Boys are twice as likely as girls to be diagnosed with ADHD. Some researchers suggest that this is due to the fact that fewer girls present with overt hyperactive/impulsive symptoms (Antshel & Barkley, 2020; Faraone et al., 2021; Liu, 2020). Moreover, boys are referred more often than girls for clinical assessment by teachers and parents who are concerned about ADHD-related symptoms (Fawns, 2021). Hence, it is not surprising that ADHD research studies often report including more boys than girls in their samples.

In an attempt to summarize existing literature and make sense of some inconsistencies (e.g., some studies support the idea of sex differences in core ADHD symptom expression, while others disagree), Carbonneau et al. (2021) conducted a meta-analysis of sex differences in ADHD symptoms and associated cognitive deficits. After reviewing 54 articles involving 47 different samples of ADHD-diagnosed children (age range 3–17 years), they concluded that, compared to girls with ADHD, boys with ADHD tend to display more hyperactive symptoms as well as more cognitive inflexibility and disinhibition. The authors discuss how the more disruptive nature of ADHD symptoms expressed by boys might lead to teachers' underestimation of ADHD symptoms in girls, especially because the learning demands of a classroom environment might make disruptive hyperactivity symptoms more noticeable.

Mowlem et al. (2019) also investigated sex differences in ADHD symptoms and diagnostics. They used data from a Swedish population-based register of 9-year-old children, all of whom were part of a national longitudinal national research project focused on twins. Their primary analyses detected no statistically significant between-sex differences in symptom severity or learning problems. Interestingly, clinically diagnosed children of both sexes were more likely to be characterized as presenting with combined symptoms rather than with inattentive or impulsive/hyperactive symptoms alone. However, those who met diagnostic criteria based on parent ratings most often presented with symptoms of inattention. Overall, girls were more likely than boys to meet criteria for an inattentive presentation.

Of further interest in the Mowlem et al. study is that, although many studies suggest that girls are frequently diagnosed with ADHD later in childhood than boys (see, e.g., Meyer et al., 2022), they found that externalizing symptoms (e.g., hyperactivity, impulsivity, conduct problems) were stronger predictors of an earlier ADHD diagnosis in females –because these

types of behaviors are commonly believed to different from what is typically observed in girls, their manifestation tends to alert clinicians to the possible presence of pathology. Hence, the authors caution that an ADHD diagnosis might be easily missed in girls unless they display significant externalizing symptoms.

Some research suggests that girls present with significantly higher rates of comorbid anxiety, while boys are more frequently diagnosed with comorbid conduct disorder (see, e.g., Fawns, 2021). For instance, Ottosen et al. (2019) found, after analysing data from a Danish registry of children born between 1981 and 2013 (a registry that included dates when any clinical diagnoses of ADHD or comorbidities were made), that more girls than boys were diagnosed with comorbid anxiety, bipolar and unipolar depression, suicidality, personality and eating disorders. In contrast, more boys than girls were diagnosed with comorbid oppositional defiant disorder (ODD), conduct disorder (CD), and tic disorders. A further important finding was that a diagnosis of ADHD in girls was associated with a significantly higher risk for the development of comorbidities, leading the authors to note that girls who present with ADHD might be equally (or even more) functionally impaired than boys who present with ADHD.

A South African study conducted in rural Limpopo considered the comorbidity of anxiety and depression in a group of primary school children who met criteria for ADHD (Mphahlele et al., 2023). Their sample included 216 children (116 girls), all of whom met criteria for ADHD based on parent and teacher feedback on the Disruptive Behavior Disorders rating scale (Pelletier et al., 2006). They found no sex differences in the experience of comorbid anxiety, although they did note that girls displayed significantly more comorbid depressive symptoms than boys.

Aging, Development, and ADHD Presentation

ADHD symptom presentation and related impairment may differ across the human lifespan. For instance, the hyperactive/impulsive presentation appears to occur most often in pre-school children, with symptoms of inattentiveness only becoming more overt in middle school and toward the onset of adolescence (Antshel & Barkley, 2020; Polanczyk et al., 2010; Schmidt & Petermann, 2009).

In one large-scale longitudinal study that attempted to describe age-related changes in ADHD symptom presentation, Murray et al. (2019) tracked and assessed 1571 Swiss children (761 girls) annually from age 7 to 15 years. They found that early adolescence was a period of vulnerability for both boys and girls, characterized by increases in all core ADHD symptoms. A noteworthy finding was that girls presented with a sudden, significant increase

in hyperactive/impulsive symptoms during early adolescence, while boys already presented with noticeable hyperactive/impulsive symptoms at age 7.

Shaw (2022) argued that researchers and clinicians must recognize ADHD's fluctuating nature. Across the individual patient's lifespan, core symptom presentation may be unstable, and remission may be impermanent. Several empirical studies reinforce these notions (see, e.g., Di Lorenzo et al., 2021; Sibley et al., 2022). For instance, Sibley et al. (2022) found, using data from a longitudinal study of 558 individuals (ages 8 to 25 years), that ADHD symptoms fluctuated over time and during different developmental stages. They noted, however, that in 90% of patients diagnosed during childhood the disorder persisted into adulthood.

Environmental Factors and ADHD Presentation

The World Federation of ADHD's 2021 Consensus Statement (Faraone et al., 2021) indicated that the disorder is rarely caused by one specific genetic or environmental factor. Instead, the interplay and combined small effects of many genetic and environmental risk factors has been linked to the presence of ADHD symptoms. These environmental risk factors include maternal tobacco and alcohol use, low birth weight, toxin exposure, maternal hypertension, and maternal use of certain medications (Faraone et al., 2021).

Following this line of thinking, diathesis-stress psychopathology models propose to explain the development and manifestation of ADHD symptomatology (see, e.g., Antshel & Barkley, 2020). Broadly speaking, these models state that children are born with genetic predispositions to develop symptoms of the disorder, and that these predispositions are most likely to manifest in the presence or absence of certain environmental factors. Some authors also describe an evocative gene-environment interaction that is often associated with ADHD: The social environment reacts to the child based on their inherited personality traits or behavioral characteristics (which, in the clinical context, are seen as symptoms). For example, impulsivity is strongly heritable, and some children are positively reinforced by peers to engage in risky, impulsive acts (Antshel & Barkley, 2020).

A crucial environmental factor that might affect the development and manifestation of ADHD symptoms is socioeconomic status (SES). Research suggests that high SES cannot be causally linked to protection from ADHD diagnosis; however, types of family dysfunction that are found more frequently in low-SES families (e.g., ineffective communication patterns, conflictual relationships, poor problem solving skills, maternal smoking and poor parental mental health) are associated with an increased prevalence of ADHD diagnoses and more

ADHD-related difficulties in children (Foley, 2011; Rowland et al., 2017; Russell et al., 2015).

Markham and Spencer (2022) systematically reviewed the literature examining psychological, environmental, and behavioral factors that might mediate the relationship between low SES and ADHD diagnosis. Their results highlighted the important mediating effects of parenting behavior, parental conflict, parental engagement, home learning environment, maternal mental health, breast feeding, and adverse childhood experiences (ACEs) on the development of ADHD. They concluded by noting, however, that the relationship between SES and ADHD remains in need of further investigation, especially in countries outside of North America and northern Europe.

Functional Impairment Associated with ADHD

Functional impairment is defined as the specific complaint or set of challenges that usually causes patients to seek treatment. These complaints and challenges often prompt the initial conversations between patient and clinician (Weiss et al., 2018).

The scientific study of functional impairment helps describe symptoms of a disorder in practical terms, making available information not always provided by diagnostic tests (Arildskov et al., 2022; Rapee et al., 2012; Weiss et al., 2018). Furthermore, although diagnosis is typically the focus of investigation after a child is referred for clinical assessment, functional impairment is often the reason that child is referred in the first place (Evans et al., 2018; Meyer et al., 2022; Sasser et al., 2016). A systematic review by Cherkasova et al. (2022) examined the results and conclusions from seven prospective longitudinal studies that followed North American children who had been diagnosed with ADHD during childhood. These participants' functional impairment and symptom presentation were assessed at 2-, 5- and 10-year intervals into adulthood. The review concluded that ADHD diagnosed in childhood leads to significant and enduring impairments, especially in the following areas: educational functioning, occupational /economic functioning, mental health, physical health, substance use, antisocial behavior, and driving.

Functional impairment appears to be an accurate indicator of prognosis in individuals diagnosed with ADHD (Sasser et al., 2016). It is important to note, however, that a decrease in core ADHD symptom count is not always linearly related to an improvement in functional impairment, and vice-versa (Arildskov et al., 2022; Meyer et al., 2022). For this reason, Cortese and Coghill (2018) argue that clinical emphasis (and hence treatment recommendations) should be placed on the degree of functional impairment experienced by

an individual with ADHD, rather than on the number of symptom criteria with which the person presents.

Personal characteristics and individual differences in circumstances of the person diagnosed with ADHD may influence the degree of functional impairment experienced, as well as the domain in which they experience the most such impairment. These characteristics and differences include psychiatric comorbidity, biological sex, lifespan developmental stage, and environmental factors.

Associations between Psychiatric Comorbidity and ADHD-Related Functional Impairment

About two-thirds of children who meet diagnostic criteria for ADHD also meet criteria for other psychiatric disorders, including depression, anxiety, substance abuse, oppositional defiant disorder (ODD), and conduct disorder (see, e.g., Antshel & Barkley, 2020; Fawns, 2021; Liu, 2020). Banaschewksi et al. (2017) reported that at least 75% of individuals with ADHD meet criteria for at least one comorbidity, with 60% meeting criteria for multiple comorbidities. Younger children with ADHD are frequently diagnosed with comorbid anxiety disorders, developmental and scholastic challenges, as well as ODD, while comorbid depressive disorders and severe conduct problems are more likely to present later in childhood and in early adolescence (Banaschewksi et al., 2017; Mattingly et al., 2021).

ADHD-related functional impairment seems to be exacerbated by the presence of comorbid psychiatric disorders, and the presence of comorbidities has been linked to poorer prognosis (Liu, 2020; Meyer et al., 2022). For instance, Elwin et al. (2020) reported that American adolescents who met diagnostic criteria for ADHD and at least one other psychiatric disorder (e.g., ODD, conduct disorder, an anxiety disorder) had significantly lower levels of global functioning, as measured by the Children's Global Assessment Scale (CGAS; Shaffer et al., 1983), than their ADHD-only peers. This study is particularly noteworthy because the researchers had access to a large sample of 3,245 children and adolescents, accessed via a national mandatory online registry for ADHD treatment follow-up (Swedish National Quality Registry for ADHD Treatment Follow-up, abbreviated to BUSA).

Cherkasova et al. (2022) reviewed seven North American longitudinal studies that mapped the functioning of individuals diagnosed with ADHD, from childhood into adulthood. The review suggested that the most significant predictors of functional impairments for individuals diagnosed with ADHD in childhood were (alongside symptom persistence over time) comorbid disruptive behavior disorders (e.g., conduct disorder, ODD, and antisocial personality disorder). These comorbidities have been closely linked to future

criminality as well as to increased prevalence of physical injuries, hospitalizations, mortality, substance abuse, and impaired functioning in the educational and occupational domains.

Associations between Biological Sex and ADHD-Related Functional Impairment

As noted earlier, research suggests that boys and girls show different ADHD symptom trajectories. Whereas many girls are first diagnosed at the onset of adolescence, boys are often identified and diagnosed at primary school age (Antshel & Barkley, 2020; Faraone et al., 2021; Murray et al., 2019).

In a recent study investigating relations between biological sex and functional impairment, Meyer et al. (2022) used data from separate reports by Swedish adolescents with ADHD (n = 164) and their parents. They also collected data from a comparison group (n = 106 community-dwelling adolescents with no psychiatric diagnoses). Results indicated that ADHD-diagnosed girls self-reported significantly higher levels of functional impairment (e.g. in the domains of school and social functioning) than ADHD-diagnosed boys. The authors note that this finding is consistent with a trend suggesting that boys with ADHD often underestimate their impairment in self-report measures (see, e.g., Fedele et al., 2012). Results from Meyer et al. (2022) further indicated no such sex differences within the control group's self-reports, or within parent ratings of children's functional impairment in either group.

Associations between Aging/Development and ADHD-Related Functional Impairment

Even though the presentation of core symptoms and associated functional impairment is unique for each patient with ADHD, adolescence seems to be a particularly vulnerable time for diagnosed individuals. Specific challenges for this cohort include higher rates of peer rejection, increased participation in impulsive and risky behaviors, more strained parental relationships, and an increased risk for developing substance use disorder (Meyer et al., 2022; Mustonen et al., 2022). Buitelaar (2017) noted that adolescents are especially vulnerable to negative outcomes associated with ADHD symptoms because this developmental stage is characterized by inadequate insight into personal functioning, limited capacity for self-reflection, poor decision making and conflict resolution skills, difficulty with self-regulation, and heightened emotional sensitivity.

ADHD Treatment and Intervention

The use of stimulant medication, especially methylphenidate, remains the most effective intervention to reduce core symptoms of ADHD (Antshel & Barkley, 2020; Cortese & Coghill, 2018; Faraone et al., 2021). However, parent training is a well-established form of psychosocial intervention for ADHD, and is particularly effective when implemented with parents of school-aged children (Fawns, 2021; Liu, 2020).

Barkley (1990), in his handbook on treatment of ADHD in children, provided the first design and advocacy for parent training programmes. Subsequently, numerous clinical researchers have based their interventions on this original model. Typically, these interventions aim to equip parents with techniques based on principles of operant conditioning. *Antecedent-based techniques* teach parents to provide clear instructions and to clarify their expectations of their child's behavior in certain situations. *Consequent-based techniques* refer to parents' response following the child's actions and can include praise, ignoring the behavior, or mild punishment (Fawns, 2021; Hornstra et al., 2021). Parent-training interventions therefore incorporate behavior management approaches in which the focus is on changing contingencies in target settings in order to help children increase the frequency or rate of desired behaviors, all while decreasing the frequency or rate of undesirable behaviors (Evans et al., 2020).

Several meta-analyses have demonstrated the efficacy of such behavior-based parent-training interventions. These studies report that following such treatment there are improvements in ADHD core symptoms as well as reduced comorbidities, relief of functional impairment, and better parenting skills (all changes associated with medium-to-large effect sizes; Morgan and O'Keefe, 2022; Steenhuis et al., 2020).

In a small systematic review on evidence-based psychosocial interventions for children and adolescents diagnosed with ADHD, Evans et al. (2018) examined 10 articles (all describing studies conducted in the United States and evaluating behaviorally focused parent-training interventions) that had been published in *The Journal of Child and Adolescent Psychology* between 2012 and 2016. Most of the reviewed studies focused on how to adapt traditional parent-training interventions to better suit specific populations (e.g., single mothers or mothers struggling with symptoms of depression) or to address specific functional challenges (e.g., assisting adolescents when learning to drive). Overall, results indicated that the interventions held their status as a well-established treatment option for elementary school children, although they could only be described as possibly efficacious for adolescents.

In one example of a study evaluating an intervention based on the original Barkley (1990) model, Shah et al. (2021) designed a manualized 10-week intervention for parents of Indian children with ADHD (administered either in group format or to individual families). The intervention considered factors specific to the local context that could have impacted on adherence to, and ultimate success of, the intervention. Alongside measures of SES and relevant clinical records, the Vanderbilt ADHD diagnostic parent-rating scale (Wolraich,

2003) was used to assess core symptoms of ADHD, the child's classroom performance, and symptoms of comorbid disorders before and after the intervention. A brief semi-structured interview was also conducted with parents 2–3 weeks post-intervention. A total of 36 families successfully completed the intervention as well as the pre- and post-intervention assessments. Results indicated significant improvement in parent ratings of children's inattention, hyperactivity, and conduct problems. Ratings of academic performance and classroom behavior were also significantly improved post-intervention. The presence or absence of stimulant medication did not affect the results. It is important to note that this study had a small sample size and did not include a waitlist control or other comparison group.

In a similar study, Shen et al. (2021) evaluated a 16-week multi-modal intervention for teachers and parents of children with ADHD. The intervention, which attempted to integrate the family, the school, and medical departments into a holistic management strategy, had been implemented in 14 primary schools in Shanghai between January and December 2018. All children attending grades 1 to 5 in participating schools were screened for ADHD symptoms. The researchers screened out children diagnosed with intellectual disabilities, autism spectrum disorders, severe physical disability or medical illness, and other comorbid psychiatric disorders. Each school was randomly assigned to either an intervention (n = 105 children and their parents) or a control (n = 99 children and their parents) group. Following screening, each child's pediatrician was tasked with the prescription of appropriate stimulant medication. Children in the control group only received the prescribed stimulant medication. Participants in the intervention group received pediatrician-guided parent-training over the full 16 weeks, while teachers at the schools associated with the intervention groups also received training on classroom management skills.

Parent training was conducted by hospital-based pediatricians. Parents attended two in-person group training sessions (each aimed at increasing ADHD-related knowledge) as well as a course on family behavior management. During the 16-week process, each participating family also received 2 individual family sessions as well as monthly conference calls that served as check-ins to monitor their progress. ADHD knowledge promotion was constant throughout the intervention process: Parents were provided with access to an online messaging and sharing platform and to educational manuals, videos, pictures and texts.

Each participating family was assessed at baseline, immediately following the intervention, and again 10 months after conclusion of the treatment. At each assessment point, the researchers used the SNAP-IV (Swanson, Nolan and Pelham Rating Scale;

Swanson et al., 1981, 2001) as a measure of core ADHD symptoms. They also tracked each child's academic performance, as well as self-reported parental stress levels.

Results indicated that children in both the control and intervention groups showed significant reductions in core ADHD symptoms and significant improvements in academic performance. Similarly, parents in both groups reported significant reductions in stress levels. However, the magnitude of change in the intervention group was significantly greater on all fronts. Another noteworthy outcome was that parents in the intervention group reported improvement in their knowledge and awareness of ADHD, available treatment options, and drug side effects.

Another intervention modelled on Barkley's original work was evaluated by Garreta et al. (2018). They investigated the effectiveness of an in-hospital parent-training programme for parents of children with ADHD. Parents attended a weekly 90-min session for 10 weeks. The children ($N = 21$) were aged between 6 and 12 years, and had all been referred to the mental health unit of a children's hospital in Mallorca, where their ADHD diagnosis was confirmed. The researchers used a quasi-experimental design, administering the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001) before and after the intervention. Results indicated that there were significant improvements in parent-rated symptoms of internalizing challenges (e.g., affective anxiety) and oppositional defiance, as well as moderate improvements in core and somatic symptoms of ADHD. Parent self-reports also indicated a significant improvement in self-perceived parenting capabilities. However, as the researchers acknowledged, inferences one might draw from the study were limited by the lack of any longitudinal follow-up measures and of a comparison or control group.

Evaluating the Success of Clinical Interventions for ADHD: Focus on Functional Impairment

When evaluating the success of psychosocial interventions for ADHD, the focus should be on the clinical significance ascribed to the treatment outcome by those who participated in the intervention rather than on a reduction in the number of core symptoms exhibited by patients (Evans et al., 2014; Karpenko et al., 2009; Weiss et al., 2018). In other words, improvement in functional impairment should be considered the primary focus of such evaluations because functional impairment describes and captures the challenges of an individual's lived experience.

Weiss et al. (2018) note the importance of understanding the clinical relationship between core symptoms of a disorder and functional impairment. In some cases, symptoms of ADHD may have subsided, but patients still experience functional impairment in certain

domains. This situation suggests the need for further intervention targeted at improving functioning in those domains. On the other hand, some patients may continue to exhibit significant core symptoms but report very little functional impairment (perhaps because their environment is supportive and not too demanding of them). In these cases, then, the intervention can target the core symptoms only. Regardless, the authors argue that symptom counts are not reliable substitutes or representatives of an individual's overall functioning.

Karpenko et al. (2009) specifically emphasized the distinction between *clinically significant change* versus *statistically significant reduction* in symptom or domain scores. The former term refers to post-treatment change that is meaningful and noticeable to the patient and/or to significant people in their life. Typically, one might think of clinically significant change as happening when there is a return to a 'normal', or desired, level of functioning for the individual. This form of change does not have to generalize across all (or even multiple) domains of functioning, and it is not necessarily correlated with a reduction in symptom scores. For instance, a child with ADHD might experience improvement in a specific area of functioning (e.g., the school or the social domain) without showing a statistically significant reduction in core ADHD symptoms.

Evans et al. (2014) published a review of articles on behavior management treatments and included parent-training interventions as well established other psychosocial interventions for children and adolescents with ADHD. The authors acknowledge that these psychosocial interventions are often criticized because studies show that they do not significantly reduce core symptoms of ADHD. However, they note that even though these core symptoms are the focus of a diagnosis, it is more often the impairment produced by the symptoms that becomes the focus of treatment and intervention. Hence, they also argue that functional impairment should be the primary focus when evaluating the effectiveness of an intervention for ADHD.

Summary and Conclusion

ADHD is a lifelong pervasive disorder that affects boys and girls, as well as individuals from different cultural and socioeconomic backgrounds. Core symptoms of inattention, hyperactivity, and impulsivity cause diagnosed individuals to struggle significantly in various domains of daily life. ADHD is associated with various negative personal, professional, economic, interpersonal, and psychiatric outcomes. A better understanding of the functional impairment associated with ADHD might lead to more effective psychosocial interventions (i.e., interventions that can be designed to target

particular areas of functional vulnerability for the patients, as well as particular areas of distress for their families and caregivers).

The current literature on ADHD treatment lacks research where needs assessments inform the design and content of psychosocial interventions, especially in low- and middle-income countries (LMICs). Furthermore, there is a need for methodologically sound research studies (i.e., studies that include appropriate control/ comparison groups, adequate sample sizes, and longitudinal designs where participants are followed-up with on more than one occasion post-intervention) that evaluate the efficacy of parent-based psychosocial interventions for ADHD on functional impairment outcomes.

CHAPTER 3
GENERAL METHOD

In this chapter, I describe aspects of the research method common to the two empirical studies contained within this dissertation (see Chapters 4 and 5). Hence, the sections below are dedicated to descriptions of participant recruitment, of particular measures and instruments, and of basic aspects of the statistical analyses.

Participant Recruitment

To recruit the samples for both Study 1 and Study 2, I placed posters advertising the research in private psychology practices, in doctors' rooms, in social workers' offices, and on public noticeboards. I also contacted private school principals about recruitment from their institutions, and I informed school psychologists, counsellors, and educators about the study. These individuals were therefore encouraged to refer suitable participants (primary caregivers/ parents of children with ADHD) to me.

Parents and caregivers[1] of children with ADHD who had seen the advertisements or who had been referred by institutional representatives contacted me via email to set up appointments for screening and further participation. These appointments were scheduled for a time and at a venue (e.g., the University of Cape Town Department of Psychology, my private practice rooms, or the child's school) convenient for participants.

All participants were required to be adult (> 18 years old) parents of children (ages 6–18 years) with ADHD. Although children were permitted to be diagnosed with disorders comorbid to the primary diagnosis of ADHD, I excluded from participation parents of children diagnosed with severe intellectual disability, autism spectrum disorder, or comorbidities of a psychotic nature.

Recruitment and enrolment of Study 1 participants started in February 2014 and concluded in December 2015. Recruitment and enrolment of Study 2 participants was continuous over the course of 4 years (February 2016 – November 2019).

[1] Hereafter, I refer to this group as simply "parents." This is done for ease of reference only.

Measures

As noted above, all measures described below were used in both Study 1 and Study 2.

Sociodemographic Questionnaire

This study-specific questionnaire (see Appendix B) captured information about the child's age, sex, grade in school, type of school attended (private or government), religion, parents' marital status, and use of stimulant medication.

Family Support Scale (FSS)

This 18-item questionnaire gathers information about participants' access to familial, social, and professional support (Dunst, 1982; Dunst & Trivette, 1985). The instrument's structure is based on Bronfenbrenner's (1979) ecological model describing the impact of social networks on the child's development and functioning within the family. This model describes four levels of ecological units, with each level being progressively farther away from the individual themselves: the nuclear and extended family, formal and informal associates (e.g., friends and colleagues), formal and informal social units (e.g., religious institutions and recreational clubs), and, finally, professional consultants and agencies.

The FSS asks participants to rate their level of access to different sources of support, as well as their perception of the helpfulness of the support received. Each item is rated using a Likert-type scale, with anchor points at 0 (*not available*) and 5 (*very helpful*). Hence, total scores can range from 0 to 90, with higher values indicating better availability of helpful support.

Regarding psychometric properties, the developers conducted a study with 139 parents of developmentally at-risk children to assess the reliability and validity of the FSS (Dunst et al., 1984). Twenty-five of those participants completed the measure twice, one month apart; test-retest reliability was calculated as an average *r* of .75 across the 18 items and an *r* of .91 for total scores. Internal consistency of the items was estimated as Cronbach's $\alpha = .77$.

More recently, Hoang (2018) evaluated the psychometric properties of the FSS using data from a Vietnamese sample of 130 parents of children with ADHD. Factor analyses confirmed the four proposed subcategories of support (nuclear family, extended family, community, and professional support). Internal consistency reliability was excellent, Cronbach's $\alpha = .89$.

Family Resource Scale (FRS)

This 30-item questionnaire asks informants to rate the adequacy of available resources across various domains of family functioning (Dunst & Leet, 1987). Respondents rate the extent to which each need is met using a Likert-type scale, with anchor points at 0 (*not at all adequate*) and 5 (*almost always adequate*). Hence, total scores can range from 0 to 150, with higher values indicating better availability of adequate resources (Van Horn et al., 2001).

Regarding psychometric properties, the developers reported good internal consistency, and short- and long-term test-retest reliability (Cronbach's $\alpha = .89$ and .84, respectively; Dunst & Leet, 1987). However, the original attempts at validation have been frequently criticised for using very small samples (see, e.g., Patwardhan et al., 2019). Nonetheless, the FRS has been widely used in studies that assess familial resources in children who struggle with emotional and behavioral disorders (Brannan et al., 2006).

Diagnostic Tool

The *Mini International Neuropsychiatric Interview for Children and Adolescents (MINI-KID*; English version 7.0.2; Sheehan et al., 2010) screened for the presence of DSM Axis I disorders. This instrument is a brief standardized diagnostic interview that is conducted with the child in the presence of a parent. It was used to confirm a primary diagnosis of ADHD, to describe ADHD presentation, and to determine the presence of comorbid disorders.

The MINI-KID has been used successfully in many studies of child psychiatric disorders. For example, Meyer at al. (2022) used it as a diagnostic tool in their study of functional impairment in adolescents with ADHD (see also, for example, Deng et al., 2023; Ding et al., 2021; Li et al., 2018; Saad et al., 2017). Part of the reason for the MINI-KID's popularity among researchers and clinicians is its relative brevity and consequent cost-effectiveness (Duncan et al., 2018; Suresh et al., 2022). Sheehan et al. (2010) noted that administration of the MINI-KID takes half as long as administration of corresponding sections of another widely used diagnostic instrument, the Structured Clinical Interview for DSM-III-R Patients (SCID-P; Spitzer, 1992).

Regarding basic psychometric properties, the MINI-KID's developers (Sheehan et al., 1998; 2010) showed that the instrument has convergent validity with the SCID-P and with the Composite International Diagnostic Interview (CIDI; World Health Organization, 1990) for International Statistical Classification of Disease (ICD-10). They also reported that the MINI-KID has very high inter-rater reliability (.88–1.00) and very good test-retest reliability (.76–

.93). More recently, Duncan et al. (2018) evaluated the psychometric properties of the MINI-KID in a sample of 283 Canadian children and adolescents, some clinic-referred (n = 98) and others recruited from the general population (n = 185). They observed acceptable test-retest reliability levels, although their values were slightly lower than those reported by the developers (see, e.g., Sheehan et al., 1998, 2010).

Regarding cross-cultural validity, Abbo et al. (2013) used the MINI-KID successfully in an investigation of the prevalence, comorbidity, and predictors of anxiety disorders in 1587 Ugandan children. More recently, Indian researchers had success using the MINI-KID as a screen for post-traumatic stress disorder in a cohort of adolescent girls (N = 100) who had been infected with COVID-19 (Suresh et al., 2022).

Regarding diagnostic validity, Högberg et al. (2019) compared screening results from the Swedish version of the MINI-KID with diagnoses made by a team of expert psychiatric and pediatric clinicians. Based on their review of 6 months of medical records provided by Swedish adolescent psychiatric outpatient clinics, the clinicians made psychiatric diagnoses of 101 participants (n = 50 boys). Independent clinicians used the MINI-KID to diagnose the same cohort of participants. The overall percentage of agreement between the MINI-KID diagnoses and the medical records' review diagnosis was 79.5%, which was deemed acceptable by the researchers. For ADHD specifically, MINI-KID interviews concluded that 37% of participants met diagnostic criteria; the review identified this disorder in 30% of participants.

Measures of Functional Impairment

Child Behavior Checklist (CBCL). This widely used instrument (Achenbach & Rescorla, 2001) obtains reports from parents, guardians, or caregivers regarding the child's competencies and behavioral/emotional problems. The current study used the parent version of the questionnaire. Respondents provide information for 20 competence items pertaining to the child's activities, social relations, and school performance, followed by 118 items that describe specific behavioral and emotional problems (e.g., *My child argues a lot*; *My child is disobedient at home*; *My child daydreams or gets lost in their thoughts*). For each of this latter set of items, the parent rates (on a 0–2 scale) how true each statement is for their child. A score of 0 indicates *not true*, 1 *somewhat/sometimes true*, and 2 *very true*.

Using the data provided by the parent ratings on these 138 items, the CBCL provides a statistical profile for each child (incorporating raw scores, T scores, and percentiles) across three Competence scales (Activities, Social, and School), two Problem-oriented scales (Internalizing Problems and Externalizing Problems), and six DSM-oriented scales: Affective

Problems, Anxiety Problems, Somatic Problems, Attention-Deficit/Hyperactivity Problems, Oppositional-Defiant Problems, and Conduct Problems. All these scales are based on factor analyses of parents' ratings of 4,994 clinically referred children, and they were normed on 1,753 children aged 6 to 18 years (Achenbach & Rescorla, 2001).

The measure yields information about the child's total competence (comprised of scores that rate their performance in the school, social, and activities domains) and total problems (comprised of scores that rate their challenges with internalizing and externalizing problems). For Competence scales, a *T*-score below 30 indicates clinically impaired competence overall as well as in the domains of school, social, and activities. *T*-scores of 35 and over indicate normal/typical functioning, while *T*-scores between 31–34 are considered borderline. For Problem-oriented scales, a *T*-score above 64 indicates clinically significant internalizing, externalizing, and total problems. *T*-scores of < 60 indicate normal/ typical functioning, while *T*-scores between 60 and 64 are considered borderline.

The CBCL manual (https://aseba.org/wp-content/uploads/2019/01/ASEBA-Reliability-and-Validity-School-Age.pdf) reports that the measure's test-retest reliability ranges from .95 to 1.00. It further reports that internal consistency for the CBCL Competence scales ranges between .63 and .79; for the Problem-oriented scales, between .78 and .97; and for the DSM-oriented scales, between .72 and .91. The instrument's developers also assessed the CBCL's content, criterion-related, and construct validity and found that it can successfully distinguish between demographically matched referred and non-referred children (i.e., the measure can identify children who present with clinically significant symptoms).

The CBCL has been used successfully in many different ADHD studies across the globe (see, e.g., Breider et al., 2019; Garreta et al., 2018). A recent Spanish study aimed to determine the accuracy of various self-report measures, including the CBCL, Conners 3 ADHD Index (Conners 3 AI; Conners, 2008), and Youth Self-Report Scale (YSR/11-18; Achenbach, 1991) in predicting ADHD diagnoses in school-aged children (Roigé-Castellví et al., 2020). Results indicated that score on the CBCL Attention-Deficit/Hyperactivity Problems scale was the most accurate predictor of an ADHD diagnosis—it correctly classified almost 80% of cases as either clinical or sub-clinical or as having no diagnosis.

In South Africa, the original English version of the CBCL has been used successfully in a number of different studies measuring children's emotional and behavioral problems (see, e.g., Asanbe et al., 2016; Louw et al., 2015; Rochat et al., 2015).

Impairment Rating Scale (IRS). This 7-item questionnaire (Fabiano et al., 2006; see Appendix C) was developed by researchers at the University of Buffalo's ADHD clinic to

assess functional impairment across seven domains: relationship with peers, relationship with siblings, relationship with parents, academic progress, self-esteem, influence on family functioning, and overall impairment. This instrument asks informants to rate the severity of a child's impairment in each of the seven functional areas by using a Likert-type scale with anchor points at 0 (*no problem/needs no intervention*) and 6 (*extreme problems/definitely needs intervention*). In the current study, I used the parent-report version of this measure.

Fabiano et al. (2006) indicate that the IRS was developed with the following aims in mind: brevity, the ability the assess multiple areas of impairment, accessibility to multiple informants (i.e., it is not exclusively a clinician-observation measure), as well as acceptable reliability and validity. The developers found that the IRS displayed good concurrent validity with other measures of functional impairment (e.g., the Children's Global Assessment Scale [CGAS; Setterberg et al., 1992]). Furthermore, the instrument proved to hold acceptable-to-excellent temporal stability over time; for instance, 1-year correlations for parent ratings of IRS items ranged from .54 to .76. Importantly in this context, they also found that the IRS was able to discriminate successfully between children with and without ADHD.

Regarding use in other ADHD-functional impairment studies, Loren et al. (2015) used the parent-report version of IRS as an index of functional impairment to evaluate the success of a parent-training intervention programme in a study of similar design to the current Study 2.

Strengths and Difficulties Questionnaire (SDQ). This 25-item questionnaire (Goodman, 1997; see Appendix D) enquires from an adult informant (e.g., parent, caregiver, teacher) about the behavior of a child aged 4–17 years. Each item asks the respondent to reflect on a particular positive or negative attribute of the child, indicating whether it is *not true* (for a score of 0)*, sometimes true* (for a score of 1), or *certainly true* (for a score of 2). Each item contributes its score to one of five subscales: Emotional Symptoms, Conduct Problems, Hyperactivity/Inattention, Peer Relationship Problems, and Prosocial Behavior. The total score for each of the five scales can range from 0 to 10. For the four problem-based subscales, a score of 0 is the best outcome (i.e., lower scores indicate the relative absence of difficulties). For the Prosocial Behavior subscale, a score of 10 is the best outcome (i.e., higher scores indicate the presence of positive social behavior).

A Total Difficulties score can be obtained by summing the scores of the four problem-based subscales. According to the instrument's manual, a Total Difficulties score in the range of 17–40 might be considered abnormal/clinically significant. Similarly abnormal/clinically significant are Emotional Symptoms scores of 5–10, Conduct Problems scores of 4–10,

Hyperactivity/Inattention scores of 7–10, and Peer Relationship Problems scores of 4–10. In the current study, I used the original English (UK) parent-report version.

Regarding use in other ADHD-functional impairment studies, Goodman and Scott (1999) compared the SDQ and CBCL in terms of their ability to describe functional impairment across different domains in children aged 4–7 years (n = 61 recruited from psychiatric clinics, n = 71 recruited from dental clinics). Mothers completed both instruments. Results indicated that SDQ and CBCL scores were strongly correlated, and that the instruments were equally able to discriminate psychiatric from dental cases (see also Breider et al., 2019, and Meyer et al., 2022, for use of the SDQ and CBCL to assess functional impairment in children with ADHD).

Regarding the SDQ's psychometric properties, Goodman (2001) reported results confirming the predicted five-factor structure and further indicated that the five subscales remain relatively uncontaminated by one another. Reliability was satisfactory, whether judged by internal consistency (mean Cronbach's α = .73), cross-informant correlation (M = .34), or test-retest stability over 4–6 months (M = .62).

More recently, Hall et al. (2019) assessed the validity of the SDQ in a sample of 250 English children aged 4–17 years, all of whom had been referred for assessment of possible ADHD. These children and their parents were participating in a large randomized controlled trial designed to evaluate the effectiveness of a computer-based measure of attention, impulsivity, and activity (QbTest) in accelerating accurate diagnoses. One group of participants received a QbTest report and a clinician's interpretation; another group did not. All participants completed the SDQ at baseline and again 6 months after commencement of assessment and their individualized treatment. Structural equation modelling confirmed the five-factor structure and indicated that it showed strong invariance across treatment groups and time points. The data also confirmed the SDQ's utility as a diagnostic aid and as a measure of intervention success.

Regarding cross-cultural use, the SDQ has been translated into many languages, including the South African languages Afrikaans and Xhosa. Hoosen et al. (2018) conducted a scoping review of the application and validity of the SDQ in the African context. They identified 54 peer-reviewed African studies that used the measure; 21 of these had been conducted in South Africa. For the most part, these studies used the SDQ to help describe internalizing/externalizing symptoms in clinical populations, especially children and adolescents living with HIV/AIDS (see, e.g., Van Kelder & Kraakman, 2007).

Hoosen et al. (2018) noted that these African studies frequently commented on issues pertaining to translation of the measure into indigenous languages. Nonetheless, they lauded the SDQ as a very useful screening tool for use in early identification and treatment of at-risk individuals in lower-income countries, emphasizing its simplicity, low cost, and easy accessibility. They concluded by stressing the importance of the correct implementation of and adherence to guidelines set out by the developers, and by encouraging the further evaluation of psychometric properties of the SDQ in specific African settings.

Picking up on this sentiment, De Vries et al. (2018) examined the psychometric properties of the SDQ using data from a South African sample of 3451 Grade 8 public school learners (mean age = 13.7 years; 60.3% female). These participants, who were part of a larger randomized controlled trial conducted in 2013 in the Western Cape province, completed the SDQ three times (at study baseline, 6 months later, and again 6 months after that). The measure was administered in English (using the UK version), Afrikaans, or Xhosa, depending on the participant's home language. Although De Vries et al. acknowledged the limitations of only using the self-report version of the SDQ, their data confirmed that the measure is indeed useful as a tool to identify clinically at-risk South African adolescents.

De Vries et al. also compared their SDQ data to those from studies conducted in China, Australia, and the United Kingdom. They reported that South African boys and girls had the highest mean Emotional Symptoms, Conduct Problems, and Total Difficulties scores. However, they cautioned against making strong inferences based on such direct cross-country comparisons, noting that diversity among biopsychosocial contexts may explain any observed differences.

Statistical Analyses

Across both studies described in subsequent chapters, all analyses were conducted using R version 4.2.1 (R Core Team, 2022). The conventional alpha value of .05 was used throughout, unless otherwise specified (e.g., when the value was adjusted to account for multiple comparisons). The skimr package was used to generate descriptive statistics (Waring et al., 2022), while the stats package was used for all ANOVA, chi-squared, and regression tests (R Core Team, 2022). Mixed effect models were run using the lme4 package (Bates et al., 2015), and effect sizes and planned contrasts calculated using the sjstats package (Lüdecke, 2018).

The set of questionnaires administered to the participants in Study 1 and Study 2 yielded a large amount of data describing the functional impairment of each participant's

child. For Study 1, all the data from all subscales on the three measures of functional impairment (CBCL, IRS and SDQ) were analyzed; this analysis is presented in Chapter 4. For the sake of brevity and more clearly interpretable results, Study 2 (which is presented in Chapter 5) only analyzed some of those outcome variables (viz., CBCL Total Competence; CBCL Total Difficulties; CBCL Internalizing Difficulties; CBCL Externalising Difficulties; SDQ Total Score; IRS Overall Impairment). The choice of these outcome variables was informed by the Study 1 results (specifically, which areas of functional impairment appeared to be most prominent) and by trends in the literature (e.g., the frequent use of scales representing internalizing and externalizing problems). The chosen outcome variables also tend toward representing totals of subscales or entire questionnaires, thereby capturing and representing overall functional impairment ratings.

CHAPTER 4
STUDY 1: FUNCTIONAL IMPAIRMENT IN SOUTH AFRICAN CHILDREN WITH ADHD

ADHD is a chronic neurodevelopmental disorder with high heritability and symptom manifestation that can progress and evolve across the lifespan. This lifelong condition is, moreover, associated with an increased risk of developing psychiatric comorbidities. The World Federation of ADHD International Consensus Statement (Faraone et al., 2021) notes that individuals diagnosed with ADHD are at increased risk for psychiatric conditions (e.g., major depressive disorder, substance use disorders), as well as for obesity, asthma, allergies, diabetes, sleep problems, psoriasis, epilepsy, sexually transmitted infections, immune disorders, and metabolic disorders (see also, Austerman, 2015; Liu, 2020). Of particular concern in this study is that individuals with ADHD are more likely than neurotypical peers to experience lower quality of life, accidental injuries, educational underachievement, unemployment, gambling, and teenage pregnancy.

The term *functional impairment* refers to how a psychiatric disorder affects an individual's performance and relations in their school, home, and social environments (Rapee et al., 2012). Important reasons to investigate functional impairment are that it adds to the understanding and prediction of treatment need and outcome, and that it helps identify the need for specific services (Arildskov et al., 2022; Weiss et al., 2018). Studying functional impairment also helps describe symptoms of a disorder in practical terms, making available information that is not always provided by diagnostic tests (Evans et al., 2018; Meyer et al., 2022; Rapee et al., 2012).

Functional impairment appears to be an accurate indicator of prognosis in individuals diagnosed with ADHD (Sasser et al., 2016). It is important to note, however, that a decrease in core ADHD symptom count is not always linearly related to an improvement in functional impairment, and vice-versa (Arildskov et al., 2022; Meyer et al., 2022). For this reason, Cortese and Coghill (2018) argue that clinical emphasis (and hence treatment recommendations) should be placed on the degree of functional impairment experienced by an individual with ADHD, rather than on the number of criteria-related symptoms with which the person presents.

The Current Study

This study aimed to describe areas of functional impairment as experienced by South African children with ADHD. It also investigated the impact of sociodemographic variables

(e.g., age, sex, home environment, socioeconomic status [SES]), as well as ADHD symptom presentation and psychiatric comorbidity, on functional impairment.

Statistical analyses allowed investigation of the following questions:

(1) In which areas of functional activity do children/adolescents diagnosed with ADHD experience the most significant impairment?

(2) To what degree is functional impairment in children/adolescents diagnosed with ADHD influenced by sociodemographic variables (e.g., age, sex, home environment), ADHD symptom presentation, and psychiatric comorbidity?

Method

Design and Setting

This study was of a descriptive, cross-sectional design. Data were collected from individual participants using semi-structured interviews and standardized self-report questionnaires. Each participant completed the interview and questionnaire session at (depending on their preference) a private room in the University of Cape Town's Department of Psychology, my private practice rooms in the southern suburbs of Cape Town, a private room in their child's school, or a private room in a neighbourhood community centre.

Participants

The sample consisted of 99 adults and their ADHD-diagnosed children, recruited as described in Chapter 3. Recall that each adult participant was required to be the parent/caregiver of a child or adolescent (age range = 6–18 years) with a current primary diagnosis of ADHD.

Measures

Each child participant was interviewed, in the presence of their parent/caregiver, using the *Mini International Neuropsychiatric Interview for Children and Adolescents (MINI-KID*; English version 6; Sheehan et al., 1998, 2010). This self-report diagnostic interview was used to confirm a primary diagnosis of ADHD, to describe ADHD symptom presentation, and to screen for the presence of other DSM-5 Axis I disorders.

Each adult participant completed measures that contributed data about (a) family sociodemographic variables (a study-specific *sociodemographic questionnaire*), (b) family home environment (the *Family Support Scale* [*FSS*; Dunst, 1982] and the Family Resource Scale [*FRS*; Dunst & Leet, 1987]), and (c) child functional impairment (the *Child Behavior Checklist* [*CBCL*; Achenbach & Rescorla, 2001], the *Impairment Rating Scale* [*IRS;* Fabiano et al., 2006], and the *Strengths and Difficulties Questionnaire* [*SDQ*; Goodman, 1997]).

Chapter 3 provides more detailed information about each of the above-named instruments.

Procedure

After successful recruitment, parent-child dyads were invited to schedule an appointment at a time and venue convenient for them. All interviews and questionnaires were completed in English. Although not all participants had English as a home language, all were able to read and speak it fluently. After administering the necessary consent and assent forms (see Appendix E and Appendix F) ensuring that both parents and children understood the study protocol and their role in it and reassuring them they would be permitted to ask questions at any time during the assessment process, I asked parents to complete the sociodemographic questionnaire. Thereafter, I administered the MINI-KID, with questions posed to the child directly. Parents were, however, encouraged to comment and add information where it was needed, or they felt it essential. After the diagnostic interview had been completed, parents filled in the SDQ, IRS, and CBCL, in that order. The session concluded after I gave both parent and child a thorough debriefing and offered them a copy of the study debriefing form (see Appendix G).

About a week after the assessment, I emailed parents a short feedback document as well as relevant referrals and helpful resources (see Appendix H).

Data Management and Statistical Analyses

First, I calculated descriptive statistics from data for all outcome variables related to each measure of functional impairment (CBCL Total Competence, Activities, Social Functioning, School Functioning, Total Problems, Internalizing Problems, Externalizing Problems; SDQ Total Difficulties, Emotional Problems, Conduct Problems, Hyperactivity/Inattention, Peer Problems, and Pro-social Scale; IRS Overall Functioning, Peer Relationships, Sibling Relationships, Academic Progress, Self-Esteem, Relationship with Parents, and Influence on Family). This set of descriptive statistics (a) sought to confirm that the data distributions permitted subsequent inferential statistical analyses, and (b) allowed investigation of the first research question (viz., in which areas of functional activity do children/adolescents diagnosed with ADHD diagnosis experience the most significant impairment?).

Second, a series of multiple linear regression models permitted investigation of the second research question (viz., to what degree is functional impairment in children/adolescents diagnosed with ADHD influenced by sociodemographic variables, ADHD symptom presentation, and psychiatric comorbidity?). Predictor variables included in

each model were: child's biological sex, child's educational level (their grade at the time of assessment), child's type of school (public or private), FRS total score (as a measure of the family's resources, and serving as a rough estimate of SES), FSS total score (as a measure of family support), whether or not the child had a current prescription for medication to treat their ADHD symptoms, and whether or not they presented with (a) a major depressive episode (b) generalised anxiety disorder, (c) conduct disorder, or (d) oppositional-defiant disorder. These predictor variables were chosen based on trends in the ADHD literature (see, e.g. Antshel & Barkley, 2020; Faraone et al., 2021; Liu, 2020). Because the large majority of participants (83 of 99, 83.84%) presented with a combined inattentive-hyperactive symptom profile and no participants presented with predominantly hyperactive symptoms, it was not prudent to use ADHD symptom presentation as a predictor variable. Outcome variables were all subscales of the CBCL (Total Competence, Activities, Social Functioning, School Functioning, Total Problems, Internalizing Problems, Externalizing Problems), SDQ (Total Difficulties, Emotional Problems, Conduct Problems, Hyperactivity, Peer Problems, Pro-social Scale), and IRD (Overall Functioning, Peer Relationships, Sibling Relationships, Academic Progress, Self-Esteem, Relationship with Parents, Influence on Family). Non-significant variables were dropped iteratively from the models until the final best-fitting model was reached.

Results

Sample Characteristics

Table 1 presents a summary of the key sociodemographic and clinical characteristics of the child participants ($N = 99$). Of particular note is that the MINI-KID clinical interview confirmed the ADHD diagnosis in each case.

More than 70% of these child participants were biological males. Furthermore, almost 60% had English as a home language, more than 80% were attending government schools, and more than 60% were at the foundation phase level (Grades 0–3) of their education.

More than 35% of the child participants were using stimulant medication to treat their ADHD symptoms. The most commonly observed psychiatric comorbidity was oppositional-defiant disorder, which was present in almost half of the participants. Finally, most participants (83 of the 99, 83.83%) presented with a combination of inattentive and hyperactive/impulsive symptoms; the rest presented with predominantly inattentive symptoms (i.e., no participant presented with predominantly hyperactive symptoms).

Only four (two boys and two girls) of the child participants presented with no comorbidities.

Table 1

Study 1: Sociodemographic and Clinical Characteristics of Child Participants (N = 99)

Characteristic	Category	*f*	%
Sex	Female	29	29.29
	Male	70	70.70
Education Level	Foundation phase: Grades 0–3	61	61.61
	Intermediate phase: Grades 4–7	26	26.26
	Senior phase: Grades 8–12	12	12.12
Home Language	English	59	59.60
	Afrikaans	29	29.30
	isiXhosa	11	11.11
School Type	Government	80	80.81
	Private	17	17.17
	Home	2	2.02
Grade Repetition [a]	Yes	23	23.23
	No	76	75.77
Race [b]	Black African	12	12.12
	Coloured (mixed ancestry)	35	35.35
	White	52	52.53
ADHD Medication [c]	Yes	37	37.38
	No	62	62.62
Psychiatric Comorbidity	Major Depressive Episode	34	34.34
	Generalized Anxiety Disorder	43	43.43
	Separation Anxiety	15	15.15
	Posttraumatic Stress Disorder	16	16.16
	Oppositional-Defiant Disorder	48	48.48
	Conduct Disorder	33	33.33

Note. f = raw frequency out of the total number of participants (*N* = 99). % = proportion, calculated as a percentage using the raw frequency converted into a percentage.

[a] This variable indicates whether the child has ever repeated a year of school.

[b] These race categories, which mirror those used by the Statistics South Africa in their census data, are used purely descriptively and because they are often predictive of important sociodemographic characteristics (e.g., socioeconomic status) and healthcare variables (e.g., access to care).

[c] This variable indicates whether the child is currently using ADHD medication.

Table 2 presents a summary of the key sociodemographic characteristics of the parent sample (*N* = 99), which had an average age of 39.3 years. More than 90% were biological females and almost 50% were married. More than 40% had completed at least a high school education and less than 13% were not formally employed (i.e., this number includes those who chose to be homemakers and hence were not actively seeking a job). Regarding type of employment, almost one-quarter of the sample indicated employment in technical, clerical, or sales-related fields. Gross household income was spread relatively evenly across the reported brackets.

Table 2

Study 1: Sociodemographic Characteristics of Parent Participants (N = 99)

Characteristic	Category	*f*	%
Sex	Female	92	92.92
	Male	7	7.07
Education Level	Primary school (incomplete)	3	3.03
	High school (incomplete)	14	14.14
	Completed high school / National Senior Certificate	41	41.41
	Tertiary education (Diploma or Bachelor's Degree)	27	27.27
	Postgraduate degree	14	14.14
Employment Status	Unemployed	12	12.12
	Semi-skilled labor	14	14.14
	Skilled manual labor	15	15.15
	Clerical or technical work; sales	24	24.24
	Administrative work; small business owners	10	10.10
	Managers and licensed professionals	16	16.16
	Executives and senior professionals	8	8.08
Income Bracket [a]	0 – 50000	9	9.09
	50000 – 100 000	14	14.14
	100000 –150000	11	11.11
	150000 – 200000	12	12.12
	200000 – 300000	15	15.15
	300000 – 400000	12	12.12
	400000 – 500000	17	17.17
	> 500 000	9	9.09
Marital Status	Married	49	49.49
	Divorced	23	23.23
	Single / Widowed	27	27.27

Note. f = raw frequency out of the total number of participants (*N* = 99). % = proportion, calculated as a percentage using the raw frequency converted into a percentage.

[a] Annual gross household income, in South African Rands (ZAR). At the time of data collection, the ZAR:US$ exchange rate was on average R15 for $1

Areas of Functional Impairment in Children/Adolescents with ADHD

Table 3 presents descriptive statistics for the CBCL, SDQ, and IRS. The data for all outcome variables were approximately normally distributed, with means and medians being similar in all cases. The subsections below present more detail regarding the data for each measure of functional impairment separately.

Table 3

Study 1: Functional Impairment in Children/Adolescents Diagnosed with ADHD (N = 99)

Measure / Subscale	*M* (*SD*)	*Mdn* (Q1, Q3)
CBCL [a]		
Total Competence	35.93 (8.59)	35.00 (31.50, 39.50)
Activities	42.20 (9.37)	43.00 (35.00, 47.00)
Social Functioning	38.36 (9.26)	38.00 (30.50, 43.50)
School Functioning	37.80 (8.42)	38.00 (33.00, 43.00)
Total Problems	64.29 (7.98)	65.00 (58.50, 70.00)
Internalizing Problems	60.07 (10.42)	61.00 (54.00, 68.00)
Externalizing Problems	61.46 (10.14)	62.00 (53.00, 69.00)
SDQ [b]		
Total Difficulties	30.54 (5.53)	31.00 (26.50, 35.00)
Emotional Problems	5.55 (1.61)	6.00 (4.00, 7.00)
Conduct Problems	5.16 (1.75)	5.00 (3.50, 7.00)
Hyperactivity	7.54 (1.05)	8.00 (7.00, 8.00)
Peer Problems	4.99 (2.15)	4.00 (3.00,7.00)
Pro-Social Scale	6.84 (1.26)	7.00 (6.00, 8.00)
IRS [c]		
Overall Functioning	4.91 (0.76)	5.00 (4.00, 5.00)
Peer Relationships	4.42 (1.10)	4.00 (4.00, 5.00)
Sibling Relationships	4.32 (0.89)	4.00 (4.00, 5.00)
Academic Progress	4.70 (0.90)	5.00 (4.00, 5.00)
Self-Esteem	4.64 (0.98)	5.00 (4.00, 5.00)
Relationship with Parents	4.46 (0.87)	5.00 (4.00, 5.00)
Influence on Family	4.59 (0.73)	5.00 (4.00, 5.00)

Note. M = mean; *SD* = standard deviation; *Mdn* = median; Q1 = first quartile; Q3 = third quartile; CBCL = Child Behavior Checklist; SDQ = Strengths and Difficulties Questionnaire; IRS = Impairment Rating Scale.

[a] Data presented are for *T*-scores. For the CBCL competence subscales (i.e., Total Competence, Activities, Social Functioning, School Functioning, range descriptors for *T*-scores are as follows: ≤ 30, clinically significant impairment; 31–35, borderline; > 35, normal/typical functioning. For the CBCL problem-related subscales (i.e., Total Problems, Internalizing Problems, Externalizing Problems), range descriptors for *T*-scores are as follows: < 60, normal/typical functioning; 60–64, borderline; > 64, clinically significant impairment (Achenbach & Rescorla, 2001).

[b] Data presented are for raw scores, which can range from 0–40 for the Total Difficulties variable and from 0-10 for all the problem-based subscales. The following are score ranges considered "abnormal / clinically significant": Total Difficulties, a score ≥ 17; Emotional Problems, ≥ 5; Conduct Problems, ≥ 4; Hyperactivity, ≥ 7; Peer Problems, ≥ 4 (Goodman, 1997).

[c] Data presented are for raw scores on a Likert-type scale with anchors at 0 and 6 (Fabiano et al., 2006).

CBCL. On average, parents rated their children's overall competence as being toward the very low end of the range described as "normal/typical functioning." Regarding the three distinct areas in which competence was rated, on average parents indicated that their children were least competent in school functioning (although it must be noted that both mean and median scores for all three subscales in this category fell within the range described as "normal/typical functioning"). For Total Competence, although scores for half of the sample were in the normal range a sizable minority (almost one-quarter) of the children scored below in the clinically impaired range (see Table 4).

Table 4

Study 1: Proportion of Sample Rated as Performing within the Normal, Borderline, and Clinically Impaired Range on Two Measures of Functional Impairment (N = 99)

	Score Range Descriptor		
Measure/ Subscale	Normal Functioning	Borderline	Clinically Impaired
CBCL			
Total Competence	0.50	0.26	0.24
Activities	0.75	0.16	0.10
Social Functioning	0.60	0.22	0.18
School Functioning	0.58	0.24	0.18
Total Problems	0.25	0.24	0.51
Internalizing Problems	0.46	0.19	0.35
Externalizing Problems	0.40	0.20	0.40
SDQ			
Total Difficulties	0.01	0.00	0.99
Emotional Problems	0.37	0.00	0.63
Conduct Problems	0.25	0.00	0.75
Hyperactivity	0.30	0.00	0.70
Peer Problems	0.32	0.00	0.68

Note. CBCL = Child Behavior Checklist; SDQ = Strengths and Difficulties Questionnaire.

Results for the problem-based subscales were somewhat different. On average, parents rated their children's overall problems as being toward the very low end of the range described as "clinically significant impairment"; more than half the sample's scores were in that range (see Table 3 and Table 4). Regarding the two distinct problem areas, on average parents indicated that their children's presentation of both internalizing and externalizing problems was in the range described as "borderline [impairment]."

SDQ. On average, parents rated their children's total difficulties as being toward the middle of the range described as "abnormal / clinically significant." Of note here is that all except one of the participants had a score within that range. Regarding the four distinct areas of problems that were rated, on average parents indicated that their children were

experiencing significant problems in each one, with the most difficulty reported in the area of hyperactivity. For each of the four problem-based subscales, more than 60% of participants were reported to be experiencing clinically significant difficulties (see Table 3). Of interest, however, is that, on average, participants rated their children as exhibiting normal pro-social functioning (see Table 3).

IRS. On average, parents rated their children's overall functioning as being toward the higher end of the 7-point Likert-type scale (median score of 5 on the 0–6 scale). Scores in that range indicate problems that are significant and that might require urgent intervention. Regarding the six distinct areas in which impairment was rated, on average parents indicated that their children were experiencing significant problems in each one (median score of at least 4), with the most difficulty reported in the area of academic progress (median score of 5; see Table 3).

Influence of Sociodemographic and Clinical Variables on Functional Impairment in Children/Adolescents with ADHD

For each model, all assumptions underlying standard regression analyses were upheld (i.e., the distribution of residuals was approximately normal and homoscedastic, and there were no issues of multi-collinearity). Fourteen of the 19 models tested proved to have a set of significant predictor variables. These models were for the following outcome variables: CBCL Total Competence, CBCL Activities, CBCL Social Functioning, CBCL Total Problems, SDQ Total Difficulties, SDQ Emotional Problems, SDQ Conduct Problems, SDQ Hyperactivity Peer Problems, SDQ Pro-social Scale, IRS Peer Problems, IRS Sibling Relationships, IRS Self-Esteem, and IRS Relationship with Parents. The models for each measure of functional impairment are discussed separately below.

CBCL. Parent ratings of Total Competence were significantly higher (on average, 3.96 units) for children with a prescription for ADHD medication and significantly lower (on average, 7.35 units) for children with comorbid oppositional-defiant disorder (see Table 5).

Parent ratings of Activities were significantly higher (on average, 4.55 units) for children with a prescription for ADHD medication.

Parent ratings of Social Functioning were significantly lower (on average, 8.73 units) for children with comorbid oppositional-defiant disorder, significantly higher (on average, 4.66 units) for children who were attending a private school, and significantly higher (on average, 0.32 units) for children in families with higher FSS scores.

Parents ratings of Total Problems were significantly higher for children (a) with comorbid oppositional-defiant disorder (on average, 5.92 units), (b) with comorbid conduct

disorder (on average, 5.66 units), (c) with a comorbid major depressive episode (on average, 3.10 units), and (d) who were in a higher school grade (on average, 0.44 units).

Table 5

Study 1: Sociodemographic and Clinical Predictors of CBCL-Measured Functional Impairment in Children/Adolescents Diagnosed with ADHD (N = 99)

				95% CI		
Outcome Variable	Significant Predictors [a]	Estimate	*SE*	LL	UL	*p*
Total Competence [c]	ADHD Medication [b]	3.96	1.65	0.75	5.61	.019*
	Oppositional-Defiant Disorder	-7.35	1.60	-10.47	-4.23	< .001***
Activities [d]	ADHD medication	4.55	1.90	0.83	8.27	.019**
Social Competence [e]	Private school	4.66	2.23	-6.89	-0.32	.039*
	FSS Total Score	0.32	0.12	0.19	0.44	.008**
	Oppositional-Defiant Disorder	-8.73	1.60	-11.85	-5.61	< .001***
Total Problems [f]	Grade	0.44	0.22	0.01	0.87	.047*
	Oppositional-Defiant Disorder	5.92	1.40	3.19	8.65	< .001***
	Conduct Disorder	5.66	1.54	2.66	8.66	< .001***
	Major Depressive Episode	3.10	1.34	0.50	6.70	.022*

Note. CBCL = Child Behavior Checklist; *SE* = standard error of the estimate; CI = confidence interval; LL = lower limit; UL = upper limit; FSS = Family Support Scale.
[a] All predictors with the exception of *Grade* (highest level of education attained at the time of the study) and *FSS Total Score* are categorical, comparing presence and absence of the variable in question. [b] This variable indicates whether the child is currently using ADHD medication. [c] Model fit was $R^2 = .18$. [d] Model fit was $R^2 = .05$. [e] Model fit was $R^2 = .29$. [f] Model fit was $R^2 = .46$. All R^2 values were adjusted for multiple predictors. *** $p < .001$. ** $p < .01$. * $p < .05$.

Of note is that for only one of these models did the significant predictors account for more than 40% of the observed variance: Total Problems = 46%; Social Functioning = 29%; Total Competence = 18%; Activities = 5%. This pattern of data suggests that some other (unmeasured) individual difference factors may have been affecting most of these subscale scores.

SDQ. Parent ratings of Total Difficulties were significantly higher for children with comorbid (a) oppositional-defiant disorder (on average, 5.11 units), (b) conduct disorder (on average, 3.96 units), and (c) generalized anxiety disorder (on average, 2.26 units).

Similarly, parent ratings on the Hyperactivity subscale were significantly higher for children with comorbid conduct disorder (on average, 1.23 units). These ratings were also significantly lower for those who had experienced a major depressive episode (on average, 0.53 units) and significantly higher for those who were attending a private school (on average, 0.79 units).

Parent ratings on the Emotional Problems subscale were also significantly higher for children (a) with comorbid oppositional-defiant disorder (on average, 0.87 units), (b) who

had experienced a major depressive episode (on average, 0.73 units), and (c) who were older (on average, 0.16 units).

Table 6

Study 1: Sociodemographic and Clinical Predictors of SDQ-Measured Functional Impairment in Children/Adolescents Diagnosed with ADHD (N = 99)

				95% CI		
Outcome Variable	Significant Predictors [a]	Estimate	*SE*	LL	UL	*p*
Total Difficulties [b]	Oppositional-Defiant Disorder	5.11	0.96	3.24	6.98	< .001***
	Conduct Disorder	3.96	1.03	1.96	5.96	< .001***
	Generalized Anxiety Disorder	2.26	0.83	0.65	3.87	.007**
Hyperactivity [c]	Private school	0.79	0.27	0.26	1.32	.004**
	Conduct Disorder	1.23	0.28	0.68	1.78	< .001***
	Major Depressive Episode	-0.53	0.21	-0.94	-0.12	.012*
Emotional Problems [d]	Age	0.16	0.05	0.06	0.26	.003**
	Oppositional-Defiant Disorder	0.87	0.29	0.30	1.44	.003**
	Major Depressive Episode	0.73	0.32	0.10	1.36	.022*
Conduct Problems [e]	Oppositional-Defiant Disorder	1.47	0.31	0.86	2.08	< .001***
	Conduct Disorder	1.27	.033	0.62	1.92	< .001***
Peer Problems [f]	Private school	1.10	0.49	0.14	2.06	0.29*
	FSS Total Score	-0.08	0.03	-0.14	-0.02	0.003**
	Oppositional-Defiant Disorder	2.12	0.36	1.41	2.83	< .001***
Pro-Social Scale [g]	Sex (Male)	-0.54	0.26	-1.05	-0.03	0.39*
	Oppositional-Defiant Disorder	-0.87	0.23	-1.32	-0.42	< .001***

Note. SDQ = Strengths and Difficulties Questionnaire; *SE* = standard error of the estimate; CI = confidence interval; LL = lower limit; UL = upper limit; FSS = Family Support Scale.
[a] All predictors with the exception of *FSS Total Score* are categorical, comparing presence and absence of the variable in question. [b] Model fit was $R^2 = .47$. [c] Model fit was $R^2 = .22$. [d] Model fit was $R^2 = .24$. [e] Model fit was $R^2 = .44$. [f] Model fit was $R^2 = .35$. [g] Model fit was $R^2 = .16$.
All R^2 values were adjusted for multiple predictors. *** $p < .001$. ** $p < .01$. * $p < .05$.

Similar to the pattern described above, parent ratings on the Conduct Problems subscale were significantly higher for children with comorbid (a) oppositional-defiant disorder (on average, 1.47 units) or (b) conduct disorder (on average, 1.27 units).

Parent ratings on the Peer Problems subscale were also significantly higher for children with comorbid oppositional-defiant disorder (on average, 2.12 units). These ratings were significantly lower for those who reported having more family support (on average, 0.08 units) and significantly higher for those who were attending private school (on average, 1.10 units).

Finally, parent ratings on the Pro-Social subscale were significantly lower for (a) children with comorbid oppositional-defiant disorder (on average, 0.87 units) and (b) boys relative to girls (on average, 0.54 units).

Of note is that for only two of these models did the significant predictors account for more than 40% of the observed variance: Total Difficulties = 47%; Conduct Problems = 44%; Peer Problems = 35%; Emotional Problems = 24%; Hyperactivity = 22%; Pro-Social = 16%. This pattern of data suggests that some other (unmeasured) individual difference factors may have been affecting most of these subscale scores.

IRS. Parent ratings on the IRS subscales of Peer Problems, Sibling Relationships, Parent Relationships, and Self-Esteem were significantly higher for children with comorbid oppositional-defiant disorder (respectively, an average of 1.04 units, 0.91 units, 0.88 units, and 0.58 units; see Table 7). The only other significant predictor among the IRS models was the presence of a major depressive episode. Parents indicated that children who had experienced such an episode had significantly poorer Sibling Relationships (by an average of 0.35 units over those who had never experienced such an episode).

Table 7
Study 1: Sociodemographic and Clinical Predictors of IRS-Measured Functional Impairment in Children/Adolescents Diagnosed with ADHD (N = 99)

				95% CI		
Outcome Variable	Significant Predictors [a]	Estimate	*SE*	LL	UL	*p*
Peer Problems [a]	Oppositional-Defiant Disorder	1.04	0.20	0.65	1.43	< .001***
Sibling Relationships [b]	Oppositional-Defiant Disorder	0.91	0.15	0.62	1.20	< .001***
	Major Depressive Episode	0.35	0.16	0.04	0.66	.031*
Parent Relationships [c]	Oppositional-Defiant Disorder	0.88	0.15	0.59	1.17	< .001***
Self-Esteem [d]	Oppositional-Defiant Disorder	0.58	0.19	0.21	0.95	.003**

Note. IRS = Impairment Rating Scale; *SE* = standard error of the estimate; CI = confidence interval; LL = lower limit; UL = upper limit. [a] Model fit was $R^2 = .22$. [b] Model fit was $R^2 = .31$. [c] Model fit was $R^2 = .25$. [d] Model fit was $R^2 = .08$.
All R^2 values were adjusted for multiple predictors. *** $p < .001$. ** $p < .01$. * $p < .05$.

Of note is that for none of these models did the significant predictors account for more than 40% of the observed variance: Sibling Relationships =31%; Parent Relationships = 25%; Peer Problems = 22%; Self-Esteem = 8%. This pattern of data suggests that some other (unmeasured) individual difference factors may have been affecting the IRS subscale scores.

Discussion

The overall purpose of this descriptive cross-sectional study was to serve as a needs assessment that would guide the design of a targeted intervention for parents of school-aged children with ADHD. The study's two primary aims were explored using two separate sets of statistical analyses. The first set of analyses attempted to answer the following question: In which areas of functional activity do children/adolescents diagnosed with ADHD experience

the most significant impairment? It is important to describe an individual's challenges and competencies in this manner because functional impairment appears to be an accurate indicator of prognosis in ADHD-diagnosed individuals (Sasser et al., 2016). The second set of analyses attempted to answer the following question: To what degree is functional impairment in children/adolescents diagnosed with ADHD influenced by sociodemographic variables (e.g., age, sex, SES), ADHD symptom presentation, and psychiatric comorbidity? Data were collected from parents of ADHD-diagnosed children ($N = 99$) using semi-structured interviews and standardized self-report questionnaires.

Regarding sample characteristics, the large majority of children (83%) were diagnosed with combined presentation ADHD; no participant presented with mostly hyperactive symptoms. Most participants (70%) were biological males, and most were enrolled in the foundation phase (i.e., between Grade R and Grade 3) of their basic education (60%). These characteristics are, by and large, typical of what is reported in research literature on school-aged children with ADHD. Boys are twice as likely as girls to present with the disorder, with some researchers suggesting that this disparity is due to the fact that fewer girls present with overt hyperactive/impulsive symptoms (see, e.g., Antshel & Barkley, 2020; Liu, 2020). Moreover, boys are referred more often than girls for clinical assessment by teachers and parents who are concerned about ADHD-related symptoms (Fawns, 2021). Research also suggests that boys and girls show different ADHD symptom trajectories. Whereas many girls are first diagnosed at the onset of adolescence, boys are often diagnosed at primary school age (see, e.g., Faraone et al., 2021; Murray et al., 2019).

Regarding the first research question, results from the three outcome measures (CBCL, SDQ, and IRS) were consistent in indicating that impairment was not limited to discrete domains of functioning but rather was experienced across multiple areas (e.g., scores for CBCL Total Problems, SDQ Total Difficulties, and IRS Overall Functioning were within the ranges conventionally described as 'impaired' or as 'of clinical concern'). On all SDQ and IRS subscales, parents rated their children as struggling significantly in all functional areas. These results are consistent with current diagnostic criteria for ADHD, which state that impairment should be pervasive across all functional areas (DSM-5; APA, 2013).

Examining the results from the first set of analyses more closely, both CBCL and IRS data indicated that parents rated their children as experiencing the most severe impairment in the school domain of functioning. Academic performance and school achievement are important developmental milestones because scholastic success is associated with healthy personal and professional functioning across the human lifespan (Locatelli, 2018; Murray,

2023). To illustrate this point, Rabiner et al. (2016) conducted a longitudinal study investigating the relationship between early childhood characteristics (specifically, attention challenges, social skills, and acquired academic skills) and academic outcomes in young adulthood ($N = 386$). They found that the presence of attention difficulties in early childhood predicted poorer academic performance in the fifth grade, which subsequently predicted lower grades during middle school, and ultimately reduced the odds of high school graduation and any tertiary education. Their results indicated, in fact, that a 1 *SD* increase in early childhood attention difficulties reduced the odds of high school graduation by 40%. Hence, these authors emphasize the importance of early detection of ADHD symptoms in children, as well as the development of effective interventions specifically targeting attentional difficulties in the school domain.

Of further interest among the results from the first set of statistical analyses is that children in this sample appear to experience the fewest problems (i.e., have the best functioning) in the social domain. Scores were relatively low on the SDQ Peer Problems subscale, and overall performance on the SDQ Pro-social subscale fell within the normal range of functioning. This pattern of results might be explained by the fact that most participants were quite young (i.e., in the early years of primary school), whereas literature suggests that older children often perform poorly on indices of social functioning (Nilsen & Bacso, 2017; Ray et al., 2017). Adolescence seems to be a particularly vulnerable time for the social functioning of ADHD-diagnosed individuals (Meyer et al., 2022; Mustonen et al., 2022).

In summary, results from the first set of analyses provided valuable knowledge to inform the design of the upcoming intervention. First, it appears important to address the functioning of ADHD-diagnosed children in all major areas of activity (school, home, interpersonal relationships). Second, there should be a special focus on how parents can support and motivate their children in the domain of school and academic functioning to ensure that they reach their cognitive potential and achieve developmental milestones appropriately. Third, despite relatively good ratings on scales measuring social functioning, the intervention should still aim to address children's performance in this domain. The specific emphasis here should be on how to teach them tools that will serve them well during adolescence.

Regarding the second research question, analyses suggested that the presence of comorbid oppositional-defiant disorder was the strongest predictor of worse overall functional impairment. The presence of other psychiatric comorbidities (notably, conduct

disorder, a major depressive episode, and generalized anxiety disorder) also had a negative impact on functioning. These results are consistent with previously published literature indicating that ADHD-related functional impairment is exacerbated by the presence of comorbid psychiatric disorders (Liu, 2020; Meyer et al., 2022).

About two-thirds of children who meet diagnostic criteria for ADHD also meet criteria for other psychiatric disorders, including depression, anxiety, substance abuse, oppositional-defiant disorder, and conduct disorder (see, e.g., Antshel & Barkley, 2020; Fawns, 2021; Liu, 2020). Banaschewksi et al. (2017) reported in their overview of published ADHD guidelines and reviews that at least 75% of ADHD-diagnosed children meet criteria for at least one comorbidity, with 60% meeting criteria for multiple comorbidities. Younger children with ADHD are frequently diagnosed with comorbid anxiety disorders and ODD, while comorbid depressive disorders and severe conduct problems are more likely to present later in childhood and in early adolescence (Banaschewksi et al., 2017; Mattingly et al., 2021). Furthermore, the presence of such comorbidities has been linked to poorer prognosis (Booster et al., 2012; Cuffe et al., 2020).

The use of stimulant medication emerged as a strong predictor of better functioning overall. Again, this finding is consistent with existing literature in the field, which indicates that the use of stimulant medication, especially methylphenidate, is the most effective single intervention able to reduce core symptoms of ADHD (Antshel & Barkley, 2020; Cortese & Coghill, 2018; Faraone et al., 2021;).

Of further interest among the results from the second set of statistical analyses is that none of the predictor variables (neither sociodemographic characteristics, nor ADHD symptom presentation, nor psychiatric comorbidities) accounted for a significant amount of variance in outcomes related to the school domain of functioning. This is an interesting finding given that this domain of functioning was identified by participating parents as the area of most challenge and concern. A qualitative study conducted by South African researchers explored the lived experiences of 10 parents with ADHD-diagnosed children (Mofokeng & Van der Wath, 2017). Thematic analyses revealed that parents' concern about their children's school performance and educational challenges was one of five themes discussed by all the participants.

Another point of interest here is that neither family resources nor family support was a significant predictor of functional impairment in general (higher scores on our measure of family support, and private school attendance, only had a small positive impact on CBCL-measured social competence). One interpretation of this finding is that children from varying

socioeconomic backgrounds struggle with ADHD-related functional impairment in much the same way. This interpretation is, however, at least partially inconsistent with previously published research. Studies suggest that although there is not causal link between high levels of SES and protection from ADHD diagnosis, types of family dysfunction that are found more frequently in low-SES families (e.g., ineffective communication patterns, conflictual relationships, poor problem solving skills, maternal smoking, and poor parental mental health) are associated with an increased prevalence of ADHD diagnoses and more ADHD-related difficulties in children (see, e.g., Foley, 2011; Rowland et al., 2017; Russell et al., 2015). Markham and Spencer (2022) systematically reviewed the literature examining psychological, environmental, and behavioral factors that might mediate the relationship between low SES and ADHD diagnosis. Their results highlighted the important mediating effects of parenting behavior, parental conflict, parental engagement, home learning environment, maternal mental health, breast feeding, and adverse childhood experiences on the development of ADHD.

In summary, results from the second set of analyses also provided valuable knowledge to inform the design of the upcoming intervention. First, parents need to be informed regarding the potentially negative effects of psychiatric comorbidities, especially oppositional-defiant disorder, on ADHD-associated functional impairment. Relatedly, treating health professionals must be fully aware of how interventions must differ for patients with and without significant comorbidities. Second, the intervention must include important and accurate information about appropriate medication for ADHD.

Limitations and Directions for Future Research

Inferences drawn from the current study must be made while considering the following limitations. First, because I used convenience sampling as the primary basis for recruitment, the sample's age, SES, and language distributions do not accurately represent the greater South African population. It is certainly possible that certain members of the population are more likely to be exposed to advertising inviting them to participate in academic research; others are less likely to be in contact with professionals or educators who might alert them to the possibility of involvement in this type of clinical study.

Second, all the measures of functional impairment used in this study were of a self-report nature. Because the participants were informed at the outset of their involvement that the goal of the research was to add to the knowledge base regarding challenges faced by children with ADHD, they may (because of demand characteristics or a need to ensure their

child received help) have tended to exaggerate their reports regarding functional impairment. Another consideration when evaluating the validity of self-report data is how educated the respondents are in terms of the topic at hand. Some parent participants in the current study had no previous exposure to answering questions regarding their child's functioning. In fact, many used the study as a starting block in addressing their child's ADHD-related everyday difficulties.

Third, this study did not measure participating parents' mental health, self-concept, or subjective experience of stress, all which may have impacted on the severity with which they experienced and rated their child's functional impairment. Future research might address this limitation by including measures of parental stress and by assessing their cognitive and mental health (and, perhaps, excluding parents with clinically significant psychological distress and/or cognitive impairment).

Future research studies in this area might also benefit from having different informants complete measures of functional impairment for each child participant. For example, teacher reports could add valuable feedback on children's behavior in the classroom and on the playground, while grandparents and other caregivers' reports can add dimension and depth to understanding of ADHD-related functional impairment in various home-based domains.

Finally, it is important to acknowledge that the current research study did not measure a myriad of potentially important or confounding individual differences, personal characteristics, and sociodemographic elements. For example, the impact of nutrition, food security, the quality of the parent-child relationship, children's IQ, children's sleep quality, and other sources of family stress were not within the scope of the current research.

Summary and Conclusion

This research contributes important knowledge on the specific ways in which ADHD-related functional impairment manifests among school-aged South African children. It also adds to the understanding of the degree to which clinical variables, specifically psychiatric comorbidity and the use of stimulant medication, impact on that functional impairment. Hence, this needs assessment study successfully identified areas of ADHD-related functional impairment that are important to address in the design of a parent-based psychosocial intervention.

An important concluding note is that participation in this study allowed parents to receive valuable individualized feedback, recommendations, and relevant referrals. All

parents were also invited to participate in the next stage of the research programme, which sought to evaluate the intervention founded on the bases of the current study's outcomes.

CHAPTER 5
STUDY 2: DESIGN, IMPLEMENTATION, AND EVALUATION OF A PARENT-BASED ADHD INTERVENTION TARGETED AT ADDRESSING CHILD FUNCTIONAL IMPAIRMENT

The results from Study 1, which was a needs assessment investigating the extent and type of functional impairment experienced by South African children with ADHD, indicated that all areas of functioning were affected negatively. Of particular concern, however, was functional impairment in the school domain and consequent academic difficulties. Furthermore, children with ADHD appeared to experience significant interpersonal and emotional difficulties. Of note here is that the Study 1 results highlighted the importance of addressing symptoms of comorbid oppositional defiant disorder (ODD); among children/adolescents with ADHD, this comorbidity was the strongest predictor of worse overall functional impairment.

The current study, Study 2 of this dissertation, describes the design, implementation, and evaluation (in a South African sample of parents with ADHD-diagnosed children) of an intervention targeting the functional impairments observed in Study 1. Hence, the content of the intervention focused specifically on the school and social domains and on the negative effects of comorbid ODD.

Existing literature indicates that the most successful interventions for ADHD use a combination of medication and behavioral therapy (for a review, see Cortese & Coghill, 2018). The pursuit of an intervention that included pharmacotherapy was not feasible within the bounds of this research endeavour because prescribing medication falls outside the scope of South African psychologists' practice. It would also not have been feasible to provide individual long-term behavior therapy to all interested families and children. Perusal of the existing literature in this field then suggests that the best alternative to regular individual or family therapy is a group-based behavioral intervention, with a specific focus on positive parenting skills training (see, e.g. Austerman, 2015; Fawns, 2021; Morgan & O'Keefe, 2022; Shen et al., 2021; Steenhuis et al., 2020). Hence, the intervention described and tested here was purely psychosocial in nature and incorporated group-based parenting skills training in attempting to address the areas of functional impairment identified by Study 1.

Specifically, an 8-week intervention sought to empower parents through psychoeducation and to teach them basic principles of behavior modification and positive parenting, with the ultimate aim of relieving functional impairment and thereby improving

quality of life for their ADHD-diagnosed children. Barkley (1990), in his seminal handbook on treatment of ADHD in children, provided the first design and advocacy for programmes of this type. Since then, numerous studies have provided data supporting the efficacy of such programmes (see, e.g., Garreta et al., 2018; Shah et al., 2021; Shen et al., 2021). Reviews of the literature have confirmed this efficacy. For instance, Steenhuis et al.'s (2020) meta-analysis of behavioral parent training interventions observed medium-to-large effect sizes in terms of parent-reported improvements with regard to ADHD symptoms, comorbidities, functional impairment, and parenting skills. Of note here are the findings of Banaschewksi et al.'s (2017) review, which indicate that even though behavior modification interventions, such as parent training, usually do not yield a reduction in core ADHD symptoms, significant positive outcomes have been noted in parents' child-rearing skills as well as in children's conduct and overall functioning.

Of further note are the conclusions from another relatively recent systematic review. Evans et al. (2018) investigated the literature on evidence-based psychosocial interventions for children and adolescents diagnosed with ADHD and concluded that even though core ADHD symptoms are traditionally the focus of a diagnosis, it is more often the functional impairment produced by the symptoms that becomes the focus of treatment and intervention. They argue that changes in impairment levels should therefore be the primary focus when evaluating the effectiveness of ADHD interventions. A successful intervention would therefore be one that improves children and families' functioning in various domains and activities of daily living, even as they continue to navigate the impact of lifelong core symptoms of this neurobehavioral disorder.

The Current Study

This study describes the design, implementation, and evaluation of an 8-week group-based intervention for parents of children with ADHD. The intervention was designed following the broad specifications of Barkley's (1990) parent training programmes, while also taking into consideration (a) recommendations and conclusions from recent peer-reviewed studies (e.g., Garreta et al., 2018; Shah et al., 2021; Shen et al., 2021) that evaluated the efficacy of parent training groups for ADHD, and (b) the findings from Study 1 of this dissertation.

In the current protocol, outcome measures were taken three times in the intervention group: immediately before the start of the intervention (baseline), immediately after completion of the intervention (post-intervention, 8 weeks post-baseline), and 6 months later (follow-up). The design also included two comparison groups: a non-structured support

group and a waitlist control group. For both groups, outcome measures were taken at baseline and 8 weeks later.

Although this study may be characterized as exploratory given that it is describes and tests a newly developed intervention, and that this is the first investigation of its kind in an African country, it did include a hypothesis-testing component. Specifically, I tested the predictions that (1) relative to participants assigned to the comparison groups, those assigned to the intervention group will report significantly less functional impairment after completion of their 8-week protocol, and (2) participants assigned to the intervention group will maintain improvement in functioning from the immediate post-intervention measurement point to the 6-month follow-up measurement point.

Method

Design and Setting

This was a non-randomized intervention study because participant assignment to groups was not truly random (see *Participants* section below). I used quantitative methods and measures (viz., semi-structured interviews and self-report questionnaires) to collect the data. Participants assigned to the intervention condition were exposed to an 8-week parent training programme. Those assigned to the control condition were either exposed to an 8-week non-structured support group process or did not take part in any process for a period of 8 weeks. This latter group of participants were therefore a waitlist control.

The assessment sessions (baseline and immediate post-intervention for participants in all three conditions; additional 6-month follow-up for those in the intervention condition) were held in either (depending on the participant's preference) a private research room within the University of Cape Town (UCT) Department of Psychology, in my private practice rooms in the southern suburbs of Cape Town, at a suitable venue located at their child's school, or in a private room within a neighborhood community center, clinic, or children's home. Similarly, and again depending on what was convenient and preferable for participants, intervention and support sessions took place at the UCT Department of Psychology, schools, community aftercare centers, church halls, and my private practice rooms. To ensure consistency and quality, I conducted all assessment, intervention, and support sessions. I am a fully qualified and registered clinical psychologist, with more than a decade of private practice experience.

Participants

Each participant was required to be the parent or primary caregiver of a school-aged child/adolescent who met formal diagnostic criteria for a diagnosis of ADHD. All Study 1

participants were invited to continue into this study. A total of 54 (54.55%) of the 99 who had participated in that study) chose to do so. New participants (n = 124) were recruited in a similar manner as in Study 1 (see Chapter 3 and Chapter 4).

Overall, then, a total of 178 parents/caregivers participated in this study. Group assignment was a follows: intervention n = 62, non-structured support n = 66, and waitlist control n = 50 (see Table 8). Group assignment was at least partially influenced by geographical and scheduling convenience. That is to say, potential participants were informed when and where an intervention or support group would commence, allowing them to make a selection based on a time and location convenient to them. For instance, participants assigned to the waitlist control condition were those for whom intervention or support group processes were only scheduled to commence in their area at a later date. I was able to secure accessible venues in the northern suburbs, southern suburbs, and central parts of Cape Town, including low-, medium-, and high-income neighbourhoods.

Regardless of initial group assignment, all participants were eventually invited to receive the intervention. At the time of writing, 96 of the sample of 178 (53.93%) had completed the 8-week intervention.

Table 8

Study2: Participants group assignment

Group allocation:	Participants in Study 2 (n=178)	Study 1 participants who took part in Study 2 (n= 54)
Intervention group	62	19
Non-structured support group	66	27
Waitlist group	50	8

Measures and Procedure

All participants, regardless of group assignment, were instructed not to alter any of their child's existing and ongoing ADHD-related treatment (regardless of whether it took the form of psychotherapy or medication) during the period of study participation.

Sociodemographic and Diagnostic Screening

Parents who had not participated in Study 1 completed informed consent documents and then filled in the study-specific sociodemographic questionnaire, Family Support Scale and Family Resource Scale during an initial introduction and screening meeting. As in Study

1, the MINI-Kid was used to confirm their child's ADHD diagnosis and the presence of comorbid psychiatric conditions. For participants assigned to the intervention condition and to the non-structured support condition, the measures of functional impairment (CBCL, SDQ, and IRS) were administered at the commencement of their group processes. For those assigned to the waitlist control group, the measures of functional impairment were administered as part of the initial introduction and screening meeting.

Individuals who had participated in Study 1 did not repeat the assessments they had completed as part of that study. Some of their Study 1 data (sociodemographic questionnaire, Family Support Scale, Family Resource Scale, MINI-Kid) were carried over to this study. In these cases, an initial introduction and screening meeting was unnecessary.

Chapter 3 provides more detailed information about each of the above-named instruments.

Intervention Groups

The study included 8 separate intervention groups. Of the 96 participants who were eventually exposed to the intervention protocol, 62 were only ever assigned to this condition. The rest had either initially been assigned to the non-structured support condition (n = 16) or to the waitlist control condition (n = 18). Regarding the 8 intervention groups, there were 14 participants in one group, 13 participants in two groups, 12 participants in three groups, and 10 participants in two groups.

The intervention protocol consisted of eight 1-hour group meetings running over 8 consecutive weeks. At the beginning of every session bar Session 1, the assigned homework from the previous week was discussed and participants were encouraged to share their experiences of trying to implement the concepts taught in the previous session. The eight sessions were otherwise structured as follows.

In *Session 1*, parents received details about the structure of the intervention as well as ADHD-specific psychoeducation related to core symptoms and typical clinical presentations. The focus of this psychoeducational component was on sharing current ADHD research (especially regarding treatment trends). It was important to start the intervention by encouraging parents to have empathy for their child's condition and to understand how ADHD symptoms might affect functioning, behavior, and conduct. Each parent participant introduced themselves and their child in absentia, and had an opportunity to share with the group any personal concerns and experiences related to their child. Group members were also encouraged to share what they hoped to learn and gain from exposure to the intervention. The measures of functional impairment from Study 1 (CBCL, SDQ, and IRS) were given to

participants to complete as homework. The data from this administration of the measures were used to establish baseline impairment. Note that, for those participants who had also been involved in Study 1, I did not carry over their CBCL, SDQ, and IRS data from that study – the new administration of the measures ensured consistency in the timing of the baseline assessment relative to the beginning of the intervention.

In *Session 2*, parents returned their completed CBCL, SDQ, and IRS forms and reflected on their completion of those questionnaires. The rest of the session focused on teaching them basic concepts of behavior modification with reference to the parenting context – that is to say, how a child's behavior can be shaped through positive reinforcement, negative reinforcement, and punishment. Participants were introduced to the idea that a reinforcer will strengthen the likelihood of a behavior occurring again, either by rewarding the child with a desirable outcome or object or by the removal of an unwanted or undesired outcome or circumstance.

To help illustrate these principles, I used a few different vignettes to generate discussion. One vignette was: *A child who struggles to concentrate in class is loudly playing with his pencil case, distracting others and disrupting the class. The teacher angrily sends him outside the classroom to have a time-out in the hallway. Through this punishment, the teacher is in fact negatively reinforcing the disruptive behavior, since the child gets to escape the unwanted, challenging classroom environment. The boy is likely to behave in this manner again*.

Another was: *A teenage girl spends a week keeping her room and personal belongings neat and tidy without any input from her parents. Her mother recognizes this behavior and verbally compliments and thanks her. Her mother also tells her that she's allowed to pick the family movie that they will all watch together on Saturday night. In so doing her mother positively reinforces her behavior, making it more likely that she will continue her efforts at keeping her room clean and tidy.*

For homework, parents were encouraged to identify specific behaviors exhibited by their children that they would like to encourage or, alternatively, would like to reduce or eliminate. They were encouraged to analyze the identified behavior in terms of existing reinforcers.

Session 3 introduced the concept of positive parenting. The focus of this session was the core idea that, rather than focusing on bad behavior and mistakes, desired behavior should be reinforced, motivated, and emphasized. Hence, parents were told that negative communication and the use of verbal aggression as a tool for discipline can lead to a

breakdown of parent-child relationships and can often have a negative impact on the child's self-esteem. Instead of pointing out mistakes and bad behavior, participants were encouraged to focus instead on positive actions, good intentions, and moments of being well-behaved. Different methods of positive reinforcement (e.g., the use of star charts, rewards by means of presents, treats, quality time, special allowances, or verbal affirmation) were presented and explored.

Toward the conclusion of this session, participants shared their experience of the homework assigned in the previous session. Group members were always encouraged to engage with each other's examples and to ask questions of the other group members and of the therapist/group leader. This week's homework assignment asked parents to identify positive aspects of their child's conduct and to record their attempts at reinforcing these behaviors.

Session 4 focused on how to reduce disruptive, unwanted, or negative behaviors. Parents were told that ignoring unwanted behavior can be an effective behavior modification tool. I also acknowledged, however, that certain types of conduct and circumstances require parents and caregivers to take action. Removing, reducing, or limiting access to rewards, favourite hobbies, and luxuries were presented as forms of punishment. We also discussed other forms of punishment (e.g., presenting children with unwanted consequences, such as time-outs, being grounded, or adding extra chores). Participants were also informed that verbal or physical aggression as punishment should be avoided; instead, they were encouraged to present consequences to the child's behavior in a matter-of-fact, calm manner, while clearly communicating to the child that their behavior is unwanted, but that they themselves are not unloved or unwanted.

Toward the conclusion of this session, participants discussed the homework assigned in the previous session. This week's homework assignment asked parents to identify an unwanted behavior exhibited by their child and to practice, as discussed and demonstrated during the session, presenting negative consequences as punishment,.

Session 5 focused on how to use the behavior modification concepts taught in sessions 2–4 to address the child's functioning in the school domain. Topics of discussion included how to motivate children to do homework, how to encourage and plan preparation for examinations and tests, and how to help children become more independent in their daily preparation for the school day. The importance of a positive relationship between parents and teachers was highlighted, and participants were encouraged to communicate effectively with their children's teachers. I shared information regarding classroom and examination

concessions available for children with ADHD and how to go about applying for these concessions and ensuring they are granted.

Toward the conclusion of this session participants discussed the homework assigned in the previous session. This week's homework assignment encouraged parents to identify a school-related behavior that they wished to either eliminate or encourage.

Session 6 focused on how to modify the child's behavior in the social domain. Hence, discussion included information about (a) improving peer relationships and forming healthy friendships, (b) addressing concerns about bullying and being bullied, and (c) identifying and addressing situations where peer pressure might be applied. The session emphasised helping children develop kindness and compassion toward themselves (so as to, for instance, bolster self-esteem) and toward others (so as to, for instance, develop empathy).

Toward the conclusion of this session participants discussed the homework assigned in the previous session. This week's homework assignment encouraged parents to use their newly-learned behavior modification tools to encourage children to incorporate more positive social behaviors.

Session 7 focused on how to modify the child's behavior in the family or home domain. Discussion points included relationships with parents and siblings, participation in or disruption of family events, engagement with chores, and bedtime and mealtime routines.

Toward the conclusion of this session participants discussed the homework assigned in the previous session, with particular focus on points of success and frustration. This week's homework assignment encouraged parents to use their newly-learned principles of behavior modification to eliminate or encourage a specific behavior in the family/home domain.

In *Session 8*, the final meeting, I asked participants to share reflections on the group process with particular emphasis on what they found significantly rewarding and significantly challenging. The focus of this session was to encourage parents to be consistent and to maintain the behavior modification tools they had learned. I shared information about emotional regulation and dysregulation (specifically about the role of the human sympathetic and parasympathetic nervous systems) and how to improve regulation and relieve dysregulation in adults and children. Parents were asked to reflect on their own dysregulating triggers and successful soothing methods, and to identify the same in their children.

At the end of this session, parents were asked to complete the measures of functional impairment (CBCL, SDQ, and IRS) again. Upon completion, participants were reminded that they would be contacted for a 6-month follow-up assessment.

The *Follow-Up Sessions* took the form of either a non-structured group meeting or an individual meeting at the original group venue (the latter for participants who could not attend a group session). At these sessions, participants completed the CBCL, SDQ, and IRS, for a third time. This design therefore allowed the study to track changes in functional impairment from baseline (the beginning of the intervention process) through the completion of the intervention and beyond, and to explore whether any of the observed changes persisted for some time after the conclusion of the set of intervention sessions.

Non-Structured Support Groups

The study included 6 separate non-structured support groups. There were 12 participants in two groups, 11 in two groups, and 10 in two groups.

This arm of the protocol consisted of eight 1-hour group meetings running over 8 consecutive weeks (i.e., this condition was structurally identical to the intervention condition). As was the case for the intervention groups, I ran each of these meetings.

The content of the meetings was largely unstructured, with my role being to simply facilitate conversation among group members. Toward the end of the first meeting, parents were asked to complete the measures of functional impairment (CBCL, SDQ, and IRS) as homework. (This was the only homework assignment presented to the participants in this condition.) The same measures were completed again after 8 weeks, at the end of this set of meetings. This design therefore allowed the study to track the change in functional impairment from baseline (the beginning of the non-structured support-group process) through the completion of the 8-week process, and to also control for changes in functional impairment related to temporal and maturation effects that might have occurred between the time of their original assessment and commencement of this support group.

After completing all these procedures, parents assigned to this condition were invited to participate in an intervention group.

Waitlist Control Group

I met all participants assigned to this condition in a one-on-one face-to-face session. At that session, I informed them that they would be invited to participate in an intervention group when space became available and asked them to complete the measures of functional impairment (CBCL, SDQ, and IRS). The same measures were completed again after an 8-weeks interval. These were the only assignments presented to the participants in this condition. This design therefore allowed the study to track an 8-week change in functional impairment (from baseline to initial follow-up) that could not be attributed to the intervention

or to support-group processes (i.e., that might be attributed purely to maturation and other temporal factors).

Data Management and Statistical Analyses

All analyses were conducted using R studio version 4.2.1, primarily the lme4 and emmeans packages (R Core Team, 2022). The threshold for statistical significance was set at the conventional level ($p = .05$), unless specified otherwise. Effect sizes were similarly interpreted following convention (Richardson, 2011).

Before testing the two major hypotheses, a set of one-way ANOVAs and chi-squared tests investigated the magnitude of between-group differences in terms of basic sociodemographic and clinical characteristics. The importance of these initial analyses is that they set out to demonstrate that participants in the three groups were sampled from similar sociodemographic and clinical pools. It was especially important to establish that there were no significant baseline between-group differences in terms of ADHD medication as well as comorbid depression, anxiety, PTSD, conduct disorder, or oppositional-defiance: Previously studies as well as results from Study 1 indicate the potential impact of these variables on functional impairment.

The first set of major inferential analyses was a set of mixed effects models testing the prediction that, relative to participants assigned to the comparison groups, those assigned to the intervention group would report significantly less functional impairment after completion of the 8-week protocol (that is to say, these models assess the intervention's effectiveness). Such analyses are ideally suited for repeated-measures designs because they model some individual differences at baseline rather than simply adding them as an error term (Bates et al., 2015). Of particular importance here is a statistic termed the intraclass correlation coefficient (ICC), which shows whether scores for individuals are robust or noisy, i.e. whether the data included a lot of meaningless variation or not. In the current models, high ICC values would suggest that children with more severe symptoms than their peers at baseline still had generally more severe symptoms post-intervention, despite any main effects of group assignment. In contrast, low ICC values would suggest that severe symptoms at baseline do not predict severe symptoms later.

The mixed effects models considered as predictors the main effects of Group and of Time, as well as the Group x Time interaction effect. An additional set of control predictors (viz., medication, type of school, and presence of oppositional-defiant disorder – based on the Study 1 results) was also considered. Given the randomisation of the experimental design, these control variables were evenly distributed among the three experimental conditions and

hence should have had no appreciable effects on the intervention itself. The outcome variables were: (a) *CBCL Total Competence* score, which was predicted to show a significant pre- to post-intervention increase for the intervention group relative to the control groups; (b) *CBCL Total Internalizing Difficulties* score, which was predicted to show a significant pre- to post-intervention decrease for the intervention group relative to the comparison groups; (c) *CBCL Externalising Difficulties* score, which was predicted to show a significant pre- to post-intervention decrease for the intervention group relative to the comparison groups; (d) *SDQ Total Score*, which was predicted to show a significant pre- to post-intervention decrease for the intervention group relative to the control groups; and (e) IRS Total Score, which was predicted to show a significant pre- to post-intervention decrease for the intervention group relative to the control groups.

Because the mixed effects models set out to test a specific hypothesis, a set of planned contrasts were conducted to confirm there were no significant between-group differences at baseline. Furthermore, where models found significant interaction effects, similar sets of planned contrasts sought to establish whether the source of the effect was significant change in the intervention group relative to each of the comparison groups and whether there were significant between-group differences at the post-intervention measurement point. This method of examining specific contrasts reduces Type 1 error (due to fewer comparisons being considered) without the need for severe *p*-value correction (e.g., a Holm or Bonferroni correction). In this way, planned comparisons improve power for testing specific hypotheses (Aickin & Gensler, 1996).

The second set of major inferential analyses was a set of standard repeated-measures ANOVAs that tested the following prediction: Participants assigned to the intervention group will maintain improvement in functioning from baseline through the immediate post-intervention measurement point to the 6-month follow-up measurement point. The outcome variables were the same as those for the first set of major inferential analyses. Because repeated-measures ANOVAs modelled no interactions, there were far fewer comparisons in play than in the previous set of analyses – hence, when the ANOVA detected a significant main effect of Time, all possible pairwise comparisons were tested. Where multiple pairwise comparisons were tested, the Holm correction was used to control familywise error. This correction is appropriate to use in a confirmatory (rather than exploratory) study, given that it is less severe than the Tukey or Bonferroni adjustments. The analyses here seek to confirm, at least in part, effects already found; moreover, there is a one-directional hypothesis because

the analysis is not investigating the presence of any change but is examining specifically whether the Intervention group continued a trajectory of functional improvement over time.

To complete the inferential analyses, a set of mixed effect models that included the same control variables as above (e.g., ADHD medication use, presence of comorbid psychiatric disorder) was run to test the second hypothesis. These models have the advantage of accounting for ICC, and by using dummy variables for the three levels of time they automatically compare the post-intervention and follow-up measurements with the baseline measurements.

Results

Sample Sociodemographic and Clinical Characteristics

Most parent participants were English speaking and most children attended government schools. For the most part, analyses detected no significant between-group differences with regard to key sociodemographic (home language, education) and clinical (ADHD medication, psychiatric comorbidities) characteristics (see Table 1 and Table 2). Similarly, there were no significant between-group differences with regard to child age: intervention group $M = 9.52 \pm 2.91$ years, non-structured support group $M = 9.15 \pm 2.60$ years, waitlist control group $M = 9.46 \pm 3.31$ years, $F = 0.29$, $p = .752$, $\eta^2 = .003$.

Overall, there were 28 children who presented with no comorbidities: 7 boys and 2 girls in the intervention group; 10 boys and 4 girls in the non-structured support group; 5 boys in the waitlist control group.

Overall, more parents of male children than female children participated. However, the sex distribution of child participants was significantly different across groups, with a relatively higher proportion of girls in the waitlist control group than in the other groups. This distributional difference was not of major concern because Study 1's results indicated that the biological sex of a child was not a significant predictor of either level or type of functional impairment. Furthermore, the effect size associated with this between-group difference is not strong (Cramer's $V = .28$).

Analyses detected no significant between-group differences with regard to key sociodemographic characteristics (sex, education level, employment or marital status) of parent participants (see Table 8). Overall, more female parents participated, with no fathers in the intervention group, only 1 in the waitlist group, and 6 in the non-structured support group.

Table 8

Study 2: Sociodemographic Characteristics of Child Participants (N = 178)

Characteristic	Category	Group: Intervention (*n* = 62)	Group: Non-Structured Support (*n* = 66)	Group: Waitlist Control (*n* = 50)	χ^2	*p*	ESE
Sex					14.19	<.001***	.28
	Female	12 (19.35%)	10 (15.15%)	22 (44.00%)			
	Male	50 (80.65%)	56 (84.85%)	28 (56.00%)			
Home Language					7.84	.098	.15
	English	49 (79.03%)	50 (75.76%)	29 (58.00%)			
	Afrikaans	12 (19.35%)	14 (21.21%)	17 (34.00%)			
	isiXhosa	1 (1.61%)	2 (3.03%)	4 (8.00%)			
School Type					4.85	.089	.17
	Government	52 (83.87%)	59 (89.39%)	37 (74.00%)			
	Private	10 (16.13%)	7 (10.61%)	13 (26.00%)			
Race [a]					4.44	.350	.11
	Black African	1 (1.61%)	3 (4.55%)	4 (8.00%)			
	Coloured (mixed ancestry)	25 (40.32%)	22 (33.33%)	22 (44.00%)			
	White	36 (58.06%)	41 (62.12%)	24 (48.00%)			

Note. For each group, data presented are raw frequencies with percentages in parentheses. ESE = effect size estimate (in this case, Cramer's *V*).

[a] These race categories, which mirror those used by the Statistics South Africa in their census data, are used purely descriptively and because they are often predictive of important sociodemographic characteristics (e.g., socioeconomic status) and healthcare variables (e.g., access to care).

*** $p < .001$. ** $p < .01$. * $p < .05$. (Bonferroni-corrected $p = .05 / 12 = .004$)

Table 9

Study 2: Clinical Characteristics of Child Participants (N = 178)

Characteristic	Category	Group: Intervention (*n* = 62)	Group: Non-Structured (*n* = 66)	Group: Waitlist (*n* = 50)	χ^2	*p*	ESE
ADHD Medication [a]					3.86	.147	.15
	Yes	29 (46.77%)	30 (45.45%)	15 (30.00%)			
	No	33 (53.23%)	36 (54.55%)	35 (70.00%)			
Psychiatric Comorbidity							
	Major Depressive Episode	19 (30.65%)	18 (27.27%)	16 (32.00%)	0.34	.844	.04
	Generalized Anxiety Disorder	21 (33.87%)	26 (39.39%)	17 (34.00%)	0.54	.764	.06
	Separation Anxiety	9 (14.52%)	9 (13.64%)	5 (10.00%)	0.55	.760	.06
	Posttraumatic Stress Disorder	4 (6.45%)	7 (10.61%)	4 (8.00%)	0.73	.694	.06
	Oppositional-Defiant Disorder	24 (38.72%)	34 (51.52%)	20 (40.00%)	2.54	.281	.12
	Conduct Disorder	18 (29.03%)	21 (31.82%)	18 (36.00%)	0.32	.851	.04

Note. For each group, data presented are raw frequencies with percentages in parentheses. ESE = effect size estimate (in this case, Cramer's *V*).

[a] This variable indicates whether the child is currently using ADHD medication.

Table 10

Study 2: Sociodemographic Characteristics of Parent Participants (N=178)

Characteristic	Category	Group			χ^2	*p*	ESE
		Intervention (*n* = 62)	Non-Structured Support (*n* = 66)	Waitlist Control (*n* = 50)			
Parent Sex					7.68	.021	.21
	Female	62 (100%)	60 (90.90%)	49 (98%)			
	Male	0 (0)	6 (9.09%)	1 (2%)			
Education Level					12.08	.145	.18
	Primary school - incomplete	0 (0)	1 (1.52%)	0 (0)			
	High school - incomplete	5 (8.06%)	5 (7.58%)	0 (0)			
	High school/ National senior certificate	25 (40.32%)	38 (57.58%)	27 (54%)			
	Tertiary education	19 (30.65%)	17 (27.42%)	14 (28%)			
	Post-graduate degree	13 (20.97%)	5 (7.58%)	9 (18%)			
Employment					15.65	.208	.21
	Unemployed	6 (9.68%)	8 (12.12%)	6 (12%)			
	Semi-skilled labor	2 (3.23%)	5 (7.58%)	1 (2%)			
	Skilled manual labor	5 (8.06%)	12 (18.18%)	10 (20%)			
	Clerical, technical or sales	17 (27.42%)	20 (30.30%)	16 (32%)			
	Administrative small business owners	21 (33.87%)	8 (12.12%)	9 (18%)			
	Managers or licensed professionals	9 (14.52%)	9 (13.64%)	4 (8%)			
	Executives and senior professionals	2 (3.23%)	4 (6.06%)	4 (8%)			
Marital Status					1.65	.800	.07
	Married	29 (46.77%)	35 (53.03%)	27 (54%)			
	Divorced	19 (30.65%)	21 (31.82%)	14 (28%)			
	Single or widowed	14 (22.58%)	10 (15.15%)	9 (18%)			

Note. For each group, data presented are raw frequencies with percentages in parentheses. ESE = effect size estimate (in this case, Cramer's *V*).

ADHD-Associated Functional Impairment at Baseline

By and large, analyses of data from the measures of functional impairment detected no significant between-group differences at baseline (see Table 8). Regarding the CBCL baseline data, the average ratings for participants in all three groups indicated that children's overall competence was in the range conventionally described as 'normal', with marginally better functioning in the social domain than the school domain (Achenbach & Rescorla, 2001). The average Total Problems score for all three groups suggested a clinically significant experience of problems, with average scores for both the Internalizing Problems and the Externalizing Problems subscales in the range conventionally described as 'borderline.'

Regarding the SDQ baseline data, the average ratings for participants in all three groups indicated that children were experiencing significant difficulties in all measured difficulties domains (and hence overall). SDQ results further indicated that participants in the Intervention and Waitlist Control groups rated their children as 'normal' on the Pro-Social subscale, whereas participants in the Non-Structured Support group rated their children as 'borderline' (Goodman, 1997) on that subscale. This between-group difference did not, however, reach the Bonferroni-corrected threshold for statistical significance.

The pattern of IRS baseline data was slightly different than those for the CBCL and SDQ. Although the average ratings for participants in all three groups indicated that children were experiencing significant difficulties in all measured problems domains (and hence overall), analyses indicated that even after the Bonferroni correction (a) for the Overall Functioning subscale, ratings of parents in the Non-Structured Support group were significantly different from those of parents in the other two groups (i.e., they reported significantly less impairment), and (b) for the Self-Esteem subscale, rating of parents in the Waitlist Control group were significantly different from those of parents in the other two groups (i.e., they reported significantly fewer challenges in this domain). In both cases, however, the effect size was small and hence between-group differences could be accounted for by subsequently mixed effects models.

Table 11

Study 2: Functional Impairment at Baseline: ADHD-Diagnosed Child Participants (N = 178)

Outcome Measure / Subscale	Group: Intervention (*n* = 62)	Group: Non-Structured Support (*n* = 66)	Group: Waitlist Control (*n* = 50)	*F*	*p*	ESE
CBCL						
Total Competence	37.24 (11.45)	36.47 (8.64)	37.54 (8.10)	0.20	.820	.002
Activities	44.27 (11.20)	44.32 (10.77)	43.10 (10.21)	0.22	.801	.002
Social Functioning	38.52 (10.26)	38.23 (9.01)	41.74 (8.83)	2.32	.101	.026
School Functioning	38.55 (9.09)	36.83 (7.94)	35.70 (8.10)	1.68	.190	.019
Total Problems	64.92 (8.69)	66.35 (7.87)	65.54 (8.80)	0.46	.630	.005
Internalizing Problems	62.29 (9.76)	63.26 (9.82)	62.68 (7.77)	0.18	.838	.002
Externalizing Problems	60.39 (10.67)	62.48 (10.13)	62.42 (10.77)	0.79	.458	.009
SDQ						
Total Difficulties	30.32 (5.93)	28.11 (6.65)	30.02 (5.91)	2.37	.096	.026
Emotional Problems	5.87 (1.89)	5.52 (2.12)	5.82 (1.87)	0.60	.550	.007
Conduct Problems	4.65 (2.05)	4.92 (2.23)	5.30 (2.30)	1.24	.292	.014
Hyperactivity	8.05 (1.02)	7.70 (0.99)	7.64 (0.88)	3.09	.048*	.034
Peer Problems	4.54 (1.90)	4.24 (1.77)	4.00 (1.87)	1.17	.313	.013
Pro-Social Scale	6.55 (1.39)	5.82 (1.35)	6.52 (1.58)	5.24	.006**	.056
IRS						
Overall Functioning	4.98 (0.59)	4.48 (0.79)	4.98 (0.65)	10.90	< .001***†	.111
Peer Relationships	3.82 (1.34)	3.68 (1.38)	4.14 (1.03)	1.87	.157	.021
Sibling Relationships	3.73 (1.15)	3.56 (1.02)	4.22 (0.93)	5.92	.003**	.063
Academic Progress	4.71 (0.98)	4.91 (0.80)	4.44 (0.97)	1.94	.147	.022
Self-Esteem	4.05 (1.12)	3.86 (1.19)	5.02 (0.74)	8.99	< .001***†	.093
Relationship with Parents	4.06 (1.08)	3.83 (1.17)	4.68 (0.74)	4.44	.013*	.048
Influence on Family	4.45 (0.72)	4.32 (0.79)	4.62 (0.64)	2.34	.101	.026

Note. For each group, data presented are means with standard deviations in parentheses. CBCL = Child Behavior Checklist; SDQ = Strengths and Difficulties Questionnaire; IRS = Impairment Rating Scale; ESE = effect size estimate (in this case, η^2).

*** $p < .001$. ** $p < .01$. * $p < .05$. † $p <$ Bonferroni-corrected value (.05 / 20 = .003).

Table 12

Study 2: Baseline Values of Potential Control Variables: ADHD-Diagnosed Child Participants (N = 178)

	Group					
Outcome Measure / Subscale	Intervention (n = 62)	Non-Structured (n = 66)	Waitlist Control (n = 50)	F	p	ESE
Family Support Scale	35.74 (5.73)	33.42 (5.75)	34.06 (10.21)	2.58	.078	.029
Family Resources Scale	97.05 (19.30)	87.35 (13.05)	93.90 (15.23)	6.07	.003*** [a]	.065
CBCL						
Affective Problems	63.06 (8.99)	63.76 (8.13)	64.46 (7.91)	0.39	.681	.004
Anxiety Problems	60.89 (8.48)	62.59 (8.86)	61.48 (8.83)	0.69	.505	.008
Somatic Problems	60.06 (10.49)	59.86 (8.94)	57.94 (6.32)	0.94	.394	.011
ADHD	68.34 (7.75)	68.83 (7.55)	68.20 (8.05)	0.11	.095	.001
Oppositional-Defiant Disorder	61.08 (8.88)	62.89 (8.90)	62.43 (8.48)	0.71	.495	.008
Conduct Disorder	60.42 (9.73)	61.65 (8.37)	62.30 (9.71)	0.61	.544	.007
Sluggish Cognitive Tempo	61.19 (8.44)	60.88 (8.75)	59.14 (7.99)	0.93	.398	.010

Note. For each group, data presented are means with standard deviations in parentheses. CBCL = Child Behavior Checklist; ESE = effect size estimate (in this case, h^2).

*** $p < .001$. ** $p < .01$. * $p < .05$. [a] $p <$ Bonferroni-corrected value (.05 / 10 = .005).

Further regarding baseline measures, as Table 12 indicates analyses detected no significant between-group differences with regard to the experiences of family support or of CBCL-measured psychiatric disorders (including ADHD; note that these latter results are consistent with those reported in Table 2). Analyses did, however, detect significant between-group differences with regard to the experience of family resources, with parents in the Non-Structured support group reporting significantly fewer such resources than did parents in the other two groups. Again, however, the associated effect size was small.

Testing Hypothesis 1: Effectiveness of the Intervention

Recall that the prediction here is that, relative to participants assigned to the comparison groups, those assigned to the Intervention group would report significantly less functional impairment after completion of the 8-week protocol (that is to say, the mixed effect models reported on here sought to assess the intervention's effectiveness). Recall also that one model was created for each of the following outcome variables: *CBCL Total Competence*, *CBCL Total Problems*, *CBCL Internalizing Problems, CBCL Externalizing Problems, SDQ Total Difficulties*, and *IRS Overall Functioning*.

CBCL Total Competence

Analyses detected a significant Group x Time interaction effect, $F(2, 175)= 46.32$, $p < .001$, $\eta_p^2 = .34$ (see Table 5). This effect, which is depicted in Figure 1, is accounted for by the pre- to post-intervention change in the Intervention group being significantly different (larger, indicating better competence over time) from that in both the Non-Structured Support group ($B = -4.40$, $p < .001$) and the Waitlist Control group ($B = -4.56$, $p < .001$).

Table 13

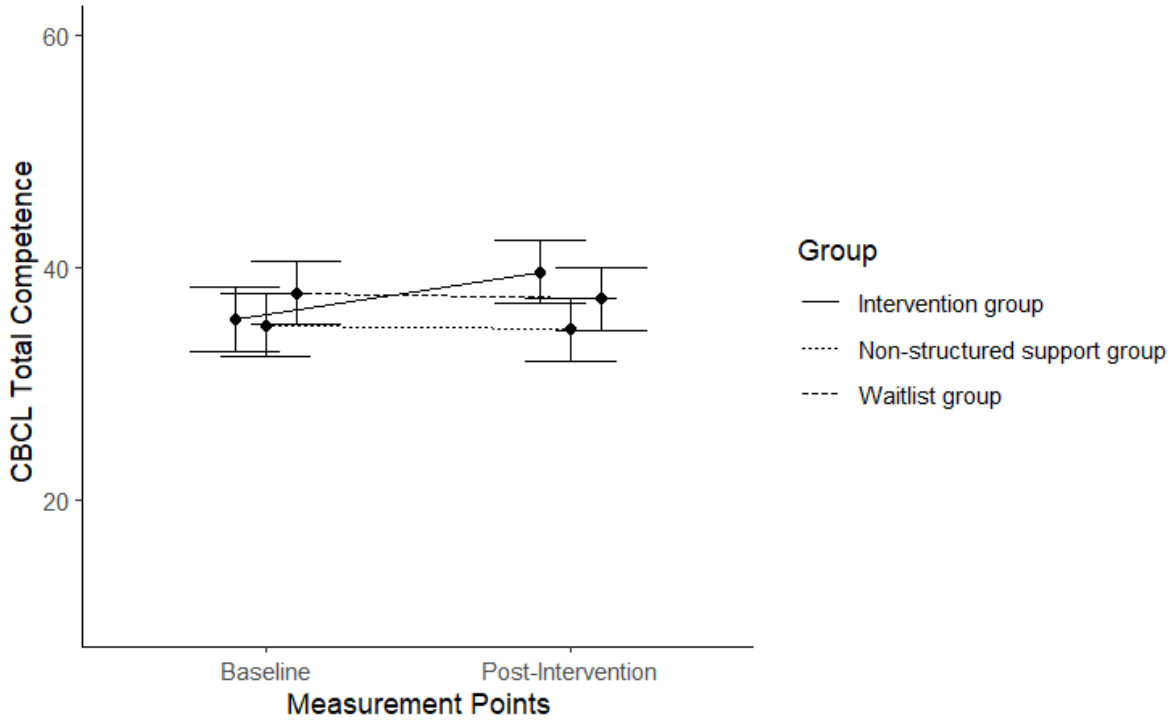
Study 2: Mixed Effects Model Significant Factors, CBCL Total Competence (N = 178)

Significant Predictor	Estimate	95% CI		*p*
		LL	UL	
Control Variables				
ADHD Medication [a]	3.57	0.83	6.30	.011*
Oppositional-Defiant Disorder	-4.29	-7.08	-1.51	.003**
Main Effect				
Time	4.08	3.34	-4.82	< .001***
Interaction Effects				
Group [NSS] x Time	-4.40	-5.42	-3.38	< .001***
Group [WC] x Time	-4.56	-5.68	-3.44	< .001***

Note. All predictor variables are categorical in nature, comparing the presence and absence of a particular factor. [a] This variable indicates whether the child is currently using ADHD medication. CBCL = Child Behavior Checklist; CI = confidence interval; LL = lower limit; UL = upper limit; NSS = Non-Structured Support; WC = Waitlist Control.
Model fit statistics: ICC = .94; R^2 = .15; conditional R^2 = .95.
All R^2 values are adjusted for multiple predictors. *** $p < .001$. ** $p < .01$. * $p < .05$.

Figure 1

Study 2: Change in CBCL Parent-Rated Total Competence Over Time: Group x Time Interaction Effect (N = 178)



Note. Data presented are mean ratings at baseline and post-intervention. The possible range of scores is 0–65. Scores in the range of 0–35 indicate clinically significant problems; 36–40, borderline; ≥ 41, normal functioning (Achenbach & Rescorla, 2001). Error bars represent 95% confidence interval. CBCL = Child Behavior Checklist.

Analyses also detected a significant main effect of Time, F (1, 175) = 23.86, p < .001. This result indicates that average parent ratings (regardless of group assignment) on this subscale increased significantly from baseline to post-intervention, B = 4.08, p < .001. However, given the disordinal interaction effect (see Figure 1), one must interpret this main effect cautiously. It appears, in fact, that ratings for the Intervention group increased markedly whereas those for the other groups did not change or decreased slightly; hence, this main effect might merely be capturing the comparatively large improvement in *Total Competence* for the Intervention group.

Together, the significant main and interaction effects explained 16% of the variance in the outcome. The ICC value was high (.94) and explained approximately 79% of the variance in the data as a result of individual differences in ADHD presentation.

Results from a set of planned contrasts support the above interpretations. These analyses indicated that, at baseline, there were no significant differences between the Intervention group and the Non-Structured Support group, B = -0.67, p = .661, or between the Intervention group and the Waitlist Control group, B = 2.28, p = .596. However, at the post-intervention measurement point, scores for the Intervention group and the Non-Structured Support group were significantly different, B = -5.07, p = .004 while those for the Intervention group and Waitlist Control group remained non-significantly different, B = -2.28, p = .596. Further, scores in the Intervention group were the only set to improve significantly from baseline to post-intervention, B = 4.08, p <.001; at the latter measurement point, these scores were also higher than all the others. Hence, it is clear that the statistically significant interaction effect resulted from this different pattern of data across the groups.

Table 12 also shows that two control variables contributed significantly to the prediction of CBCL Total Competence scores. Children with prescriptions for ADHD medication were rated as being significantly more competent than those with no such prescriptions, B = 3.57, p = .011, and children who met diagnostic criteria for the psychiatric comorbidity of oppositional-defiant disorder were rated as significantly less competent than those with no such diagnosis, B = -4.29, p = .003.

CBCL Total Problems

Analyses detected a significant Group x Time interaction effect, F(2, 175)= 85.03, p < .001, η_p^2 = .48 (see Table 13). This effect, which is depicted in Figure 2, is accounted for by the pre- to post-intervention score decrease in the Intervention group being significantly

different (larger, indicating fewer problems over time) from that in both the Non-Structured Support group ($B = 6.18$, $p < .001$) and the Waitlist Control group ($B = 3.75$, $p < .001$).

Table 14

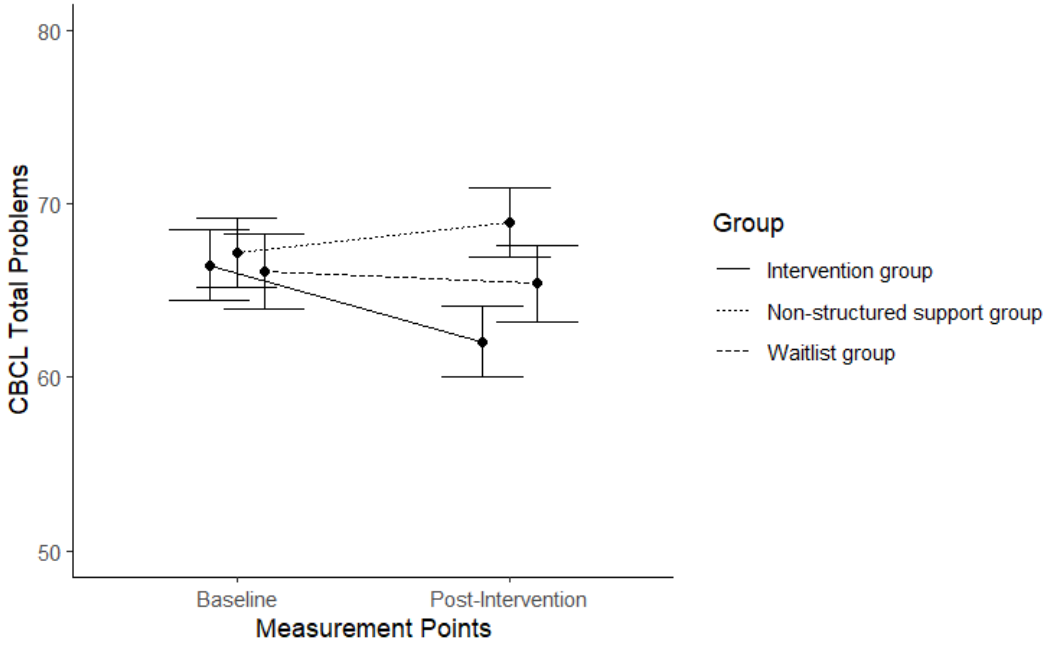
Study 2: Mixed Effects Model Significant Factors, CBCL Total Problems (N = 178)

		95% CI		
Significant Predictor	Estimate	LL	UL	*p*
Control Variables				
Oppositional-Defiant Disorder	6.89	4.68	9.10	< .001***
Conduct Disorder	1.69	0.32	3.06	.016*
Depressive Episode	4.09	1.85	6.33	< .001***
Main Effect				
Time	-4.42	-5.10	-3.74	< .001***
Interaction Effects				
Group [NSS] x Time	6.18	5.25	7.12	< .001***
Group [WC] x Time	3.75	2.73	4.78	< .001***

Note. All predictor variables are categorical in nature, comparing the presence and absence of a particular factor. CBCL = Child Behavior Checklist; CI = confidence interval; LL = lower limit; UL = upper limit; NSS = Non-Structured Support; WC = Waitlist Control.
Model fit statistics: ICC = .92; $R^2 = .38$; conditional $R^2 = .95$.
All R^2 values are adjusted for multiple predictors. *** $p < .001$. ** $p < .01$. * $p < .05$.

Figure 2

Study 2: Change in CBCL Parent-Rated Total Problems Over Time: Group x Time Interaction Effect (N = 178)



Note. Data presented are mean ratings at baseline and post-intervention. The possible range of scores is 0–100. Scores in the range of 0–60 indicate normal functioning; 61–64, borderline; ≥ 65, clinically significant problems (Achenbach & Rescorla, 2001). Error bars represent 95% confidence interval. CBCL = Child Behavior Checklist.

Analyses also detected a significant main effect of Time, F (1, 175) = 29.05, $p < .001$. This result indicates that average parent ratings (regardless of group assignment) on this subscale decreased significantly (i.e., indicated fewer problems) from baseline to post-intervention, $B = -4.42$, $p < .001$. However, given the disordinal interaction effect (see Figure 2), one must interpret this main effect cautiously. It appears, in fact, that ratings for the Intervention group decreased markedly whereas those for the other groups either changed only marginally (Waitlist Control) or increased (Non-Structured Support); hence, this main effect might merely be capturing the comparatively large decrease in *Total Problems* for the Intervention group.

Together, the significant main and interaction effects explained 38% of the variance in the outcome. The ICC value was high (.92) and explained approximately 57% of the variance in the data as a result of individual differences in ADHD presentation.

Results from a set of planned contrasts support the above interpretations. These analyses indicated that, at baseline, there were no significant differences between the Intervention group and the Non-Structured Support group, $B = 0.72$, $p = 1.00$, or between the

Intervention group and the Waitlist Control group, B = -0.40, p = 1.00. However, at the post-intervention measurement point, scores for the Intervention group and the Non-Structured Support group were significantly different, B = -6.90, p < .001, as were those for the Intervention group and Waitlist Control group, B = -3.36, p = .045. Further, scores in the Intervention group were the only set to improve significantly (fewer problems) from baseline to post-intervention, B = -4.42, p < .001. Hence, it is clear that the statistically significant interaction effect resulted from this different pattern of data across the groups.

Table 14 also shows that three control variables contributed significantly to the prediction of CBCL Total Problems scores. Children who met diagnostic criteria for at least one of three psychiatric comorbidities (oppositional-defiant disorder, conduct disorder, major depressive episode) were rated as experiencing significantly more problems than those with no such diagnosis, B = 6.89, p < .001, B = 4.09, p < .001, B = 1.69, p = .016, respectively.

CBCL Internalizing Problems

Analyses detected a significant Group x Time interaction effect, $F(2, 175)= 64.64$, p < .001, η_p^2 = .42 (see Table15). This effect, which is depicted in Figure 3, is accounted for by the pre- to post-intervention score decrease in the Intervention group being significantly different (larger, indicating fewer such problems over time) from that in both the Non-Structured Support group (B = 5.94, p < .001) and the Waitlist Control group (B = 4.20, p < .001).

Table 15

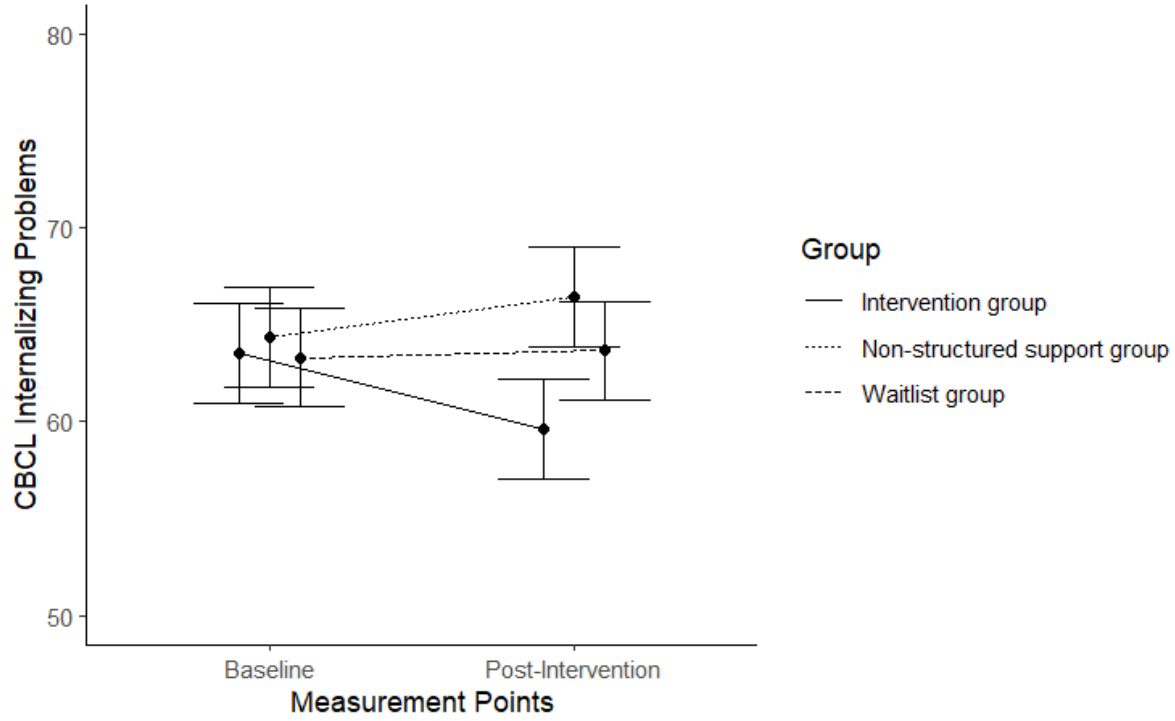
Study 2: Mixed Effects Model Significant Factors, CBCL Internalizing Problems (N = 178)

		95% CI		
Significant Predictor	Estimate	Lower Limit	Upper Limit	*p*
Control Variables				
Oppositional-Defiant Disorder	2.67	0.03	5.31	.048*
Depressive Episode	6.12	3.44	8.79	< .001***
Generalized Anxiety Disorder	3.09	0.57	5.62	.017*
Main Effect				
Time	-3.87	-4.63	-3.11	< .001***
Interaction Effects				
Group [NSS] x Time	5.94	4.90	6.99	< .001***
Group [WC] x Time	4.20	3.06	5.35	< .001***

Note. All predictor variables are categorical in nature, comparing the presence and absence of a particular factor. CBCL = Child Behavior Checklist; CI = confidence interval; NSS = Non-Structured Support; WC = Waitlist Control.
Model fit statistics: ICC = .93; R^2 = .23; conditional R^2 = .95.
*** p < .001. ** p < .01. * p < .05. All R^2 values are adjusted for multiple predictors.

Figure 3

Study 2: Change in CBCL Parent-Rated Internalizing Problems Over Time: Group x Time Interaction Effect (N = 178)



Note. Data presented are mean ratings at baseline and post-intervention. The possible range of scores is 0–100. Scores in the range of 0–60 indicate normal functioning; 61–64, borderline; ≥ 65, clinically significant problems (Achenbach & Rescorla, 2001). Error bars represent 95% confidence interval. CBCL = Child Behavior Checklist.

Analyses also detected a significant main effect of Time, F (1, 175) = 2.70, p =.035. This result indicates that average parent ratings (regardless of group assignment) on this subscale decreased significantly (i.e., indicated fewer internalizing problems) from baseline to post-intervention, B = -3.87, p < .001. However, given the disordinal interaction effect (see Figure 3), one must interpret this main effect cautiously. It appears, in fact, that ratings for the Intervention group decreased markedly whereas those for the other groups either changed only marginally (Waitlist Control) or increased (Non-Structured Support); hence, this main effect might merely be capturing the comparatively large decrease in *Internalizing Problems* for the Intervention group.

Together, the significant main and interaction effects explained 23% of the variance in the outcome. The ICC value was high (.93) and explained approximately 72% of the variance in the data as a result of individual differences in ADHD presentation.

Results from a set of planned contrasts support the above interpretations. These analyses indicated that, at baseline, there were no significant differences between the Intervention group and the Non-Structured Support group, B = 0.82, p = 1.00, or between the

Intervention group and the Waitlist Control group, $B = 0.21$, $p = 1.00$. However, at the post-intervention measurement point, scores for the Intervention group and the Non-Structured Support group were significantly different, $B = 6.76$, $p < .001$, and those for the Intervention group and Waitlist Control group strongly approached significance, $B = 3.99$, $p = .056$. Further, scores in the Intervention group were the only set to improve significantly (fewer internalizing problems) from baseline to post-intervention, $B = -3.87$, $p < .001$. Hence, it is clear that the statistically significant interaction effect resulted from this different pattern of data across the groups.

Table 15 also shows that three control variables contributed significantly to the prediction of CBCL Internalizing Problems scores. Children who met diagnostic criteria for at least one of three psychiatric comorbidities (oppositional-defiant disorder, major depressive episode, generalized anxiety disorder) were rated as experiencing significantly more internalizing problems than those with no such diagnosis, $B = 2.67$, $p = .048$, $B = 6.12$, $p < .001$, $B = 3.09$, $p = .017$, respectively.

CBCL Externalizing Problems

Analyses detected a significant Group x Time interaction effect, $F(2, 175) = 57.55$, $p < .001$, $\eta_p^2 = .38$ (see Table 16). This effect, which is depicted in Figure 4, is accounted for by the pre- to post-intervention score decrease in the Intervention group being significantly different (larger, indicating fewer such problems over time) from that in both the Non-Structured Support group ($B = 6.53$, $p < .001$) and the Waitlist Control group ($B = 2.67$, $p < .001$).

Table 16

Study 2: Mixed Effects Model Significant Factors, CBCL Externalizing Problems (N = 178)

		95% CI		
Significant Predictor	Estimate	Lower Limit	Upper Limit	*p*
Control Variables				
Oppositional-Defiant Disorder	10.80	8.41	13.19	< .001***
Conduct Disorder	2.37	0.88	3.86	.002**
Depressive Episode	2.50	0.09	4.92	.042*
Main Effect				
Time	-3.50	-4.37	-2.63	< .001***
Interaction Effects				
Group [NSS] x Time	6.53	5.32	7.74	< .001***
Group [WC] x Time	2.67	1.35	3.99	< .001***

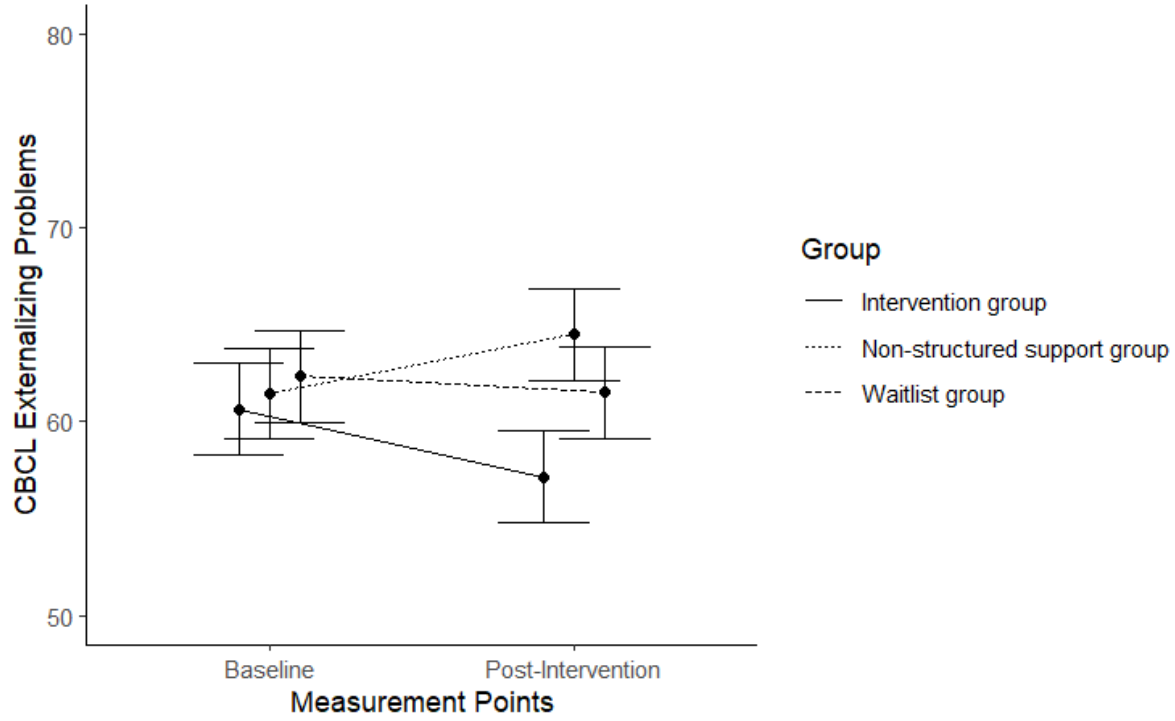
Note. All predictor variables are categorical in nature, comparing the presence and absence of a particular factor. CBCL = Child Behavior Checklist; CI = confidence interval; NSS = Non-Structured Support; WC = Waitlist Control.
Model fit statistics: ICC = .89; R^2 = .50; conditional R^2 = .95.
All R^2 values are adjusted for multiple predictors. *** $p < .001$. ** $p < .01$. * $p < .05$.

Analyses also detected a significant main effect of Time, $F(1, 175) = 2.70$, $p = .102$. This result indicates that average parent ratings (regardless of group assignment) on this subscale decreased significantly (i.e., indicated fewer externalizing problems) from baseline to post-intervention, $B = -3.50$, $p < .001$. However, given the disordinal interaction effect (see Figure 4), one must interpret this main effect cautiously. It appears, in fact, that ratings for the Intervention group decreased markedly whereas those for the other groups either changed only marginally (Waitlist Control) or increased (Non-Structured Support); hence, this main effect might merely be capturing the comparatively large decrease in *Externalizing Problems* for the Intervention group.

Together, the significant main and interaction effects explained 50% of the variance in the outcome. The ICC value was high (.89) and explained approximately 45% of the variance in the data as a result of individual differences in ADHD presentation.

Figure 4

Study 2: Change in CBCL Parent-Rated Externalizing Problems Over Time: Group x Time Interaction Effect (N = 178)



Note. Data presented are mean ratings at baseline and post-intervention. The possible range of scores is 0–100. Scores in the range of 0–60 indicate normal functioning; 61–64, borderline; ≥ 65, clinically significant problems (Achenbach & Rescorla, 2001). Error bars represent 95% confidence interval. CBCL = Child Behavior Checklist.

Results from a set of planned contrasts support the above interpretations. These analyses indicated that, at baseline, there were no significant differences between the Intervention group and the Non-Structured Support group, $B = 0.81$, $p = .546$, or between the Intervention group and the Waitlist Control group, $B = 1.69$, $p = .546$. However, at the post-intervention measurement point, scores for the Intervention group and the Non-Structured Support group were significantly different, $B = -7.34$, $p < .001$, as were those for the Intervention group and Waitlist Control group, $B = -4.36$, $p = .013$. Further, scores in the Intervention group were the only set to improve significantly (fewer externalizing problems) from baseline to post-intervention, $B = -3.50$, $p < .001$. Hence, it is clear that the statistically significant interaction effect resulted from this different pattern of data across the groups.

Table 16 also shows that four control variables contributed significantly to the prediction of CBCL Externalizing Problems scores. Children who met diagnostic criteria for at least one of three psychiatric comorbidities (oppositional-defiant disorder, major depressive episode, conduct disorder) were rated as experiencing significantly more

externalizing problems than those with no such diagnosis, $B = 10.80$, $p < .001$, $B = 2.50$, $p = .042$, $B = 2.37$, $p = .002$, respectively.

SDQ Total Difficulties

Analyses detected a significant Group x Time interaction effect, $F(2, 175) = 86.67$, $p < .001$, $\eta_p^2 = .49$ (see Table 17). This effect, which is depicted in Figure 5, is accounted for by the pre- to post-intervention score change in the Intervention group being significantly different (larger, indicating fewer difficulties over time) from that in both the Non-Structured Support group ($B = 3.61$, $p < .001$) and the Waitlist Control group ($B = 3.06$, $p < .001$).

Table 17

Study 2: Mixed Effects Model Significant Factors, SDQ Total Difficulties (N = 178)

		95% CI		
Significant Predictor	Estimate	Lower Limit	Upper Limit	*p*
Control Variables				
ADHD Medication [a]	-1.96	-3.44	-0.49	.009**
Oppositional-Defiant Disorder	5.51	4.01	7.02	< .001***
Conduct Disorder	1.58	0.65	2.52	.001**
Depressive Episode	2.76	1.24	4.28	< .001***
Main Effect				
Time	-2.29	-2.70	-1.88	< .001***
Interaction Effects				
Group [NSS] x Time	3.61	3.04	4.18	< .001***
Group [WC] x Time	3.06	2.44	3.68	< .001***

Note. All predictor variables are categorical in nature, comparing the presence and absence of a particular factor. SDQ = Strengths and Difficulties Questionnaire; CI = confidence interval; NSS = Non-Structured Support; WC = Waitlist Control.

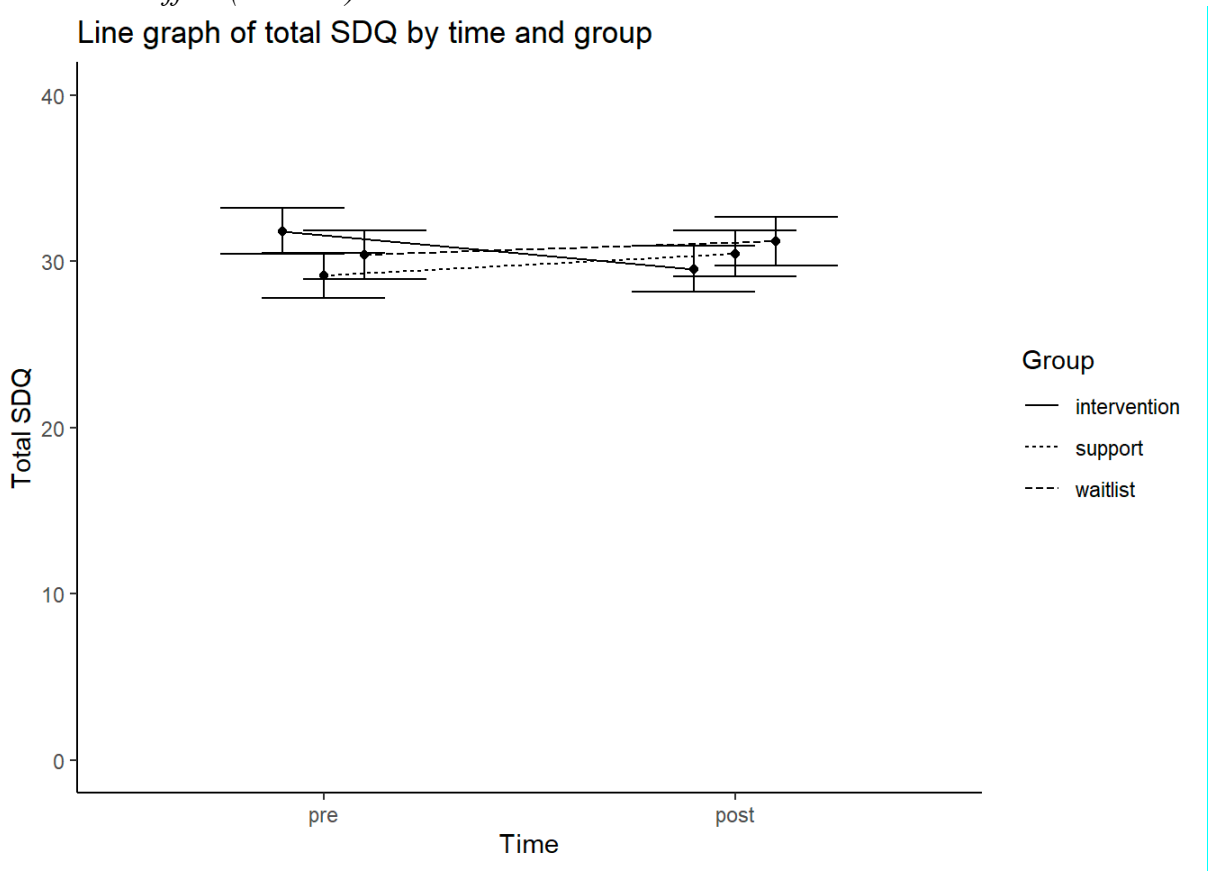
[a] This variable indicates whether the child is currently using ADHD medication.

Model fit statistics: ICC = .94; $R^2 = .41$; conditional $R^2 = .96$.

All R^2 values are adjusted for multiple predictors. *** $p < .001$. ** $p < .01$. * $p < .05$.

Figure 5

Study 2: Change in Parent-Rated SDQ Total Difficulties Over Time: Group x Time Interaction Effect (N = 178)



Note. Data presented are mean ratings at baseline and post-intervention. The possible range of scores is 0–40. Scores in the range of 0–60 indicate normal functioning; 14–16, borderline; ≥ 17, clinically significant difficulties (Goodman, 1997). Error bars represent 95% confidence interval. SDQ = Strengths and Difficulties Questionnaire.

Analyses also detected a significant main effect of Time, $F(1, 175) = .27$, $p = .603$. This result indicates that average parent ratings (regardless of group assignment) on this measure decreased significantly (i.e., indicated fewer difficulties) from baseline to post-intervention, $B = -2.20$, $p < .001$. However, given the disordinal interaction effect (see Figure 5), one must interpret this main effect cautiously. It appears, in fact, that ratings for the Intervention group decreased markedly whereas those for the other two groups increased marginally; hence, this main effect might merely be capturing the comparatively large decrease in *Total Difficulties* for the Intervention group.

Together, the significant main and interaction effects explained 41% of the variance in the outcome. The ICC value was high (.94) and explained approximately 55% of the variance in the data as a result of individual differences in ADHD presentation.

Results from a set of planned contrasts generally support the above interpretations. These analyses indicated that, at baseline, there was a significant difference between scores for the Intervention group and the Non-Structured Support group, $B = 2.68$, $p < .001$, but no such difference between the Intervention group and the Waitlist Control group, $B = 1.41$, $p = .260$. At baseline, scores were highest in the Intervention group (see Figure 6). However, at the post-intervention measurement point, scores for the Intervention group and the Non-Structured Support group were not significantly different, $B = -0.94$, $p < .260$, and neither were those for the Intervention group and Waitlist Control group, $B = 1.65$, $p = .226$. Further, scores in the Intervention group were the only set to improve significantly (fewer difficulties) from baseline to post-intervention, $B = -2.29$, $p < .001$; scores in the other groups increased slightly over time. Hence, it is clear that the statistically significant interaction effect resulted from this different pattern of data across the groups.

Table 17 also shows that four control variables contributed significantly to the prediction of SDQ Total Difficulties scores. Children who met diagnostic criteria for at least one of three psychiatric comorbidities (oppositional-defiant disorder, major depressive episode, conduct disorder) were rated as experiencing significantly more difficulties than those with no such diagnosis, $B = 5.51$, $p < .001$, $B = 2.76$, $p < .001$, $B = 1.58$, $p = .001$, respectively. Furthermore, children with prescriptions for ADHD medication were rated as experiencing significantly fewer difficulties than those with no such prescriptions, $B = -1.96$, $p = .009$.

IRS Overall Functioning

Analyses detected a significant Group x Time interaction effect, $F(2, 175)= 42.04$, $p < .001$, $\eta_p^2 = .29$ (see Table 18). This effect, which is depicted in Figure 6, is accounted for by the pre- to post-intervention score change in the Intervention group being significantly different (larger, indicating better functioning over time) from that in both the Non-Structured Support group ($B = 0.73$, $p < .001$) and the Waitlist Control group ($B = 0.68$, $p < .001$).

Table 18

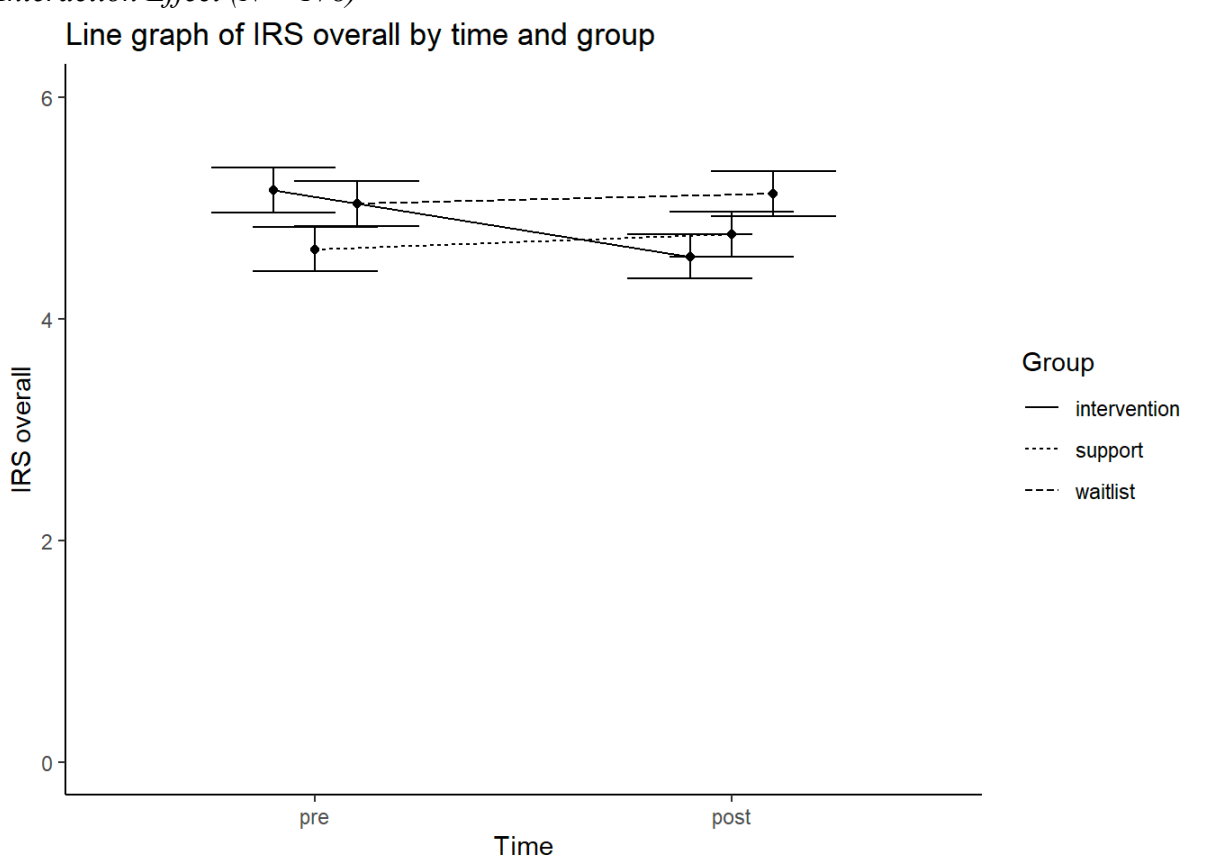
Study 2: Mixed Effects Model Significant Factors, IRS Overall Functioning (N = 178)

Significant Predictor	Estimate	95% CI		*p*
		LL	UL	
Control Variables				
Oppositional-Defiant Disorder	0.54	0.34	0.74	< .001***
Main Effect				
Time	-0.60	-0.72	-0.47	< .001***
Interaction Effects				
Group [NSS] x Time	0.73	0.56	0.90	< .001***
Group [WC] x Time	0.68	0.49	0.87	< .001***

Note. All predictor variables are categorical in nature, comparing the presence and absence of a particular factor. IRS = Impairment Rating Scale; CI = confidence interval; LL = lower limit; UL = upper limit; NSS = Non-Structured Support; WC = Waitlist Control. Model fit statistics: ICC = .72; Marginal R^2 = .27; conditional R^2 = .80.
All R^2 values are adjusted for multiple predictors. *** $p < .001$. ** $p < .01$. * $p < .05$.

Figure 6

Study 2: Change in Parent-Rated IRS Overall Functioning Over Time: Group x Time Interaction Effect (N = 178)



Note. Data presented are mean ratings at baseline and post-intervention. The possible range of scores on this Likert-type scale is 0–6, where 0 represents *no problem / needs no intervention* and 6 represents *extreme problems / definitely needs intervention* (Fabiano et al., 2006) Error bars represent 95% confidence intervals . IRS = Impairment Rating Scale.

Analyses also detected a significant main effect of Time, $F(1, 175) = .01$, $p = .934$. This result indicates that average parent ratings (regardless of group assignment) on this measure decreased significantly (i.e., indicated fewer impairments and hence better overall functioning) from baseline to post-intervention, $B = -0.60$, $p < .001$. However, given the disordinal interaction effect (see Figure 6), one must interpret this main effect cautiously. It appears, in fact, that ratings for the Intervention group decreased markedly whereas those for the other two groups increased marginally; hence, this main effect might merely be capturing the comparatively large decrease in impairments (and better *Overall Functioning)* for the Intervention group.

Together, the significant main and interaction effects explained 27% of the variance in the outcome. The ICC value was moderate (.72) and explained approximately 53% of the variance in the data as a result of individual differences in ADHD presentation.

Results from a set of planned contrasts generally support the above interpretations. These analyses indicated that, at baseline, there were no significant difference between scores for the Intervention group and the Non-Structured Support group, $B = 0.53$, $p = .134$, or for the Intervention group and the Waitlist Control group, $B = 0.19$, $p = .380$. However, at the post-intervention measurement point, scores for the Intervention group and the Waitlist Control group were significantly different, $B = 0.56$, $p < .001$, although those for the Intervention group and the Non-Structured Support group remained non-significantly different, $B = -0.20$, $p = .181$. Further, scores in the Intervention group were the only set to improve significantly (fewer impairments, better overall functioning) from baseline to post-intervention, $B = -0.60$, $p < .001$; scores in the other groups either increased slightly (Non-Structured Support) or decreased slightly (Waitlist Control) over time. Hence, it is clear that the statistically significant interaction effect resulted from this different pattern of data across the groups.

Table 18 also shows that one control variable contributed significantly to the prediction of IRS Overall Functioning scores. Children who met diagnostic criteria for oppositional-defiant disorder were rated as experiencing significantly more impairments than those with no such diagnosis, $B = 0.54$, $p < .001$.

Testing Hypothesis 2: Persistence of the Intervention's Effects

Recall that the prediction here is that participants assigned to the Intervention group would maintain improvement in functioning from baseline through the immediate post-intervention measurement point to the 6-month follow-up measurement point (that is to say, the repeated-measures ANOVAs and subsequent mixed effect models reported on here sought

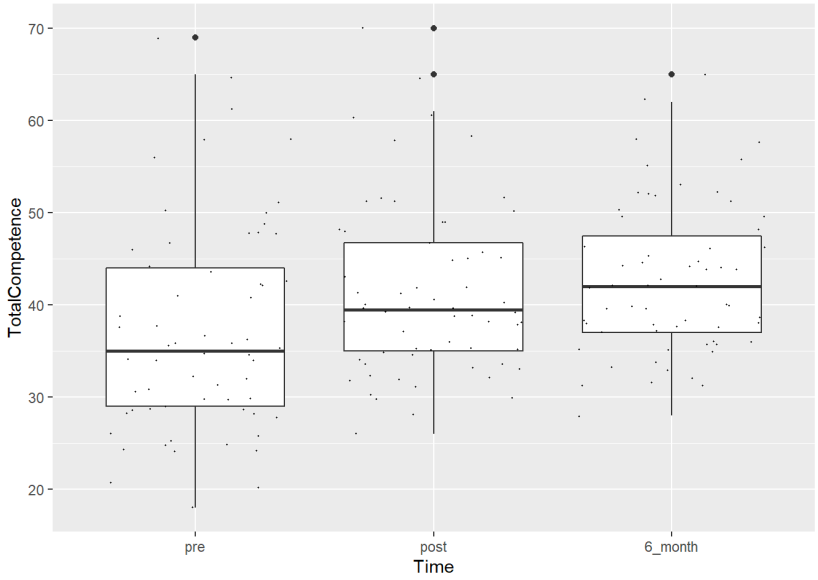
to assess the sustained effectiveness of the intervention). Recall also that one model was created for each of the following outcome variables: *CBCL Total Competence*, *CBCL Total Problems*, *CBCL Internalizing Problems, CBCL Externalizing Problems, SDQ Total Difficulties*, and *IRS Overall Functioning*.

Repeated-Measures ANOVAs

CBCL Total Competence. The main analysis detected a significant overall main effect of Time, $F(2,183) = 5.31$, $p = .006$, $\eta^2 = .055$ (moderate magnitude). The set of post-hoc pairwise comparisons (with the Holm correction) detected, on average, (a) a significant difference between baseline and post-intervention scores, $B = -4.08$, $p = .042$, (b) a significant difference between baseline and 6-month follow-up scores, $B = -5.50$, $p = .006$, but (c) no significant difference between post-intervention and 6-month follow-up scores, $B = -1.42$, $p = .419$. This pattern of data indicates that CBCL Total Competence scores were lowest at baseline and highest at 6-month follow-up, with the most change occurring during the course of the intervention (i.e., between the baseline and immediate post-intervention measurement points; see Figure 7). Importantly, it appears that the intervention's beneficial effects on Total Competence were sustained over the follow-up period, even though there was a non-significant increase from the immediate post-intervention measurement point to 6-month follow-up.

Figure 7

Study 2: Change in CBCL Parent-Rated Total Competence Over Time: Boxplot Showing Ratings for Intervention Group at Baseline, Immediate Post-Intervention, and 6-Month Follow-up (N = 62)

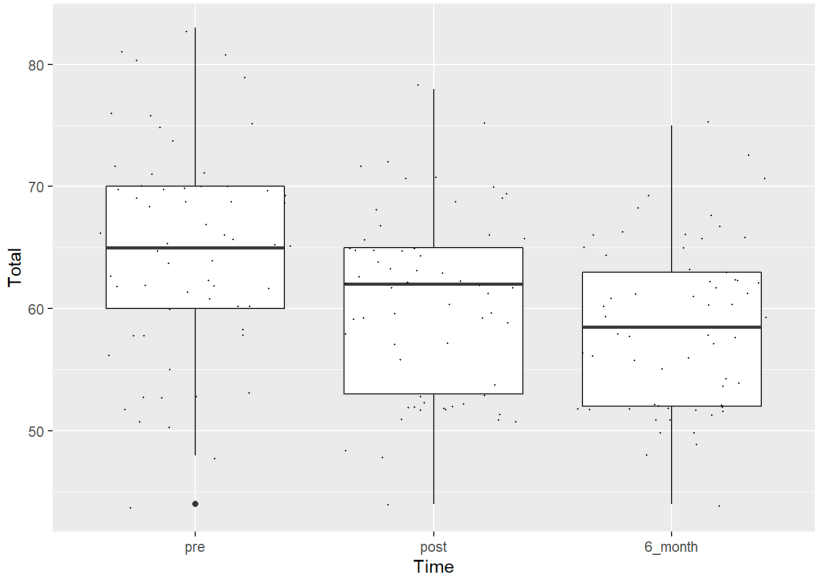


Note. Data presented are mean ratings at each of the three measurement points. The possible range of scores is 0–65. Scores in the range of 0–35 indicate clinically significant problems; 36–40, borderline; ≥ 41, normal functioning (Achenbach & Rescorla, 2001). Error bars represent 95% confidence interval. CBCL = Child Behavior Checklist.

CBCL Total Problems. The main analysis detected a significant overall main effect of Time, $F(2,183) = 10.89$, $p < .001$, $\eta^2 = .106$ (moderate magnitude). The set of post-hoc pairwise comparisons (with the Holm correction) detected, on average, (a) a significant difference between baseline and post-intervention scores, $B = 4.42$, $p = .003$, (b) a significant difference between baseline and 6-month follow-up scores, $B = 6.26$, $p < .001$, but (c) no significant difference between post-intervention and 6-month follow-up scores, $B = 1.84$, $p = .18$. This pattern of data indicates that CBCL Total Problems scores were highest at baseline and lowest at 6-month follow-up, with the most change occurring during the course of the intervention (i.e., between the baseline and immediate post-intervention measurement points; see Figure 8). Importantly, it appears that the intervention's beneficial effects on Total Problems were sustained over the follow-up period, even though there was a non-significant decrease from the immediate post-intervention measurement point to 6-month follow-up.

Figure 8

Study 2: Change in CBCL Parent-Rated Total Problems Over Time: Boxplot Showing Ratings for Intervention Group at Baseline, Immediate Post-Intervention, and 6-Month Follow-up (N = 62)

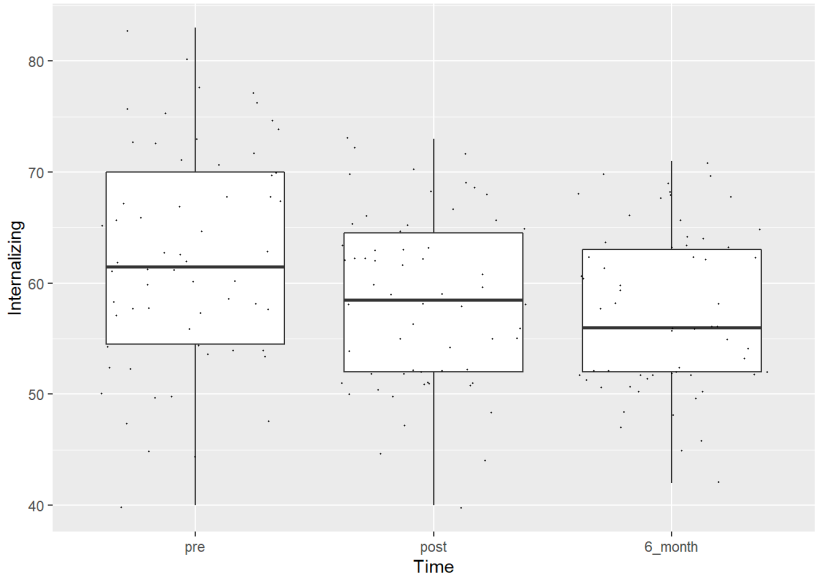


Note. Data presented are mean ratings at each of the three measurement points. The possible range of scores is 0–100. Scores in the range of 0–60 indicate normal functioning; 61–64, borderline; ≥ 65, clinically significant problems (Achenbach & Rescorla, 2001). Error bars represent 95% confidence interval. CBCL = Child Behavior Checklist.

CBCL Internalizing Problems. The main analysis detected a significant overall main effect of Time, $F(2,183) = 5.77$, $p = .003$, $\eta^2 = .059$ (moderate magnitude). The set of post-hoc pairwise comparisons (with the Holm correction) detected, on average, (a) a significant difference between baseline and post-intervention scores, $B = 3.87$, $p = .021$, (b) a significant difference between baseline and 6-month follow-up scores, $B = 4.79$, $p = .004$, but (c) no significant difference between post-intervention and 6-month follow-up scores, $B = 0.92$, $p = .54$. This pattern of data indicates that CBCL Internalizing Problems scores were highest at baseline and lowest at 6-month follow-up, with the most change occurring during the course of the intervention (i.e., between the baseline and immediate post-intervention measurement points; see Figure 9). Importantly, it appears that the intervention's beneficial effects on Internalizing Problems were sustained over the follow-up period, even though there was a non-significant decrease from the immediate post-intervention measurement point to 6-month follow-up.

Figure 9

Study 2: Change in CBCL Parent-Rated Internalizing Problems Over Time: Boxplot Showing Ratings for Intervention Group at Baseline, Immediate Post-Intervention, and 6-Month Follow-up (N = 62)

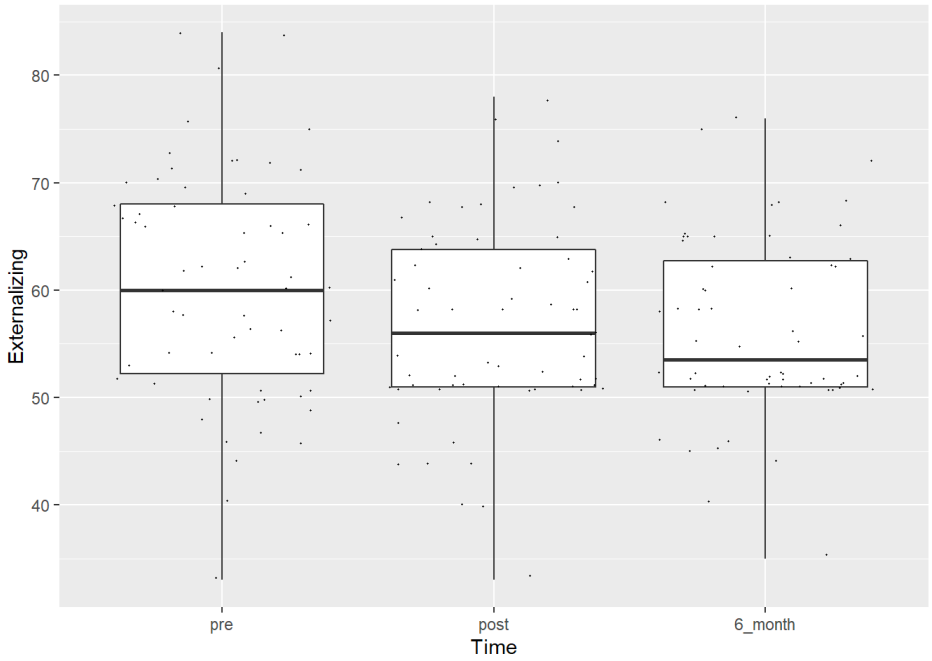


Note. Data presented are mean ratings at each of the three measurement points. The possible range of scores is 0–100. Scores in the range of 0–60 indicate normal functioning; 61–64, borderline; ≥ 65, clinically significant problems (Achenbach & Rescorla, 2001). Error bars represent 95% confidence interval. CBCL = Child Behavior Checklist.

CBCL Externalizing Problems. The main analysis detected a significant overall main effect of Time, $F(2,183) = 3.46$, $p = .034$, $\eta^2 = .036$ (moderate magnitude). The set of post-hoc pairwise comparisons (with the Holm correction) detected, on average, (a) no significant difference between baseline and post-intervention scores, $B = 3.50$, $p = .081$, (b) a significant difference between baseline and 6-month follow-up scores, $B = 4.15$, $p = .047$, but (c) no significant difference between post-intervention and 6-month follow-up scores, $B = 0.65$, $p = .704$. This pattern of data indicates that CBCL Externalizing Problems scores were highest at baseline and lowest at 6-month follow-up, but that significant change only occurred when evaluating baseline scores against 6-month follow-up scores (i.e., the effects of the intervention may been somewhat delayed in alleviating these problems; see Figure 10). Importantly, it appears that the intervention's beneficial effects on Externalizing Problems were sustained over the follow-up period, even though there was a non-significant decrease from the immediate post-intervention measurement point to 6-month follow-up.

Figure 10

Study 2: Change in CBCL Parent-Rated Externalizing Problems Over Time: Boxplot Showing Ratings for Intervention Group at Baseline, Immediate Post-Intervention, and 6-Month Follow-up (N = 62)

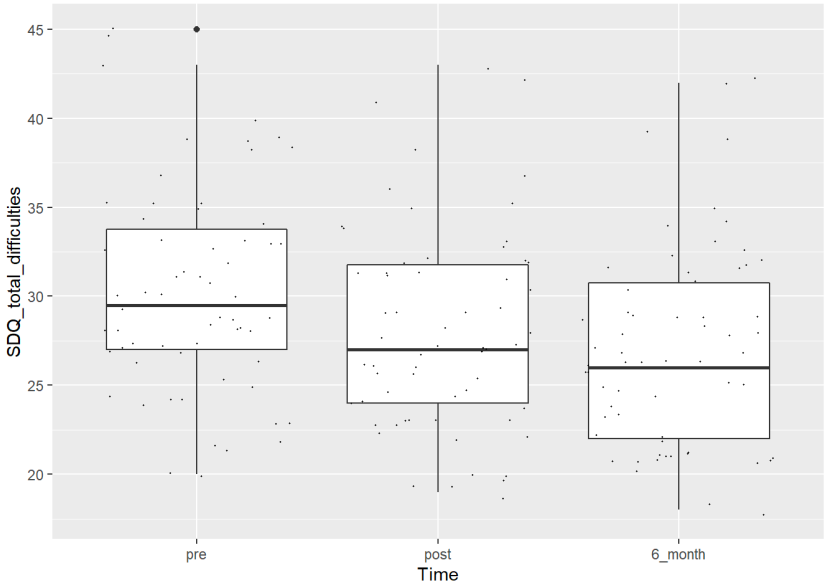


Note. Data presented are mean ratings at each of the three measurement points. The possible range of scores is 0–100. Scores in the range of 0–60 indicate normal functioning; 61–64, borderline; ≥ 65, clinically significant problems (Achenbach & Rescorla, 2001). Error bars represent 95% confidence interval. CBCL = Child Behavior Checklist.

SDQ Total Difficulties. The main analysis detected a significant overall main effect of Time, $F(2,183) = 5.21$, $p = .006$, $\eta^2 = .054$ (moderate magnitude). The set of post-hoc pairwise comparisons (with the Holm correction) detected, on average, (a) no significant difference between baseline and post-intervention scores, $B = 2.29$, $p = .055$, (b) a significant difference between baseline and 6-month follow-up scores, $B = 3.24$, $p = .006$, but (c) no significant difference between post-intervention and 6-month follow-up scores, $B = 0.95$, $p = .358$. This pattern of data indicates that SDQ Total Difficulties scores were highest at baseline and lowest at 6-month follow-up, but that significant change only occurred when evaluating baseline scores against 6-month follow-up scores (i.e., the effects of the intervention may been somewhat delayed in alleviating these difficulties; see Figure 11). Importantly, it appears that the intervention's beneficial effects on Externalizing Problems were sustained over the follow-up period, even though there was a non-significant decrease from the immediate post-intervention measurement point to 6-month follow-up.

Figure 11

Study 2: Change in Parent-Rated SDQ Total Difficulties Over Time: Boxplot Showing Ratings for Intervention Group at Baseline, Immediate Post-Intervention, and 6-Month Follow-up (N = 62)

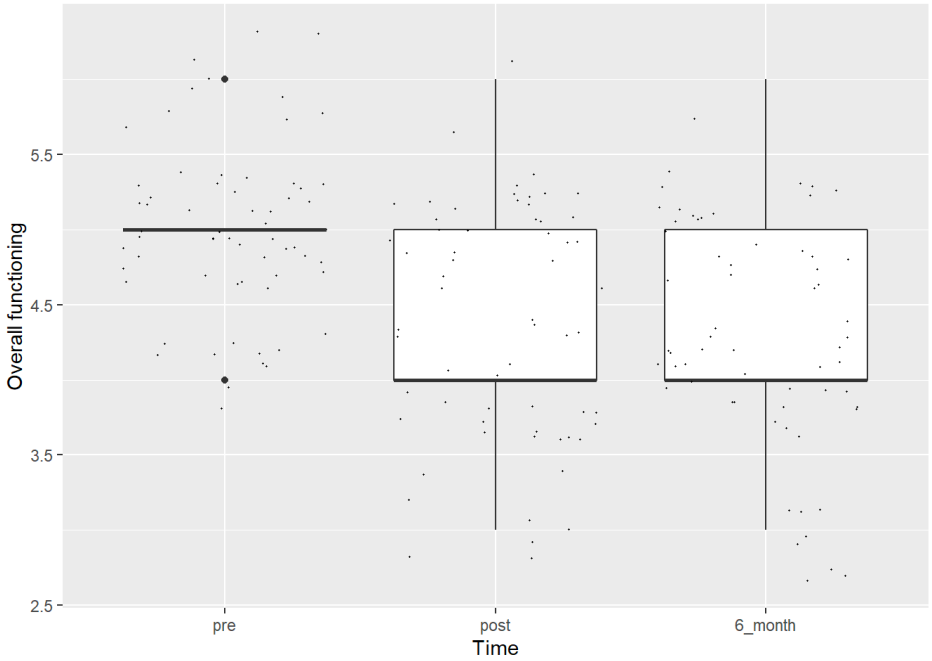


Note. Data presented are mean ratings at each of the three measurement points. The possible range of scores is 0–40. Scores in the range of 0–13 indicate normal functioning; 14–16, borderline; ≥ 17, clinically significant difficulties (Goodman, 1997). Error bars represent 95% confidence interval. SDQ = Strengths and Difficulties Questionnaire.

IRS Overall Functioning. The main analysis detected a significant overall main effect of Time, $F(2,183) = 17.88$, $p < .001$, $\eta^2 = .163$ (moderate magnitude). The set of post-hoc pairwise comparisons (with the Holm correction) detected, on average, (a) a significant difference between baseline and post-intervention scores, $B = 0.60$, $p < .001$, (b) a significant difference between baseline and 6-month follow-up scores, $B = 0.68$, $p < .001$, but (c) no significant difference between post-intervention and 6-month follow-up scores, $B = 0.08$, $p = .52$. This pattern of data indicates that IRS Overall Functioning scores were highest at baseline and lowest at 6-month follow-up, with the most change occurring during the course of the intervention (i.e., between the baseline and immediate post-intervention measurement points; see Figure 12). Importantly, it appears that the intervention's beneficial effects on IRS Overall Functioning were at least sustained over the follow-up period, even though there was a non-significant decrease from the immediate post-intervention measurement point to 6-month follow-up.

Figure 12

Study 2: Change in Parent-Rated IRS Overall Functioning Over Time: Boxplot Showing Ratings for Intervention Group at Baseline, Immediate Post-Intervention, and 6-Month Follow-up (N = 62)



Note. Data presented are median ratings at each of the three measurement points. The possible range of scores on this Likert-type scale is 0–6, where 0 represents *no problem / needs no intervention* and 6 represents *extreme problems / definitely needs intervention* (Fabiano et al., 2006). Note that at the baseline measurement point the median, first quartile, and third quartile values are identical (5.0). At the other measurement points, the median and first quartile scores are identical (4.0). Error bars represent 95% confidence interval. IRS = Impairment Rating Scale.

Mixed Effect Models

Recall that this set of mixed effect models included the same control variables (viz., child sex, ADHD medication use, type of school, and presence of psychiatric disorder – based on the Study 1 results) as those used in the tests of Hypothesis 1. The following is also worth noting here: Although repeated-measures ANOVA is appropriate for examining effects of the intervention in isolation, it does not allow consideration of potential confounders as mixed effect models do. These models can control for variance from other measured sources (in this case, medication use, school type, and presence or absence of particular psychiatric disorders) as well as for unmeasured individual differences (captured by the ICC value). Hence, the effects are clarified because the 'noise' present in standard ANOVA models is reduced.

Results from these models are summarized in Table 19 and Table 20. Regarding main effects, it is evident that parents of participants assigned to the Intervention group rated their children as showing improved functioning over time (from baseline to immediate post-intervention, and comparing baseline to 6-month follow-up) on all outcome variables, regardless of the particular measure or subscale. Effects of the control variables were less consistent. Child sex, type of school, presence of generalized anxiety disorder, and experience of a major depressive episode were not significant predictors of any outcome variable. ADHD medication use only predicted better scores on the CBCL Total Competence subscale (children who were prescribed medication tended to obtain ratings of significantly better overall competence); the presence of oppositional-defiant disorder predicted worse scores on the CBCL Total Problems, CBCL Externalizing Problems, SDQ Total Difficulties, and IRS Overall Functioning outcomes (children diagnosed with that psychiatric comorbidity tended to obtain ratings of significantly more total and externalizing problems, more difficulties, and worse overall functioning); and the presence of conduct disorder predicted worse scores on the CBCL Total Problems, CBCL Externalizing Problems, and SDQ Total Difficulties outcomes (children diagnosed with that psychiatric comorbidity tended to obtain rating of significantly more total and externalizing problems and more difficulties).

Recall that all participants, regardless of their initial group assignment, were offered the opportunity to participate and benefit from the 8-week intervention process. In other words, some participants initially assigned to the Non-Structured Support group or the Waitlist Control group went on to receive intervention at a later point. When these participants' baseline, immediate post-intervention, and 6-month follow-up data were added to the original datasets (i.e., those whose analyses are reported above), the trends described above were confirmed (i.e., overall, parents reported that their child's functioning improved from baseline to the end of the intervention protocol, and that this improvement was sustained at 6-month follow-up. Appendix I provides a full account of these results.

Table 19

Study 2, Hypothesis 2: Mixed Effects Model Significant Factors, CBCL Outcome Variables (N = 62)

Outcome Variable	Significant Predictor	Estimate	95% CI		*p*
			LL	UL	
Total Competence [a]	Control Variable(s)				
	ADHD medication use	5.21	0.59	9.84	.027*
	Main Effect				
	Time [Baseline vs Post-Intervention]	4.08	3.12	5.04	< .001***
	Time [Baseline vs 6-month Follow-up]	5.50	4.54	6.46	< .001***
Total Problems [b]	Control Variable(s)				
	Oppositional-defiant disorder	5.13	1.78	8.48	.003**
	Conduct disorder	6.35	2.74	9.97	.001**
	Main Effect				
	Time [Baseline vs Post-Intervention]	-4.42	-5.18	-3.65	< .001***
	Time [Baseline vs 6-month Follow-up]	-6.26	-7.02	-5.49	< .001***
Internalizing Problems [c]	Main Effect				
	Time [Baseline vs Post-Intervention]	-3.87	-4.70	-3.04	< .001***
	Time [Baseline vs 6-month Follow-up]	-4.79	-5.62	-3.94	< .001***
Externalizing Problems [d]	Control Variable(s)				
	Oppositional-defiant disorder	7.70	4.25	11.15	< .001***
	Conduct disorder	10.34	6.61	14.06	< .001***
	Main Effect				
	Time [Baseline vs Post-Intervention]	-3.50	-4.28	-2.72	< .001***
	Time [Baseline vs 6-month Follow-up]	-4.15	-4.93	-3.36	< .001***

Note. All predictor variables are categorical in nature, comparing the presence and absence of a particular factor. CBCL = Child Behavior Checklist; CI = confidence interval; LL = lower limit; UL = upper limit. [a] Model fit statistics: ICC = .92; Marginal R^2 = .16; conditional R^2 = .93. [b] Model fit statistics: ICC = .89; Marginal R^2 = .38; conditional R^2 = .93. [c] Model fit statistics: ICC = .92; Marginal R^2 = .12; conditional R^2 = .93. [d] Model fit statistics: ICC = .89; Marginal R^2 = .53; conditional R^2 = .95.

All R^2 values are adjusted for multiple predictors. *** $p < .001$. ** $p < .01$. * $p < .05$.

Table 20

Study 2, Hypothesis 2: Mixed Effects Model Significant Factors, SDQ and IRS Outcome Variables (N = 62)

Outcome Variable	Significant Predictor	Estimate	95% CI		*p*
			LL	UL	
SDQ Total Difficulties [a]	Control Variable(s)				
	Oppositional-Defiant Disorder	5.12	2.70	7.54	< .001***
	Conduct Disorder	4.06	1.45	6.68	.003
	Main Effect				
	Time [Baseline vs Post-Intervention]	-2.29	-3.74	-2.74	< .001***
	Time [Baseline vs 6-month Follow-up]	-3.24	-3.74	-2.74	< .001***
IRS Overall Functioning [b]	Control Variable(s)				
	Oppositional-Defiant Disorder	0.50	0.19	0.80	.002**
	Main Effect				
	Time [Baseline vs Post-Intervention]	-0.60	-0.73	-0.46	< .001***
	Time [Baseline vs 6-month Follow-up]	-0.68	-0.81	-0.64	< .001***

Note. All predictor variables are categorical in nature, comparing the presence and absence of a particular factor. SDQ = Strengths and Difficulties Questionnaire; IRS = Impairment Rating Scale; CI = confidence interval; LL = lower limit; UL = upper limit. [a] Model fit statistics: ICC = .91; Marginal R^2 = .40; conditional R^2 = .95. [b] Model fit statistics: ICC = .66; Marginal R^2 = .28; conditional R^2 = .75.
All R^2 values are adjusted for multiple predictors.*** $p < .001$. ** $p < .01$. * $p < .05$.

Discussion

Parent training is a well-established form of psychosocial intervention for ADHD, and is particularly effective when implemented with parents of school-aged children (Fawns, 2021; Liu, 2020). Several meta-analyses have demonstrated the efficacy of such behavior-based parent-training interventions. These studies report that following such treatment there are improvements in ADHD core symptoms as well as reduced comorbidities, relief of functional impairment, and better parenting skills (all changes associated with medium-to-large effect sizes; Morgan and O'Keefe, 2022; Steenhuis et al., 2020). Of particular relevance for this study is the argument, made by several researchers in this literature, that evaluation of the success of psychosocial interventions for ADHD should focus on the clinical significance ascribed to the treatment outcome by those who participated in the intervention (e.g., improvement in functional activities of daily living) rather than on a reduction in the number of core symptoms exhibited by patients (Evans et al., 2014; Karpenko et al., 2009; Weiss et al., 2018).

Hence, this study (Study 2 of the doctoral dissertation) built on prior research and on the results from Study 1 (a needs assessment investigation) in order to develop, implement, and test an 8-week parent training psychosocial intervention aimed at reducing ADHD-related functional impairment in school-aged South African children. Specifically, this intervention sought to empower parents by using psychoeducational techniques and by teaching them basic principles of behavior modification and positive parenting, with the ultimate aim of relieving functional impairment and thereby improving quality of life for their ADHD-diagnosed children. Questionnaire data were collected from 178 parents/caregivers of ADHD-diagnosed children (Intervention $n = 62$, Non-Structured Support $n = 66$, Waitlist Control $n = 50$).

Regarding sample characteristics, analyses generally detected no significant between-group differences with regard to key sociodemographic (e.g., parental employment, marital status, family's home language) and clinical (e.g., use of medication and psychiatric comorbidities) characteristics of the parents and their children. In the one instance where a statistically significant between-group difference was detected (there were many more girls in the Waitlist Control group than in the other two groups), the magnitude of the associated effect size was small enough to support the assumption that differences in sex distribution did not have an outsize influence on the outcome.

An interesting aspect of the sample characteristics is that most parent participants were women. Although this data point is consistent with a longstanding trend in the literature

on parent-training studies (see, e.g., Fabiano, 2007; Fabiano & Caserta, 2018), the question of *why* mothers rather than fathers tend to participate in such studies has only recently become the focus of empirical investigation. Nicolia et al. (2020) used data from four different behavioral parent-training studies to investigate potential predictors of fathers' ($N = 171$) attendance. Race/ ethnicity, child's medication status, and fathers' ratings of their children's psychiatric symptoms were not significant predictors; only fathers' education level was (i.e., those with no tertiary education had the lowest attendance levels). To explain this result, the researchers suggested that accessibility of the material presented during the intervention might influence attrition, as might the socioeconomic implications of having lower levels of education – fathers doing shift work, or those holding down two jobs, will tend to have less leisure time and hence less availability to attend.

Preliminary analyses of data from the major outcome variables (CBCL Total Competence, CBCL Total Problems, CBCL Internalizing Problems, CBCL Externalizing Problems, SDQ Total Difficulties, IRS Overall Functioning) detected, for the most part, no significant between-group differences at the baseline measurement point. Again, in the three instances where significant between-group differences were detected effect sizes were small and they could be accounted for in the subsequent set of mixed effects models. Consistent with the results of Study 1 (unsurprising because many of the Study 1 participants continued their involvement into Study 2), parents reported children to be struggling with functional impairment across domains. These results are also consistent with the DSM-5 diagnostic criteria for ADHD, which state that impairment should be pervasive across all functional areas (APA, 2013).

Regarding the major inferential analyses, the first major aim of the study was to answer the following question: Will parents assigned to the intervention condition, as compared to those assigned to the comparison conditions, rate their children's functioning as significantly improved after participating in the protocol? In other words, the analyses here sought to determine the effectiveness of the intervention.

Results indicated that parents assigned to the intervention condition rated their children's functioning as significantly improved (on all outcome measures) from the baseline to the immediate post-intervention measurement point. Parents assigned to the non-structured support condition reported either no significant change from baseline across the 8-week period or more functional impairment at the immediate post-intervention measurement point than at baseline. This latter aspect of the data pattern may be interpreted as indicating that, in the context of parenting an ADHD-diagnosed child, participating in a psychosocial activity

that involves only peer-based information sharing without any formal psychoeducation or any offer of formal practical solutions may increase feelings of hopelessness and subjective despair. Parents assigned to the waitlist control condition reported marginal change (either slight improvement or slight deterioration) from baseline to the immediate post-intervention measurement point.

Further regarding the major inferential analyses, the second major aim of the study was to answer the following question: Will participants assigned to the intervention group maintain improvement in functioning from the immediate post-intervention measurement point to the 6-month follow-up measurement point? In other words, the analyses here sought to determine whether effectiveness of the intervention was maintained over the medium- to long-term, with the same outcome variables considered here as in the previous set of analyses.

Results indicated that parents assigned to the intervention group tended to report a continued improved functioning from the immediate post-intervention measurement point to the 6-month follow-up measurement point. A consistent report, across all outcome variables, was that functional impairment was worst at baseline and that the largest improvement was observed at the 6 month follow-up mark. For some outcome variables (CBCL Total Competence, CBCL Total Problems, CBCL Internalizing Problems, IRS Overall Functioning), analyses detected a significant difference between scores at the baseline and post-intervention measurement points. That is to say, for those outcomes parents reported that the most improvement occurred during the time of the active intervention. Notably, for each of these outcomes this positive change was sustained at 6-month follow-up. For the other outcome variables (CBCL Externalizing Problems, SDQ Total Difficulties), analyses detected no significant differences between scores at baseline and at the immediate post-intervention measurement point, but a significant difference (an improvement) from baseline to the 6 month follow-up measurement. This pattern of data suggests that the intervention may have taken more time to alleviate these challenges: Parents may have been able to continue to implement what they learned during the intervention, and hence the child's functioning may have continued to improve over time.

Results from both the first and second set of analyses were consistent in indicating that the presence of psychiatric comorbidity (specifically, oppositional-defiant disorder [this was the strongest predictor among the control variables], conduct disorder, generalized anxiety disorder, and/or a major depressive episode) had a negative impact on functional impairment. In contrast, children who were prescribed stimulant medication tended to show

lower levels of functional impairment. As noted earlier, these findings are consistent with the extant literature indicating that ADHD-related functional impairment is exacerbated by the presence of comorbid psychiatric disorders (see e.g., Liu, 2020; Meyer et al., 2022) and that stimulant medication, especially methylphenidate, remains the most effective intervention to reduce core symptoms of ADHD (Antshel & Barkley, 2020; Cortese & Coghill, 2018; Faraone et al., 2021).

Taken together, results from the two major sets of inferential analyses indicate that the current intervention was successful in alleviating functional impairment in school-aged ADHD-diagnosed children, and that this success was maintained beyond the period when parents were actively attending intervention-group meetings. Of course, the current dataset and analyses cannot answer the question of *why* such success was observed. This shortcoming is common among treatment outcome studies, and hence a sizeable literature, stretching back decades, has attempted to uncover the 'active ingredient(s)' that makes psychotherapeutic interventions work (see e.g., Chronis-Tuscano et al., 2011; Dose et al., 2021; Hornstra et al., 2021; Kaminski et al., 2008; Leijten et al., 2019; Westen et al., 2004).

With regard to parent-training interventions, Dekkers et al. (2022) conducted a meta-analysis (29 studies, overall $N = 2{,}345$) that sought to add to knowledge regarding which components of such interventions (i.e. which techniques learned during such protocols) yield the most successful outcomes. They reported that a focus on teaching parents how to manipulate antecedents to children's behavior and how to implement positive reinforcement techniques were the most significant predictors of positive parental outcomes (feelings of competence, improved mental health, reduction of negative parenting strategies). They also found, however, that more time spent on psychoeducation had a negative impact on parental outcomes.

Of interest is that, although the intervention described in this dissertation was designed and trialled before the publication of the Dekkers et al. meta-analysis, it followed the recommendations made by that review. Specifically, of the 8 sessions in the current intervention only 2 focused on psychoeducation (around ADHD diagnostics, presentation, and treatment); the rest focused on training parents how to use basic concepts of behavior modification.

Strengths of the Design

This study's strength lies in its carefully considered methodology which strongly adhered to important elements of sound programme evaluation. The intervention was designed following a needs assessment of the specific targeted population. The design

involved comparisons of an intervention group to two comparison groups (a non-structured support group and a passive waitlist control group), with measures taken at baseline, immediately following the intervention period, and 6 months later – this longitudinal element allowed the analyses to assess whether the observed improvements were sustained over time. Another notable feature of the design is the standardization of the protocol: A single clinician facilitated all intervention and control group processes. Furthermore, the 8-week intervention presented here is easily manualized, and as such can be disseminated, replicated, and further evaluated by other researchers.

Limitations and Directions for Future Research

The inferences that might be drawn from the current data and analyses thereof must be constrained by the following design limitations. Note that these limitations are similar to those of Study 1. This is not surprising given that the same population was sampled from, using similar recruitment strategies, and that the same measures were used.

One limitation is that the sample's age, race/ethnicity, and language distributions were not an accurate representation of the South African population (either broadly speaking or with more specific reference to ADHD-diagnosed children). The reason for this limitation is the same as that for Study 1: I used convenience sampling to recruit parents into the study, and it is likely that some individuals with the target population are more likely to be exposed to advertising that invites them to participate in academic research while others are less likely to be in contact with professionals or educators who might alert them to the existence of this type of clinical study.

A second limitation is that all the outcome measures of functional impairment were of a self-report nature and that the parents knew that the goal of the research was to evaluate an intervention that would address challenges faced by children with ADHD. In this study, the demand characteristics of the study may have had even more of an effect of parent responses to the measures. Almost universally, parents assigned to the intervention condition were engaged in their group activities and committed to their groups, and throughout their meetings they expressed feelings of gratitude and positivity related to their experience with the intervention protocol. Hence, they may have been swayed toward reporting greater magnitudes of improvement in their children's functioning and may have felt they needed their responses to be positive for their feedback to be regarded as relevant or helpful to the research and the researchers.

A related consideration when evaluating the validity of self-report data is how educated respondents are in terms of the questionnaire's material. In the current study, some

parents had no previous exposure to answering questions regarding their child's functioning. In fact, many participants used the study as a starting block in addressing their child's ADHD-related challenges.

A third limitation is that the study measures did not include any assessment of individual factors that might have affected parents' ability to engage with the intervention protocol (e.g., mental and emotional wellbeing, self-concept, subjective experience of stress, cognitive health). Indeed, there were no exclusionary criteria applied to parents interested in participating in the research, even though children diagnosed with autism, psychotic symptoms, and intellectual disability were excluded from the sample. Future research might address the third limitation by including, for example, a measure of parental stress, and assessments of mental and cognitive health. It would also be interesting to see whether participation in the intervention leads to lower levels of self-reported parental stress.

A fourth limitation is that the same therapist facilitated and led all the intervention-group sessions. Hence, it is difficult to discern how much of the measured success was due to the personal skillset and relational ability of this clinician, and how well the intervention might be scaled up for broader use. Future research might address the fourth limitation by evaluating the success of the intervention when implemented by other therapists, medical professionals, or allied healthcare workers.

Future research may also benefit from having multiple informants complete measures of functional impairment for each child participant. For example, teachers could report on behavior in the classroom and on the playground, while grandparents and other caregivers' reports can add dimension and depth to the understanding of how ADHD-related functional impairment at home and in interpersonal relations changes as a result of parent exposure to the intervention.

Finally, future evaluations of this intervention should consider evaluating the impact of adding a booster or reminder session to the protocol, perhaps at the 6-month follow-up measurement point.

Summary and Conclusion

This research provides a blueprint for what could be an evidence-based, cost-effective intervention for ADHD-diagnosed children in low-income and low-resource settings. The study design allowed children and parents to be accompanied from first referral through a typical functional assessment, a targeted intervention programme, and a follow-up session. Although this may seem like a heavy burden for any healthcare system, the fact that the

intervention is group-based and focuses on parent-driven changes in the home environment makes it relatively efficient and cost effective.

This research makes a valuable contribution to ADHD literature by describing an effective, affordable, and replicable psychosocial intervention that was found to significantly improve functional impairment in school-aged children with ADHD. This research also supports the idea that reduction in ADHD symptom count may not concomitantly reduce impairment or enhance wellness, while interventions that focus on combating functional impairment will improve the lived experience of ADHD-diagnosed individuals.

CHAPTER 6
GENERAL DISCUSSION

Attention-Deficit/Hyperactivity Disorder (ADHD) is a pervasive developmental disorder that affects between 3 and 7% of children worldwide. By consensus and within formal diagnostic systems, the core symptoms of ADHD are inattention, hyperactivity, and impulsivity (APA, 2013; Faraone et al., 2021). These vary in presentation, severity, and associated functional impairment over the course of a diagnosed individual's life. Diagnosed individuals therefore often face lifelong challenges in various areas of life and functional activities of daily living; hence, the presence of ADHD is frequently associated with financial liabilities and other stressors for families, and in adverse academic, psychological, interpersonal, and vocational outcomes for the diagnosed individual (Fawns, 2021; Lui, 2020).

Because ADHD is a lifelong condition, management of core symptoms, comorbidities, and associated functional challenges is costly. In South Africa, which the World Bank classifies as a low- or middle-income country (LMIC; www.datatopics.worldbank.org) local research indicates that the presence of ADHD in adulthood more than doubles annual medical costs of medical scheme beneficiaries (Schoeman & Liebenberg, 2017).

The research described in this doctoral dissertation had the broad aims of (1) investigating functional impairment as experienced by South African school-aged children diagnosed with ADHD and (2) designing and testing a psychosocial intervention targeting domains where most functional impairment is reported in ADHD-diagnosed children. The value and rationale of this study lie in its exploration of ADHD-related functional impairment and its use of these data to design, implement, and evaluate a cost-effective psychosocial intervention.

Study 1: Functional Impairment in South African Children with ADHD

This was a needs assessment study that set out to describe types and degree of functional impairment experienced by a sample South African school-aged ADHD-diagnosed children ($N = 99$). I interviewed children and their parents individually, first to confirm the ADHD diagnosis and then to gather information (via self-report paper-and-pencil questionnaires) about functional impairment, comorbid psychiatric disorders, socioeconomic status, medication regimen, schooling experience, and other sociodemographic / clinical characteristics. Ultimately, the data described the areas of life where this sample of children

faced the most severe ADHD-related challenges in terms of everyday functioning in various domains of activity (school, home, interpersonal relationships).

Children in this sample ranged from 6–18 years; 70.71% were biological males. Historically, more boys than girls are identified as exhibiting symptoms of ADHD, and as such boys are more frequently referred for assessment, intervention, or research participation (Carbonneau et al., 2021; Fawns, 2021; Mowlem et al., 2019). Eighty-three of the 99 children in this sample were identified as exhibiting a mixed presentation of core ADHD symptoms (i.e., hyperactivity/ impulsivity as well as inattention were observed), while the remaining 16 were classified as exhibiting the predominantly inattentive presentation of ADHD. More than 60% of the children were also in the foundation phase level (Grades 0–3) of their education, which is a developmental phase where combined presentation of core ADHD symptoms are most common (Antshel & Barkley, 2020). These sample characteristics are, by and large, typical of what is reported in research literature on school-aged children with ADHD. Parent participants in this sample had an average age of 39.3 years, while more than 90% were biological females.

The primary statistical analyses indicated that, on average, parents rated their children as struggling most in the domain of school/academic functioning. However, ratings on all functional areas indicated significant challenges. Pervasive functional impairment, as observed here, is consistent with previous literature (see, e.g., Arildskov et al., 2022; Meyer et al., 2022). This is important to note for numerous reasons. One of these is that functional impairment appears to be a more accurate indicator of prognosis than core symptom counts: Whereas symptom presentation tends to fluctuate over the ADHD-diagnosed individual's lifetime, assessment of functional impairment at any point in the lifetime paints an accurate picture of unique challenges being experienced at that time and can provide suggestions as to how those challenges might grow if left unaddressed (Cortese & Coghill, 2018; Sasser et al., 2016).

Analyses additionally indicated that comorbid oppositional-defiant disorder (especially) and comorbid conduct disorder were the strongest predictors of higher scores on the CBCL Total Problems and lower scores on the CBCL Total Competence measures. These psychiatric comorbidities also impacted negatively on CBCL Social Competence scores. This set of findings is consistent with previous literature reporting that ADHD-related functional impairment seems to be exacerbated by the presence of comorbid psychiatric disorders (see, e.g., Liu, 2020; Meyer et al., 2022). Moreover, the presence of psychiatric comorbidities has been linked to poorer overall prognoses. For instance, Cherkasova et al. (2022) reviewed

seven North American longitudinal studies that mapped the functioning of individuals diagnosed with ADHD, from childhood into adulthood. The review suggested that the most significant predictors of functional impairments for individuals diagnosed with ADHD in childhood were (alongside symptom persistence over time) comorbid disruptive behavior disorders (e.g., conduct disorder, ODD, and antisocial personality disorder). These comorbidities have been closely linked to future criminality as well as to increased prevalence of physical injuries, hospitalizations, mortality, substance abuse, and impaired functioning in the educational and occupational domains.

Analyses further indicated that children who had been prescribed stimulant medication tended to have significantly better parent-reported competence. Again, this finding is expected and is consistent with extant literature: Stimulant medication, especially methylphenidate, remains the most effective intervention to reduce core symptoms of ADHD and alleviate associated impairment (Antshel & Barkley, 2020; Cortese & Coghill, 2018; Faraone et al., 2021).

Finally, analyses indicated that strength of family resources and availability of family support were not significant predictors of functional impairment. This finding concurs with literature that suggests high SES cannot be causally linked to protection from ADHD diagnosis, while low-SES communities often struggle with types of dysfunction that may exacerbated ADHD-related impairment (e.g., ineffective communication patterns, conflictual relationships, poor problem solving skills, maternal smoking and poor parental mental health) (Foley, 2011; Rowland et al., 2017; Russell et al., 2015).

Study 2: Design, Implementation, and Evaluation of a Parent-Based ADHD Intervention Targeted at Addressing Child Functional Impairment

The Study1 results were used in conjunction with recommendations from existing literature to design a psychosocial intervention for parents of ADHD-diagnosed children. Ultimately, the design featured an 8-week group-based parent-training intervention which sought to equip parents with tools and strategies based on the basic principles of behavior modification, as well as positive and mindful parenting approaches. The content of this intervention focused specifically on the school and social domains and on the negative effects of comorbid oppositional-defiant disorder. The overall aim of the intervention was to alleviate functional impairment of ADHD-diagnosed children, and in doing so, enhance their overall quality of life.

The same diagnostic process and measures of functional impairment as in Study 1 were used to establish Study 2 participants' pre-intervention (baseline) functioning. The

measures were re-administered immediately after the completion of the 8-week intervention and then again 6 months later. The study design also involved two comparison groups: a non-structured support group and a waitlist control group. Parents assigned to the former group attended eight 1-hour group meetings running over 8 consecutive weeks (i.e., this condition was structurally identical to the intervention condition), where parents were encouraged to engage in non-specific and self-directed discussion. Parents assigned to both these groups completed the same measures as the intervention-group participants at baseline and 8 weeks later.

Hypothesis 1 tested the effectiveness of the intervention. Analyses detected no significant between-group differences regarding clinical or sociodemographic characteristics or regarding functional impairment at baseline. However, parents assigned to the intervention group, compared to those assigned to the comparison groups, reported that their children were experiencing significantly less functional impairment after completion of the 8-week protocol. Indeed, intervention-group parents were the only ones to report improved (over baseline) functioning on all outcome variables at the immediate post-intervention measurement point.

Analyses further indicated that, consistent with the Study 1 results, the presence of comorbid psychiatric disorders (oppositional-defiant disorder, conduct disorder, generalized anxiety disorder, major depressive episode) had a negative impact on functional impairment, whereas the use of prescribed stimulant medication had a positive impact on functional impairment. As noted above, these findings are consistent with previously published literature indicating that ADHD-related functional impairment is exacerbated by the presence of comorbid psychiatric disorders (see, e.g., Liu, 2020; Meyer et al., 2022) and that stimulant medication, especially methylphenidate, remains the most effective intervention for ADHD (see, e.g., Antshel & Barkley, 2020; Cortese & Coghill, 2018; Faraone et al., 2021).

Hypothesis 2 tested whether intervention-group participants would maintain improved functioning from the immediate post-intervention measurement point to the 6-month follow-up measurement point. Analyses here indicated that, by and large, functional impairment was the worst at baseline and that the largest improvement was observed at the 6 month follow-up mark. For some outcome variables, it appeared that the largest improvements occurred during the time of the intervention (i.e., the largest significant difference was between baseline and post-intervention scores), and that this positive change was sustained at 6-month follow-up. For other outcome variables, there was a non-significant difference between baseline and post-intervention scores, but a significant change from baseline to 6 month follow-up scores.

This latter pattern of data suggests participants continued to improve over time and that the intervention may have taken more time to alleviate certain challenges. *Externalizing problems*, as measured by the CBCL, was one of the outcome variables that took more time to show improvement; this might be linked to the fact that externalizing problems refer to overt problematic behavior such as hyperactivity and impulsivity, which are core symptoms of ADHD and therefore perhaps more difficult to assuage.

Strengths of the Study

A major strength of this study lies in its methodology, which strongly considered and adhered to important elements of sound programme evaluation. The intervention was designed following a needs assessment of the specific targeted population. The design involved comparisons of the intervention group to both an active and a passive control group, and it featured a longitudinal follow-up to assess whether the observed improvements were sustained over time. Furthermore, the protocol was strongly standardized in that one clinician facilitated all intervention and control group processes.

A second important strength lies in the intervention's dissemination potential. Because the protocol can be manualized quite easily, it is possible to train educators, nurses, and other healthcare providers to facilitate the intervention. In this way, access to cost-effective and helpful treatment can be offered to caregivers and parents who cannot afford individualized or private medical care for their ADHD-diagnosed child. There is no evidence that ADHD manifests differently in South Africa than elsewhere in the world, and therefore the intervention can also be applied globally.

This study also contributed to the wellbeing of its participants. For many of the parents, participation in this study was the first contact they had with a mental health professional regarding their child's ADHD and related challenges. Participation in this study, even just at needs assessment level, included receiving valuable individualized feedback, recommendations, and relevant referrals. The intervention specifically embraced the strengths of social learning theory (Bandura & Walters, 1977) by providing participants a safe space to practice, model and rehearse new skills. Members of the intervention groups found meaning and value in being reinforced and supported by each other; this is illustrated by the fact that one of the groups continued meeting on their own, independent of any professional facilitation, for more than a year after the conclusion of the 8-week intervention.

General Limitations and Directions for Future Research

The limitations of each individual study are documented at the end of Chapter 4 and Chapter 5. Here I discuss some additional factors that might limit the inferences one can draw

from the observed data and I note how these constraints may be addressed by future research studies.

First, the study did not include an assessment of parent-child attachment either as a screening criterion or as an outcome measure. Quality of attachment may have influenced how effectively parents could implement the concepts they learned during the intervention, while it is possible that participation in the intervention could have had a positive effect on attachment. Future research might address this shortcoming by, for instance, including an observational assessment of parent-child interaction at baseline and upon completion of the intervention protocol.

Second, the study only included children with a primary ADHD diagnosis, and hence it cannot comment on whether the intervention protocol is generalizable to other clinical populations. It is certainly possible that parents of children diagnosed with other clinical disorders (perhaps primary oppositional-defiant disorder or conduct disorder, in particular) will find that the intervention equips them with parenting skills and strategies that have a positive effect on their child's functioning. Even parents of neurotypical children might benefit from exposure to the intervention given that it can equip them with effective skills to enhance their child's overall functioning and competence.

Another future research endeavor could include qualitative feedback from participants alongside quantitative measures. In this way, one might gain more understanding of ways in which the intervention affects individual families and why it might be more effective in some home environments than others.

Clinical Implications

The parent-training psychosocial intervention that was designed, implemented, and evaluated in this study was successful in addressing functional impairment in various domains of ADHD-diagnosed children's lives. The 8-week intervention included two sessions of psychoeducation focused on the core symptoms of ADHD and on information regarding the roles of medical and allied health professionals in a multidisciplinary team that can help manage their child's ADHD-related challenges. The rest of the intervention prioritized equipping parents with tools to help their children cope with challenges in various domains of life (school, home, interpersonal relationships with friends and family members). Participants were taught to use tools based on the principles of basic behavior modification strategies, as well as positive parenting and mindful parenting approaches. There was an overall focus on practicing healthy communication, effective discipline strategies, and mindful management of children's behavior and emotional dysregulation. Extant literature has demonstrated the

value and effectiveness of teaching parents these types of behavior modification strategies (see, e.g., the meta-analysis by Dekkers et al., 2022) while the value of positive and mindful parenting strategies (such as responding to children with sensitivity, consistency, warmth, and helpfulness) is also well-documented (see, e.g., Emerson et al., 2021).

Psychosocial interventions are, of course, not a total cure for ADHD. However, treatment protocols that focus on improving functional impairment are of significant value to this clinical population. Cortese and Coghill (2018) argue that clinical emphasis (and hence treatment recommendations) should be placed on the degree of functional impairment experienced by an individual with ADHD, rather than on the number of core symptoms in their presentation.

Furthermore, ADHD is a lifelong disorder and therefore symptoms and associated challenges will continue to affect diagnosed individuals across their lifespan, with functional impairment persisting from childhood into adulthood (Austerman, 2015; Fawns, 2021; Liu, 2020). Cherkasova et al. (2022), in a systematic review, illustrate these ongoing challenges They examined the results and conclusions from seven prospective longitudinal studies that followed North American ADHD-diagnosed children. Their review concluded that, for most individuals who have had ADHD diagnosed during childhood, there are significant and enduring impairments into adulthood. These impairments tend to be particularly marked in the following areas: educational functioning, occupational /economic functioning, mental health, physical health, substance use, antisocial behavior, and driving.

How, then, might one address the impairment as early as possible? Posner et al.(2020) advocate for the value of adopting a developmental perspective when considering psychosocial interventions for ADHD—that is to say, the importance of designing interventions that will address functional impairment in various domains to support the ADHD-diagnosed individual from early childhood across their lifespan. This is reiterated by DuPaul et al., (2020) who advocates for a so-called life course model of care when designing and evaluating psychosocial interventions for ADHD. Nazarova et al. (2022), in their recent review of 695 ADHD clinical trials, found a significant increase in non-pharmacological ADHD-interventions, akin to the parent-training protocol described here, and specifically noted the importance of behavioral interventions that commence in childhood with the help of parents/ caregivers and that continue to support the individual as they mature into adulthood.

Summary and Conclusion

This doctoral dissertation set out to better understand the functional impairment experienced by school-aged South African children with ADHD, and to design, implement and evaluate a targeted intervention that would address the observed impairments. The research findings make a valuable contribution to the clinical scientific literature on ADHD by: (1) confirming that ADHD-diagnosed children struggle with functional impairment across various domains of functioning; (2) confirming that psychiatric comorbidities, especially oppositional-defiant disorder, exacerbate ADHD-related functional impairment, while stimulant medication helps alleviate associated challenges; and (3) describing an affordable and replicable psychosocial intervention that can effectively target and significantly improve functional impairment in school-aged ADHD-diagnosed children.

This research also supports the idea that interventions which focus on combating functional impairment will improve the lived experience of ADHD-diagnosed individuals, even in the presence of lifelong core symptoms of this neurodevelopmental disorder.

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APPENDIX A

DSM-5 DIAGNOSTIC CRITERIA FOR ADHD

A. Either (1) and/or (2).

1. **Inattention**: Six (or more) of the following symptoms have persisted for at least 6 months to a degree that is inconsistent with developmental level and that impact directly on social and academic/occupational activities. Note: for older adolescents and adults (ages 17 and older), only 4 symptoms are required. The symptoms are not due to oppositional behavior, defiance, hostility, or a failure to understand tasks or instructions.

(a) Often fails to give close attention to details or makes careless mistakes in schoolwork, at work, or during other activities (for example, overlooks or misses details, work is inaccurate).

(b) Often has difficulty sustaining attention in tasks or play activities (for example, has difficulty remaining focused during lectures, conversations, or reading lengthy writings).

(c) Often does not seem to listen when spoken to directly (mind seems elsewhere, even in the absence of any obvious distraction).

(d) Frequently does not follow through on instructions (starts tasks but quickly loses focus and is easily sidetracked, fails to finish schoolwork, household chores, or tasks in the workplace).

(e) Often has difficulty organizing tasks and activities. (Has difficulty managing sequential tasks and keeping materials and belongings in order. Work is messy and disorganized. Has poor time management and tends to fail to meet deadlines.)

(f) Characteristically avoids, seems to dislike, and is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework or, for older adolescents and adults, preparing reports, completing forms, or reviewing lengthy papers).

(g) Frequently loses objects necessary for tasks or activities (e.g., school assignments, pencils, books, tools, wallets, keys, paperwork, eyeglasses, or mobile telephones).

(h) Is often easily distracted by extraneous stimuli. (for older adolescents and adults may include unrelated thoughts.).

(i) Is often forgetful in daily activities, chores, and running errands (for older adolescents and adults, returning calls, paying bills, and keeping appointments).

2. **Hyperactivity and Impulsivity**: Six (or more) of the following symptoms have persisted for at least 6 months to a degree that is inconsistent with developmental level and that impact directly on social and academic/occupational activities. Note: for older adolescents and adults (ages 17 and older), only 4 symptoms are required. The symptoms are not due to oppositional behavior, defiance, hostility, or a failure to understand tasks or instructions.

(a) Often fidgets or taps hands or feet or squirms in seat.

(b) Is often restless during activities when others are seated (may leave his or her place in the

classroom, office or other workplace, or in other situations that require remaining seated).

(c) Often runs about or climbs on furniture and moves excessively in inappropriate situations. In adolescents or adults, may be limited to feeling restless or confined.

(d) Is often excessively loud or noisy during play, leisure, or social activities.

(e) Is often "on the go," acting as if "driven by a motor." Is uncomfortable being still for an extended time, as in restaurants, meetings, etc. Seen by others as being restless and difficult to keep up with.

(f) Often talks excessively.

(g) Often blurts out an answer before a question has been completed. Older adolescents or adults may complete people's sentences and "jump the gun" in conversations.

(h) Has difficulty waiting his or her turn or waiting in line.

(i) Often interrupts or intrudes on others (frequently butts into conversations, games, or activities; may start using other people's things without asking or receiving permission, adolescents or adults may intrude into or take over what others are doing).

(j) Tends to act without thinking, such as starting tasks without adequate preparation or avoiding reading or listening to instructions. May speak out without considering consequences or make important decisions on the spur of the moment, such as impulsively buying items, suddenly quitting a job, or breaking up with a friend.

(k) Is often impatient, as shown by feeling restless when waiting for others and wanting to move faster than others, wanting people to get to the point, speeding while driving, and cutting into traffic to go faster than others.

(l) Is uncomfortable doing things slowly and systematically and often rushes through activities or tasks.

(m) Finds it difficult to resist temptations or opportunities, even if it means taking risks (A child may grab toys off a store shelf or play with dangerous objects; adults may commit to a relationship after only a brief acquaintance or take a job or enter into a business arrangement without doing due diligence).

B. Several noticeable inattentive or hyperactive-impulsive symptoms were present by age 12.

C. The symptoms are apparent in two or more settings (e.g., at home, school or work, with friends or relatives, or in other activities).

D. There must be clear evidence that the symptoms interfere with or reduce the quality of social, academic, or occupational functioning.

E. The symptoms do not occur exclusively during the course of schizophrenia or another psychotic disorder and are not better accounted for by another mental disorder (e.g., mood disorder, anxiety disorder, dissociative disorder, or a personality disorder).

Specify Based on Current Presentation

Combined Presentation: If both Criterion A1 (Inattention) and Criterion A2 (Hyperactivity-Impulsivity) are met for the past 6 months.

Predominately Inattentive Presentation: If Criterion A1 (Inattention) is met but Criterion A2 (Hyperactivity-Impulsivity) is not met and 3 or more symptoms from Criterion A2 have been present for the past 6 months.

Predominately Hyperactive/Impulsive Presentation: If Criterion A2 (Hyperactivity-Impulsivity) is met and Criterion A1 (Inattention) is not met for the past 6 months.

Inattentive Presentation (Restrictive): If Criterion A1 (Inattention) is met but no more than 2 symptoms from Criterion A2 (Hyperactivity-Impulsivity) have been present for the past 6 months

APPENDIX B

DEMOGRAPHIC QUESTIONNAIRE

1. Child age:

2. Child biological sex: Male / Female

3. Parent Age:

4. Parent biological sex:

5. What is your race or ethnic background?

6. Religion:

7. Home language:

8. Type of neighborhood: Suburban/ Urban/ Rural

9. Household income per annum (tick appropriate income category):

0 - R50000	
R50000 - R100 000	
R100000 - R150000	
R150000 - R200000	
R200000 - R300000	
R300000 - R400000	
R400000 - R500000	
R500 000 plus	

10. Parent marital status (tick appropriate category):

Married/ Partnership	
Divorced	
Single	

11. Parent employment status (tick appropriate category):

Executives, senior professionals, business owners	
Managers, professionals	
Administrative and small business owners	
Clerical, technical, sales	
Skilled manual labor	
Semi-skilled labor	
Unemployed	

12. Parent level of education (tick appropriate category):

0 years	
Some primary school - incomplete	
Some high school - incomplete	
Completed high school	
Tertiary education – college diploma / bachelors degree	
Post graduate	

13. What grade is your child presently in?

14. What type of school is your child attending? government / private

15. Is your child currently taking medication to help manage ADHD symptoms?

APPENDIX C
IMPAIRMENT RATING SCALE

Child's name:

Form completed by:

Date completed:

Instructions: In the space below, please describe what you see as your child's primary problems, both at home and at school. Also, please describe how your child's problems have affected the following areas and complete the rating at the end of each:
(1) his or her relationships with playmates and brothers or sisters,
(2) his or her relationship with you (and your spouse if present),
(3) his or her academic progress at school,
(4) his or her self-esteem, and
(5) your family in general.

For the ratings, please mark an "X" on the lines at the points that you believe reflect the impact of the child's problems on this area and whether he or she needs treatment or special services for the problems.

(1) How your child's problems affect his or her relationship with playmate

No Problem_____ Extreme Problem
Definitely does not need treatment_____Definitely needs treatment

Regardless of whether this child is popular or unpopular with peers, does he or she have a special, close "best friend" that he or she has kept for more than a few months? (Please circle)

YES/ NO

(2) How your child's problems affect his or her relationship with brothers or sisters

No Problem_____ Extreme Problem
Definitely does not need treatment_____Definitely needs treatment

(3) How your child's problems affect his/her relationship with you / other caregivers

No Problem_____ Extreme Problem
Definitely does not need treatment_____Definitely needs treatment

(4) How your child's problems affect his or her academic progress at school

No Problem_____ Extreme Problem
Definitely does not need treatment_____Definitely needs treatment

(5) How your child's problems affect his or her self-esteem

No Problem_____ Extreme Problem
Definitely does not need treatment_____Definitely needs treatment

(6) How your child's problems affect your family in general

No Problem_____ Extreme Problem
Definitely does not need treatment_____Definitely needs treatment

(7) Please mark an "X" on the following line at the point that you believe reflects the overall severity of this child's problem in functioning and overall need for treatment.

No Problem_____ Extreme Problem
Definitely does not need treatment_____Definitely needs treatment

APPENDIX D

STRENGTHS AND DIFFICULTIES QUESTIONNAIRE

PARENT REPORT

For each item, please mark the box for Not True, Somewhat True or Certainly True. It would help us if you answered all items as best you can even if you are not absolutely certain or the item seems daft! Please give your answers on the basis of the child's behavior over the last six months.

Child's Name.....
Male/Female
Birthday.....

	Not True	Somewhat True	Certainly True
Considerate of other people's feelings			
Restless, overactive, cannot stay still for long			
Often complains of headaches, stomach-aches or sickness			
Shares readily with other children (treats, toys, pencils etc.)			
Often has temper tantrums or hot tempers			
Rather solitary, tends to play alone			
Generally obedient, usually does what adults request			
Many worries, often seems worried			
Helpful if someone is hurt, upset or feeling ill			
Constantly fidgeting or squirming			
Has at least one good friend			
Often fights with other children or bullies them			
Often unhappy, down-hearted or tearful			
Generally liked by other children			
Easily distracted, concentration wanders			
Nervous or clingy in new situations, easily loses confidence			
Kind to younger children			

Often lies or cheats

Picked on or bullied by other children

Often volunteers to help others (parents, teachers, other children)

Thinks things out before acting

Steals from home, school or elsewhere

Gets on better with adults than with other children

Many fears, easily scared

Sees tasks through to the end, good attention span

APPENDIX E

CONSENT FORM

You are being asked to take part in a research study. This form provides you with information about the study and seeks your authorization for the collection, use and disclosure of your mental health and other personal as other information necessary for the study. The Principal Investigator (the person in charge of this research), Mareli Fischer, will also describe this study to you and answer all of your questions.
Your participation is entirely voluntary. Before you decide whether or not you want your child and yourself to take part, read the information below and ask questions about anything you do not understand. By participating in this study you will not be penalized or lose any benefits to which you would otherwise be entitled.

1. Name of Parent and Child Participants

_____

2. Title of Research Study

Functional impairment in South African children with Attention-Deficit/Hyperactive Disorder and the design, implementation and evaluation of a targeted intervention

3. Investigators and Telephone Number(s)

Dr. Kevin G. F. Thomas
Senior Lecturer
Department of Psychology
University of Cape Town
Telephone: 021-650-4608

Mareli Fischer
PhD Student & Clinical Psychologist
Department of Psychology
University of Cape Town
Telephone: 082 588 8727
Email: adhd@marelifischer.co.za
www.marelifischer.co.za

4. Source of Funding or Other Material Support

NRF Innovation Scholarship

5. What is the purpose of this research study?

The purpose of this research study is to describe the nature of functional impairment in South African children and adolescents with Attention Deficit Hyperactive Disorder (ADHD), and then to design, implement and evaluate a targeted research intervention.

6. What will be done if your child/adolescent takes part in this research study?

In this study, you and your child will undergo an interview that will ask you questions relating to your child's mental health. Both you and your child will undergo the same interview simultaneously. In addition, you will complete a questionnaire relating to the impact that your child's ADHD symptoms has had on their lives.
Possible locations for the interviews and filling out the questionnaires: the University of Cape Town's Department of Psychology, your child's school, a community clinic or Mareli's private practice office. Each testing session will be individually conducted by Mareli, a clinical psychologist.
After the testing session, you will have the opportunity to ask questions and thus learn more about psychological research. Feedback and relevant referral information will be provided. However, your child's particular results will not be disclosed. You will then be given the opportunity to consent to take part in the second part of the study, namely the designed intervention. This intervention will consist of an 8 week long parent-training group, where a trained clinician will be teaching parents principles to help them better communicate with their child, and how to control and overcome certain challenging behaviors.

7. If you choose to allow your child to participate in this study, how long will he/she be expected to participate in the research?

Part 1 of the study consists of 1 session, which will last for a maximum of 2 hours. If at any time, during the interviews or when filling out the questionnaires, you or your child finds any of the procedures uncomfortable, you are free to discontinue participation without penalty.
Part 2 of the study will consist of participating in 8 sessions of group parent-training, over the course of 8 weeks.

8. How many parents and children are expected to participate in the research?

About 150

9. What are the possible discomforts and risks?

There are no known risks associated with participation in this study. The only possible discomfort your child may experience is slight fatigue. If he/she becomes tired during the interviews, we will take a break. Your child will be allowed to take breaks whenever requested. Your child may feel slight discomfort with the fact that he/she is taking part in an ADHD study and that people at the venue of the study may know of his/her ADHD diagnosis. However, privacy will be maintained, as best as is possible, in the place where the study is conducted.
If you wish to discuss the information above or any discomforts you or your child may experience, you may ask questions now.

10a. What are the possible benefits to you and your child/adolescent?

You and your child may or may not personally benefit from the research.
Participating in the 8 week parent training intervention will expose parents to useful literature about ADHD, as well as information on successful communication and discipline strategies.

10b. What are the possible benefits to others?

This study will help validate or disconfirm previous research conducted on the functional impairments of children and adolescents ADHD. All this will help inform the future treatment and diagnosis of ADHD in children and adolescents.

11. If you choose to take part in this research study, will it cost you anything?

Participating in this study will not cost you anything.

12. Will you receive compensation for taking part in this research study?

No

13a. Can you withdraw your child from this study?

You are free to withdraw your consent and to stop participating in this research study at any time. If you do withdraw your consent, there will be no penalty.

You are also free to decline to answer specific questions or to participate in certain parts of the study.

If you have any questions regarding your child's rights as a research participant, and your rights as the individual granting consent for research participation, you may phone the Psychology Department offices at 021-650-3430.

13b. If you withdraw your child from this study, can information about you still be used and/or collected?

Information already collected may be used.

14. Once personal and performance information is collected, how will it be kept secret (confidential) in order to protect your privacy?

Information collected will be stored in locked filing cabinets or in computers with security passwords. Only certain people have the right to review these research records. These people include the researchers for this study and certain University of Cape Town officials. Your research records will not be released without your permission unless required by law or a court order.

15. What information about your child may be collected, used and shared with others?

The information gathered from your child will be on their mental health status and functional impairments related to ADHD. If you agree that your child can be in this research study, it is possible that some of the information collected might be copied into a limited data set to be used for other research purposes. If so, the limited data set may only include information that does not directly identify you or your child. For example, the limited data set cannot include you or your child/adolescents' name, address, telephone number, ID number, or any other photographs, numbers, codes, or so forth that link you or your child/adolescent to the information in the limited data set.

The results of the research will be presented as part of a doctoral research project for the University of Cape Town. Also, the results may be submitted for publication in a peer-reviewed journal. In both instances neither you nor your child will be identified in any way.

16. What should you tell your child?

You may wish to discuss the study with your child to find out or determine whether he/she feels comfortable taking part. Your child should also know that if he/she does choose to participate, he/she can withdraw at any time during the study with no negative consequences

17. How will the researcher(s) benefit from your being in the study?

In general, presenting research results helps the career of a scientist. Therefore, the Principal Investigator and others attached to this research project may benefit if the results of this study are presented at scientific meetings or in scientific journals.

18. Signatures

As a representative of this study, I have explained to the parent/guardian of the participant the purpose, the procedures, the possible benefits, and the risks of this research study; and how the participant's performance and other data will be collected, used, and shared with others:

_____ _____
Signature of Person Obtaining Consent and Authorization Date

You have been informed about this study's purpose, procedures, possible benefits, and risks; and how your child's mental health status and ADHD-related functional impairments and other data will be collected, used and shared with others. You have received a copy of this form. You have been given the opportunity to ask questions before you sign, and you have been told that you can ask other questions at any time.
You voluntarily consent to allow your child to participate in this study. You hereby authorize the collection, use and sharing of your child's mental health status and ADHD-related functional impairments and other data. By signing this form, you are not waiving any of your legal rights.

_____ _____
Signature of Person Consenting and Authorizing Date

Please indicate below if you would like to be notified of future research projects conducted by our research group:

_____ (initial) Yes, I would like to be added to your research participation pool and be notified of research projects in which I or my child might participate in the future.

Phone number: _____
E-mail address: _____

APPENDIX F

ASSENT FORM

Project Title: Functional Impairments of South African Children with Attention Deficit/ Hyperactivity Disorder and the design, implementation and evaluation of a targeted intervention
Principal Investigator: Mareli Fischer

Why are you here?
Your doctors/parents want to tell you about a research study involving children with Attention Deficit/ Hyperactivity (ADHD/ADD). Research is a special way to learn about something. They want to see if you would like to be in this study. Mareli Fischer and some other researchers are doing this study.

Why is this study being done?
The researchers are doing this study because they want to learn more about how ADHD/ADD is affecting children's lives, so that this can provide psychologists and psychiatrists with information that will help them to treat children with ADHD/ADD.

What will happen to you if you agree join this study?
If you take part you will be asked some questions about your feelings and your life. Your mom/dad will also be asked the same questions about you. You and your parents will be asked these questions together. But you will only be asked these questions if you join the study.
This study won't make you feel better or get well. But the researchers might find out something that will help other children like you later.

What if you have any questions?
If you have questions about the study you can ask them at any time. You can ask now, or you can ask later. You can talk to the researchers or your parents. Do you have any questions now?

Who will know you are in the study?
When the study is finished we will tell other researchers, psychiatrists and psychologists what we found out, but we won't tell them your name.

Do you have to be in the study?
You don't have to be the study. No one will be mad at you if you don't want to take part. If you don't want to be in this study, you just have to tell us. If you want to be in the study, you just have to tell us.
You can say yes now and change your mind later. It is up to you.

If you want to be in this study print your name here.

I want to be in this study _____

_____ _____
Signature or Mark of Subject or Legally Authorized Representative Date

_____ _____
Signature of Person Obtaining Consent Date

APPENDIX G
DEBRIEFING FORM

Thank you for your participation in this research study. Your input has been very valuable. Please be assured that all you information and results will be managed confidentially.
Should you have any further questions or concerns, please reach out to the principal researcher, Mareli Fischer, via email: adhd@marelifischer.co.za
Should you require further help or intervention, please reach out to any of the facilities listed below, or feel free to ask Mareli about an appropriate referral (see email above):

- Red Cross Children's hospital
    - Klipfontein road, Rondebosch, Cape Town
    - 021 658 65111

- UCT Child Guidance Clinic
    - Chapel road, Rosebank, Cape Town
    - 021 650 3900

- Tygerberg Hospital Pediatric unit
    - Francie van Zijl Drive, Cape Town
    - 021 938 9583

- FAMSA Western Cape
    - 9 Bowden Road, Observatory, Cape Town
    - 021 447 7951

APPENDIX H
PARTICIPANT FEEDBACK EXAMPLE

Date

Dear Mrs Brown

Thank you so much for consenting to participate in our ADHD research study, and for completing the interview process and the questionnaires about Johnny. I wanted to give you some feedback based on your answers and our discussion.

You indicated that Johnny (who is currently 7 years old in Grade1) was diagnosed with ADHD by his pediatrician at Red Cross Hospital last year, and that they manage his stimulant medication prescription at the hospital. Our diagnostic interview confirmed this diagnosis. Johnny presents with symptoms of hyperactivity, impulsivity and inattention. You mentioned that he specifically struggles with listening and sitting still in the classroom and at home, that he is forgetful and disorganized, and that often gets in trouble with shouting out, interrupting and climbing on things.

From the questionnaires that you completed, it showed us that Johnny enjoys various sports and hobbies, and that he is popular among his friends. However, you are worried about his academic performance and learning at school. This seems to be the area where Johnny struggles most with ADHD symptoms. It would be a good idea to share Johnny's ADHD diagnosis with his teacher, and to keep an open line of communication with her, so that she can also alert you to any of Johnny's specific classroom challenges.

Johnny does not currently struggle with noticeable self-esteem issues, but from your answers it does appear that he presents with some symptoms of anxiety, for example night terrors and being afraid of the dark. It is important to help Johnny feel reassured by practicing good communication strategies and self-soothing skills at home.

We will be in contact to invite you to participate in our parenting group, where we can explore more appropriate tools and equip you to support Johnny even more.

Thank you

Mareli

APPENDIX I
STUDY 2, HYPOTHESIS 2 (INCLUSIVE SAMPLE)

Table I1

Study 2, Hypothesis 2: Mixed Effects Model Significant Factors, CBCL Outcome Variables (N = 97)

Outcome Variable	Significant Predictor	Estimate	95% CI		*p*
			LL	UL	
Total Competence [a]	Control Variable(s)				
	Oppositional-defiant disorder	-4.23	-7.93	-.52	.027*
	Main Effect				
	Time [Baseline vs Post-Intervention]	3.70	2.99	4.41	< .001***
	Time [Baseline vs 6-month Follow-up]	5.10	4.39	5.81	< .001***
Total Problems [b]	Control Variable(s)				
	Oppositional-defiant disorder	4.93	2.08	7.78	.003**
	Conduct disorder	5.43	2.49	8.42	.001**
	Main Effect				
	Time [Baseline vs Post-Intervention]	-4.77	-5.36	-4.19	< .001***
	Time [Baseline vs 6-month Follow-up]	-6.54	-7.12	-5.95	< .001***
Internalizing Problems [c]	Main Effect				
	Time [Baseline vs Post-Intervention]	-4.21	-4.81	-3.60	< .001***
	Time [Baseline vs 6-month Follow-up]	-5.0	-5.60	-4.40	< .001***
Externalizing Problems [d]	Control Variable(s)				
	Oppositional-defiant disorder	6.55	3.60	9.51	< .001***
	Conduct disorder	9.07	6.00	12.14	< .001***
	Main Effect				
	Time [Baseline vs Post-Intervention]	-3.92	-4.56	-3.28	< .001***
	Time [Baseline vs 6-month Follow-up]	-4.54	-5.18	-3.90	< .001***

Note. All predictor variables are categorical in nature, comparing the presence and absence of a particular factor. CBCL = Child Behavior Checklist; CI = confidence interval; LL = lower limit; UL = upper limit. [a] Model fit statistics: ICC = .91; Marginal R^2 = .18; conditional R^2 = .92. [b] Model fit statistics: ICC = .89; Marginal R^2 = .39; conditional R^2 = .94. [c] Model fit statistics: ICC = .92; Marginal R^2 = .13; conditional R^2 = .94. [d] Model fit statistics: ICC = .88; Marginal R^2 = .51; conditional R^2 = .94. All R^2 values are adjusted for multiple predictors. *** $p < .001$. ** $p < .01$. * $p < .05$.

Table I2

Study 2, Hypothesis 2: Mixed Effects Model Significant Factors, SDQ and IRS Outcome Variables (N = 97)

Outcome Variable	Significant Predictor	Estimate	95% CI		*p*
			LL	*UL*	
SDQ Total Difficulties [a]	Control Variable(s)				
	Oppositional-defiant disorder	4.45	2.36	6.54	< .001***
	Conduct disorder	4.04	1.87	6.21	.003
	Main Effect				
	Time [Baseline vs Post-Intervention]	-2.13	-2.54	-1.73	< .001***
	Time [Baseline vs 6-month Follow-up]	-2.84	-3.24	-2.43	< .001***
IRS Overall Functioning [b]	Control Variable(s)				
	Oppositional-defiant disorder	0.41	0.13	0.69	.004**
	Main Effect				
	Time [Baseline vs Post-Intervention]	-0.58	-0.69	-0.47	< .001***
	Time [Baseline vs 6-month Follow-up]	-0.64	-0.75	-0.53	< .001***

Note. All predictor variables are categorical in nature, comparing the presence and absence of a particular factor. SDQ = Strengths and Difficulties Questionnaire; IRS = Impairment Rating Scale; CI = confidence interval; LL = lower limit; UL = upper limit.

[a] Model fit statistics: ICC = .91; Marginal R^2 = .39; conditional R^2 = .94.

[b] Model fit statistics: ICC = .67; Marginal R^2 = .24; conditional R^2 = .75.

All R^2 values are adjusted for multiple predictors. *** $p < .001$. ** $p < .01$. * $p < .05$