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Prevalence of Attention Problems and the Efficacy of a Short-Term Parent-Teacher Intervention for Possible ADHD in A Low SES Community in Ekurhuleni, Gauteng

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Dedication

To all the amazing people in my life and those I have met on my life journey with ADHD, a super-power in disguise. I have been privileged to learn from you. It is because of you that I undertook this project and wanted to make a difference in the lives of other families, encouraging parents to find the strengths of the condition as I have certainly been blessed to acknowledge in those around me with ADHD.

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To God be the glory: thank you for allowing me to complete this lifelong dream and for using me for Your purposes. I am humbled by this opportunity.

Abbreviations

ADHASA	Attention Deficit Hyperactivity Support Group of South Africa
ADHD	Attention Deficit/ Hyperactivity Disorder
APA	American Psychiatric Association
ARV	Antiretroviral treatment
ASD	Autism Spectrum Disorder
ASEBA	Achenbach System of Empirically Based Assessment
ATT-DIF	Child participants with attentional problems
BASC-3	Behaviour Assessment System for Children – Third Edition
BPT	Behaviour Parent Training programme
BRIEF-2	Behaviour Rating Inventory of Executive Function 2
Brown EF/A Scales	Brown Executive Function Attention Scales (Parent, Teacher and Self-Report Forms)
CBCL	Child Behaviour Checklist; available in TRF: Teacher Report Form; SRF: Self Report Form and Parent Report Forms
CD	Conduct Disorder
CPT	Continuous Performance Tests
DSM-IV	Diagnostic and Statistical Manual – Fourth Edition
DSM-V	Diagnostic and Statistical Manual – Fifth Edition
DSM 5-TR	Diagnostic and Statistical Manual – Fifth Edition, Text Revision
DDT	Dynamic Developmental Theory (Sagvolden et al, 2005)
DTD	Dopamine Transfer Deficit Theory (Tripp & Wickens, 2008)
EOG	Electrooculography (EOG) biofeedback; often referred to as "neurofeedback"
FXS	Fragile X syndrome
GABA	Gamma-aminobutyric acid
GB	Gigabyte
GDE	Gauteng Department of Education
HEG	Hemoencephalographic feedback
HKD	Hyperkinetic Disorder
ICD	International Classification of Diseases
ICD-11	International Classification of Diseases 11th Revision
IQR	Interquartile Range
KS	Klinefelter Syndrome

LDS	Language Development Survey
MBCT	Mindfulness Based Cognitive Therapy
MDT	Multidisciplinary Team
MSBR	Mindfulness Based Stress Reduction
MGBA	Microbiome–gut–brain axis
MRI	Magnetic Resonance Imaging
NICE guidelines	National Institute for Health and Care Excellence (NICE) guidelines
No ATT-DIFF	Child participants without attention problems
OCD	Obsessive Compulsive Disorder
ODD	Oppositional Defiant Disorder
PANAS-C	Positive and Negative Affect Schedule for Children
PANAS-C PA	Positive and Negative Affect Schedule for Children: Positive Affect subscale
PANAS-C NA	Positive and Negative Affect Schedule for Children: Negative Affect subscale
PREE	Partial Reinforcement Extinction Effect
RCI	Reliable Change Index
RCT	Randomised Control Trials
s-ADHD	Secondary ADHD
SAHRC	South African Human Rights Commission
SES	Socio-economic status
SGB	School Governing Body
SLD	Specific Learning Disorder
STARS-ADHD	Software Treatment for Actively Reducing Severity of ADHD
TBI	Traumatic Brain Injury
TSC	Tuberous Sclerosis Complex
UCT	University of Cape Town
UCT REC	University of Cape Town Research Ethics Committee
UK	United Kingdom
USA	United States of America
WHO	World Health Organisation
WS	Williams Syndrome

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Abstract

Attention Deficit Hyperactivity Disorder (ADHD), a neurodevelopmental disorder, impacts a large number of children. Treatment access barriers in South Africa, and long-term effectiveness of pharmacological interventions, particularly for socio-economically disadvantaged individuals, necessitate low-cost, evidence-based interventions.

The aim of this dissertation, comprising two studies, was to determine the efficacy of a short-term, teacher-led, parent training intervention, which I designed based on available evidence and best practice recommendations, in alleviating attention problems in learners aged 8 to12 years from a disadvantaged school in Gauteng. Study One intended to identify the extent of undiagnosed attention problems in the same school, through various standardised and non-standardised measures. Parents, of children presenting with attention problems, were then invited to participate in a teacher-led parent psychosocial training intervention, the efficacy of which was investigated in Study Two.

Both studies utilise a cross-sectional and quantitative design, with (informal / descriptive) qualitative observations for Study Two. For Study One, after screening for possible ADHD, I collected information on parent demographic details, risk factors for ADHD, and co-morbid difficulties. Study Two followed a pre-and post-intervention design, quantifying changes in parent-, and teacher reported attention-related problems in child participants from Study One. Data was analysed using descriptive statistics, with Study One using *t*-tests, and Fisher's Exact tests; Study Two used the Reliable Change Index (RCI; Jacobson & Traux, 1991), and within-group analyses, assessing the efficacy of the programme.

Study One (N=30) results indicated that ± 73% of child participants were assessed to have possible ADHD; they tended to be older, descriptively, than child participants without attention-related problems, and male. Study Two (N=17) results indicate that the intervention showed moderate effect sizes for improvements in memory-related difficulties as assessed by parent and teacher participants with parents reporting (qualitative) positive changes in aspects not measured by the standardised assessment, and encouraging outcomes for a promising locally-applicable psychosocial intervention . Despite the noted limitations, both studies provide contextually-relevant insights into difficulties experienced by parents, children, and teachers regarding inequalities in access to quality healthcare, multilingualism, and educational provision for learners not only with attentional difficulties, but with special educational needs more generally.

General Introduction

Attention Deficit Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder affecting approximately 5 - 7% of children in South Africa, and approximately 5.29% of children worldwide (Attention Deficit Hyperactivity Support Group of South Africa [ADHASA], 2020; Smith et al., 2015). The disorder affects various areas of functioning in children, including academic and cognitive functioning, and relationships with others (Evans et al., 2020; Hartman et al., 2023; Wannapaschaiyong et al., 2022). As such, early identification of the disorder and intervention lessens the impact on the future outcomes for children with ADHD (Evans et al., 2018).

Treatment generally includes a multimodal approach, incorporating pharmacological support, use of technological aids, and psychosocial treatments (Flood et al., 2016; Kemper et al., 2018; Pan et al., 2019; Swanson et al., 2018). However, due to lack of resources and other constraints specific to the South African context, due to historical inequalities, many children with ADHD from disadvantaged backgrounds in South Africa remain undiagnosed. Further, many do not receive adequate treatment for the disorder, despite the severity of the effect ADHD can have on their lives (Arnold et al., 2003, Fridman et al., 2017; Massuti et al., 2021; Wampfler, 2023). Additionally, even when parents can afford the requisite medications, many prefer not to utilise these due to adverse side effects and concerns about long-term medication usage (Khan & Aslani, 2021; Storebø et al., 2018). Technological-based treatments are also costly, often needing considerable space and time to implement, limiting their accessibility (Cibrian et al., 2022). Thus, seeking an alternative treatment mode is important to improve possible outcomes for children with ADHD.

Providing a viable alternative to reduce the overall treatment gap, research suggests that including teachers in parent training programmes has led to a reduction in ADHD symptoms, with teachers and schools often being involved in the early identification and support of children with special educational needs (Department of Basic Education, 2015; Ewe, 2019; Korkram et al., 2004; Truter, 2022).

With this in mind, the main aim of this dissertation was to determine whether a short-term teacher-led parent training intervention, based on researched Behaviour Parent Training (BPT) programmes, could alleviate symptoms related to attention problems in children aged between 8 and 12 years attending a school educating learners from a disadvantaged community in Ekurhuleni, Gauteng, South Africa.

It is important at the outset to explain the reference to ‘possible ADHD’ in the title, with the focus of the dissertation on ADHD. The original proposal for the two studies

reported on in this dissertation involved the assessment and diagnosis of ADHD among learners in some South African schools in Gauteng. However, my data collection coincided with the COVID-19 pandemic (explained in more detail later in the dissertation) with associated limitations in face-to-face contact with parent and child participants and the scope of assessments. Thus, the focus of the dissertation was modified to identify whether children participants presented with signs of attention problems and possible, rather than diagnosed, ADHD.

This dissertation is comprised of a general introduction, three content chapters, two study chapters, and a general discussion and conclusion. An outline of these various chapters is presented below.

The first content chapter (Chapter One) covers an overview of ADHD through an examination of diagnostic variations, pathophysiology, course and development of the disorder, co-morbid conditions, and potential outcomes of ADHD. The second content chapter (Chapter Two) considers different theories of attention, working memory, and learning (the latter two domains which are closely related to attention), providing a theoretical framework for understanding ADHD. The final content chapter (Chapter Four) evaluates treatment options, including the use of pharmacology, and technological and psychosocial interventions, with a special focus on BPT programmes, before barriers to treatment are examined.

Regarding the study chapters, Study One (Chapter Three) focused on exploring known risk factors for ADHD and identifying the prevalence of attention problems (and possible ADHD) amongst learners in grades one to three in a primary (elementary) school in Gauteng in South Africa. Study One also served as a needs-assessment and preliminary investigation for the second study. Study Two (Chapter Five) then involved the implementation of a short-term teacher-led training intervention, which I designed, with parents and caregivers of children with possible ADHD, as identified in Study One. Both studies apply quantitative analyses of data collected from standardised and non-standardised measures regarding the prevalence of possible ADHD, and associated risk factors from Study One, as well as the efficacy of the short-term intervention applied in Study Two.

The final chapter (Chapter Six) discusses overarching themes which emerged from the two studies, highlighting aspects needing particular attention in the South African context. Taken together, this dissertation highlights the need for a cost-effective intervention which can be expanded and implemented in low Socio-economic Status (SES) areas to minimise adverse symptoms of ADHD, thus limiting the consequences of ADHD. Although starting in

childhood, ADHD is “considered not only a neurodevelopmental disorder, but also a persistent and complex condition, with detrimental consequences for quality of life in adulthood” (Di Lorenzo et al., 2021, p. 238).

Chapter One

Overview of Attention Deficit/ Hyperactivity Disorder (ADHD)

In this chapter, I will provide an overview of ADHD through providing a definition, reviewing the clinical characteristics, a discussion of the main types of ADHD, and issues related to diagnosis of the disorder. In addition. I will consider the epidemiology of the disorder by examining the frequency with which it is diagnosed, the distribution of ADHD worldwide, in Africa and in South Africa, as well as the outcomes of the disorder.

Definition

ADHD is a neurodevelopmental disorder characterised by symptoms of inattention, poor organisational skills, and/or hyperactivity-impulsivity (American Psychiatric Association [APA], 2022; Center for Disease Control [CDC], 2024). Inattention- and disorganisation-related symptoms are manifested as difficulty staying on task, not seeming to listen when spoken to directly, and often losing things. Furthermore, symptoms related to hyperactivity and impulsivity are demonstrated through difficulty sitting still, being overactive, fidgeting, difficulty waiting one's turn, and intruding into others' activities (Franke et al., 2018). Additionally, all levels of symptoms are inconsistent with the child's developmental level and age (APA, 2022). Symptomology ranges across two main areas of functioning: inattention and hyperactivity-impulsivity. Moreover, symptoms are noticed before the child is 12 years of age and in at least two settings in which the child functions (for example at home and at school), interfere with or negatively impact areas of the child's academic or social functioning, are not better attributed to another psychological disorder, and do not occur solely during a psychotic or schizophrenic episode (APA, 2022).

Types of ADHD and Diagnostic Criteria

The DSM-5-TR (APA; 2022) further distinguishes three main types of ADHD based on the symptoms discussed:

Combined Presentation

This can be diagnosed if the person presents with at least six of the nine symptoms of inattention (Criterion A1) in addition to six of the nine symptoms of hyperactivity-impulsivity (Criterion A2). Symptoms need to be noted for a minimum of 6 months for this diagnosis to be applied. For adolescents and adults, five symptoms would suffice for diagnosis.

Predominantly Inattentive Presentation. Criterion A1 is met, but the child does not present with six symptoms of Criterion A2 for the prior 6 months. Likewise, five symptoms are needed for diagnosis in adults and adolescents.

Predominantly Hyperactive/Impulsive Presentation. Symptoms related to Criterion A2 are observed without six symptoms indicative of attentional problems (Criterion A1) for the past 6 months before diagnosis is made. Similar to the previous types described, five symptoms are needed for diagnosis in adults and adolescents.

Partial Remission

Partial remission is possible should the previously-diagnosed individual not present with the symptoms required for a diagnosis for at least 6 months.

Severity of Symptoms

ADHD can present in ranges from mild to severe according to the intensity of symptoms and their effects on functioning in the different spheres of a person's life (APA, 2022).

Relatedly, some children present with symptoms of inattention, hyperactivity or impulsivity which do not meet full criteria for a diagnosis of ADHD, known as subthreshold, subsyndromal or subclinical ADHD (Chen et al., 2022; Kirova et al., 2019). Prevalence rates are reportedly higher than ADHD and children are shown to be at higher risk for negative outcomes due to symptoms often not being recognised for treatment (Kirova at el., 2019). Difficulties experienced include academic, and social functioning, increased rates of suicidal ideation, increased self-harming behaviours, and higher incidence of co-morbid conditions than typically developing children (Boot et al., 2017; Mulraney et al., 2021; Zendarski et al., 2022).

Table 1 describes each main symptom and associated behaviours, particularly as it relates to children, as is the primary focus of this dissertation.

Table 1

Descriptions of ADHD Criteria (APA, 2022)

Criterion	Associated symptoms	Examples of associated behaviours
Criterion A1: Inattention: five / six of nine symptoms required for diagnosis of adolescents / adults, and young children, respectively.	Often failing to give careful attention to detail or making careless errors	Making mistakes in overlooking details; making silly errors in schoolwork
	Difficulty maintaining attention in play activities and tasks	Not paying attention in class or when parents and caregivers instruct them to perform tasks at home; difficulty maintaining attention when following conversations with others
	Not seeming to hear or understand when spoken to directly	Asking for others to repeat what has been spoken in conversation; others needing to repeat what was said previously before the child responds appropriately. It appears that the child's attention is focused elsewhere
	Frequently not following instructions fully and failing to complete tasks, which could include homework and chores	When the child is distracted and loses focus on the task at hand
	Often having difficulty with organisation of activities and tasks	Problems with following sequential steps; it can also include disorganised management of spaces, such as a messy bedroom or desk as well as failing to meet deadlines; difficulty with managing their time
	Regularly avoiding, disliking or being reluctant to start or continue tasks which are experienced as difficult and which could require continuous mental energy	Giving up easily on work which is perceived as difficult; trying to avoid engaging with the task
	Often losing or misplacing items which are needed for activities and tasks	Often losing items needed for school and home, such as items of school clothing, school homework and work books; losing pieces of stationery
	Frequently becoming easily distracted by stimuli	Distraction by external things, such as noise and movements in class; in older adolescents, it could include distraction by thoughts which are unrelated to the current situation in which they find themselves
	Often being forgetful in everyday activities	Forgetting what is required in performing certain tasks, such as applying a mathematical formula or steps required to complete a chore or daily task
Criterion A2: Hyperactivity and Impulsivity: six of nine symptoms required for diagnosis of adolescents / adults, and young children, respectively.	Often fidgeting or tapping with hand or feet and difficulty sitting still	Child often fiddling with their hands or feet or other items on their desks, such as items of stationery
	Frequently having difficulty remaining seated when expected to do so	The child may often leave their seat when completing homework or during mealtimes
	Regularly running or climbing about in situations when it is not acceptable to do so	Children climb on furniture when watching television; run around a classroom during lessons
	Difficulty engaging in relaxing or play activities quietly	The child makes excessive noise during play time
	Often " 'on the go', "acting as if 'driven by a motor'" (APA; 2022, p. 70)	Difficulty remaining still for a period of time with compulsive movement
	Frequently talking excessively	Finding it challenging to remain silent during lessons and talking continuously
	Regularly blurting out answers before questions are finished	Difficulty waiting one's turn in a conversation
	Frequently having difficulty waiting their turn	Impatience when the child is in a line and must wait their turn
	Often interrupting or intruding on other people	Interrupting conversations, activities and games; using others' items without seeking and receiving permission

Note. Information tabulated from DSM 5-TR (APA, 2022).

Other Diagnostic Criteria

The APA diagnostic criteria are not the only criteria relied upon for the diagnosis of ADHD-like behaviour. According to the World Health Organisation (WHO), the International Classification of Disease (ICD) system is utilised in several countries across the world for diagnosis of health conditions (World Health Organisation [WHO], 2023). Currently, version 11 is in use (ICD-11).

According to the ICD-11, there are core symptoms of ADHD from the following clusters: difficulty with sustained attention, being easily distracted by external stimuli, often losing items, being overactive, difficulty participating in activities quietly, difficulty waiting one's turn and impulsive behaviours (Gomez et al., 2023; WHO, 2023). Interestingly, there are no changes in diagnostic criteria of ADHD from the previous version of the DSM (DSM 5) when compared to the updated DSM 5-TR.

Prior to implementation of the ICD-11 in 2022, ADHD was not recognised with the same symptomology, as noted in Table 1. Rather associated behaviours were classified as Hyperkinetic Disorder (HKD), which was characterised by a cluster of behaviours, including: a deficiency in perseverance in cognitively-demanding activities, lack of persistence in activities that require cognitive involvement, predisposition to move from one activity to another without either being completed, appearing disorganised, poor emotional regulation, being prone to accidents and showing unnecessary activity, hyperactivity, and impulsivity, inter alia (Dreschler et al., 2020; Jummani et al., 2017; WHO, 2019). It is worth noting, however, differences in diagnostic criteria for HKD when compared to ADHD, which include younger age of onset before 6 years of age, and combined symptoms of inattention and hyperactivity with no differentiation between types (Jummani et al., 2019). However, the distinct classification of HKD is no longer in use, which may partly be due to problems with long-standing different diagnostic criteria being applied across various countries and associated diagnostic issues (Döpfner et al., 2008; Lahey et al., 2006; Santosh et al., 2005).

Considerations in ADHD Diagnoses

Until recently, an additional challenge related to the diagnosis of ADHD was reportedly due to the lack of using biological markers during the diagnostic process (Davidovitch et al., 2017; Dreschler, 2020). Mental disorders, unlike somatic disorders, are largely undetected in neuronal, physiological or genetic measures, as their diagnostic criteria are defined following consensus based on research regarding clusters of behaviours and emotions. These are described in diagnostic manuals such as the ICD-11 or DSM-5-TR (Merten et al., 2017). The lack of such biological markers, thus, compound the subjectivity of

ADHD, particularly when using inconclusive rating scales and non-standardised measures (Emser et al., 2018).

Often Continuous Performance Tests (CPTs) are used as part of the diagnostic process (Hall et al., 2016; Slobodin et al., 2020). They are easy to administer, differentiate between types of ADHD, provide valuable information regarding the impact of impairment for treatment, and often take short amounts of time to complete (Brooks et al., 2024; Schweitzer & Zion Golumbic, 2024). However, used in isolation, CPTs are not considered adequate to diagnose ADHD (Arrondo et al., 2024; Callan et al., 2023). Additionally, with traditional (hand-scored) CPTs, validity, sensitivity and specificity are often unreliable (Slobodin et al., 2020). Machine-based scoring systems, on the other hand, show much higher rates of accuracy (Slobodin et al., 2020). Commonly used CPTs include the QbTest, and Conners CPT-3 for ADHD (Brooks et al., 2024; Callan et al., 2023; Hall et al., 2016; Hollis et al., 2018).

Despite this, recent advances in technology have facilitated the use of physiological assessment methods as possible future complementary processes for diagnoses based on such consensus processes. For instance, Lee et al. (2023) indicate the use of eye movement tracking programmes, assessing simple selective attention, interference selection, and continuous inhibition, which have shown a difference in eye movement indicators between children with and without ADHD. Furthermore, a study by Nobukawa et al. (2021) shows promising results regarding using the size of pupil diameters as a part of the diagnostic process for adult ADHD. Their findings suggest that, as a neural pathway for norepinephrine (which is related to levels of alertness, focus and effective working memory utilisation as indicated by Aston-Jones & Cohen, 2005; and Zhang et al., 2013), activity in the locus coeruleus[1] could be identified from the diameter of the pupil and thus, indicate problems with attention and arousal. A similar study was conducted in 2022 indicating that, with 78% accuracy, changes in children's pupil diameter data can be used to determine whether a child has the disorder (Vimalajeew et al., 2022). However, these physiologically-based assessment methods are not currently considered sufficient to diagnose ADHD and would need to be utilised in conjunction with other diagnostic assessment measures when feasible (APA, 2022; Öztekin et al., 2021).

[1] The **locus coeruleus** is the nucleus found in the brainstem (Poe et al., 2020), which is responsible for moderating alertness and arousal (Morris et al., 2021).

Due to the complexity of the disorder, overlap in behavioural characteristics in children with, and without ADHD, high rate of co-morbid disorders, and behaviours and conditions which present similarly to ADHD, diagnosis should be made utilising a multidisciplinary team (MDT) approach (Abdelnour et al., 2022; Mannem et al., 2021; Zysset et al., 2023). A MDT includes professionals and experts in a particular field working together to diagnose a condition, and determine the most suitable treatment plan for a patient through regular consultations with each other to monitor the patient's progress (Wang & Qui, 2023). In the case of a child with ADHD, the MDT would comprise child psychiatrists, psychologists, other allied health workers (such as Occupational Therapists and Speech Therapists), and the child's teachers led by a Paediatrician (Efron & Sciberras, 2010; French et al., 2019; Mannem et al., 2021; McGonnell et al., 2009; Zysset et al., 2023). Working together, the MDT has a greater chance of accurate diagnosis of the disorder as well as co-morbid disorders, and through shared treatment and communication with each other, enhance the level of care and associated positive outcomes for children with ADHD (French et al., 2019).

Variations in and Challenges to Diagnoses

ADHD is a controversial disorder with distinct discourses on its existence and treatment, with some advocates arguing that the disorder is over-diagnosed in many regions, while others suggest that the disorder is underdiagnosed in different areas (Gascon et al., 2022; Hinshaw, 2018; Massuti et al., 2021; Tseng, 2021). With this in mind, various factors have been identified as related to diagnostic inaccuracies. These include the effects of socio-economic resources, use of substandard assessment methods, awareness of ADHD symptomology, sex, race and culture, and age of the child, and the likelihood of being diagnosed with ADHD. These factors are discussed below.

Socio-economic Issues

It is believed that children with ADHD from a lower socio-economic standing are often undiagnosed due to a lack of access to treatment (Madsen et al., 2017; Massuti et al., 2021). However, a study by Bozinovic et al. (2021) found that there were higher rates of ADHD diagnoses in areas in the United States of America (USA) characterised by economic difficulties, and unsafe schools and neighbourhoods. Findings from that study suggest urban areas with more amenities tended to yield fewer ADHD diagnoses across most assessed states, which could be related to social factors, such as access to social services and related improved health outcomes. In line with this argument, Mykletun et al. (2021) postulate that symptoms which could be considered as being subclinical in severity may, in fact, be related

to psychosocial stress from other sources, such as those that are often associated with lower socio-economic backgrounds (and exposure to increased stressors), the symptoms of which are confused with ADHD characteristics. However, apart from socio-economic influences, there are additional external factors which are also shown to be related to diagnostic concerns.

The Use of Substandard Diagnostic Measures

Variations in diagnosis rates are well documented in the literature (Dreschler et al., 2021; Gascon et al., 2022; Mykletun, et al., 2021). This may in part be attributed to accessibility to diagnostic resources and the use of two different diagnostic systems (the ICD-10 used prior to 2022, and DSM-5-TR since 2022) with accompanying disparities in diagnostic criteria (Döpfner, et al., 2008; Lahey et al., 2006; Madsen et al., 2015; Santosh et al., 2005). With this in mind, studies have consistently shown over the years how some children meet the criteria for ADHD when the APA criteria are applied, but not when the criteria formulated for HKD are applied, thus impacting on the diagnosis and treatment the children subsequently receive (Lahey et al., 2006; Santosh et al., 2005). To alleviate this, diagnostic criteria for ADHD, according to the ICD-11, are now consistent with APA criteria (WHO, 2023).

Furthermore, since the expansion of symptoms in the DSM-IV which included more attention-related problems, in addition to hyperactivity-related issues, more girls were being diagnosed with the disorder (Abdelnour et al., 2022; Smith, 2017). Further to this, with the recent acceptance of the DSM V-TR as a manual for diagnosis of disorders globally, more children are diagnosed with the condition.

At the same time, insufficient consultation of the diagnostic criteria (Merten et al., 2017; Reale & Bonati, 2018; Schellack et al., 2017; Shahabuddin & Parikh, 2022), the use of outdated rating scales (DuPaul et al., 2016), the effect of responder bias in rating of behaviours (Mowlem et al., 2019), and limited information and measures considered in formulation of the diagnosis (Dreschler et al., 2020; Gascon et al., 2022; Merten et al., 2017; Parker & Corkum, 2016) may result in false positives, misdiagnoses or underdiagnoses of the disorder (Merten et al. 2017; Manos et al., 2017).

False positives related to using limited diagnostic measures may accompany malingering[2] of symptoms to gain various advantages, such as approval of accommodations

[2] **Malingering** is the term ascribed to the behaviour in which symptoms, including psychiatric and neurocognitive symptoms, are feigned for a person to gain advantage or to avoid something undesirable (Sherman et al., 2020).

in the school or workplace, and changes to the way educational materials are presented to students (Koutsoklenis, 2020; Massuti et al., 2021; Ramachandran et al., 2020; Sherman et al., 2020; Suhr et al., 2020). Individuals without ADHD could feign ADHD-symptoms, for example, to be awarded additional time to complete examinations. or to acquire stimulant medications to bolster academic performance. There is, however, mixed evidence which supports the efficacy of the medication for non-ADHD patients regarding academic performance enhancement (Faraone et al., 2020; Gascon et al., 2022; Maier et al., 2018; Wilens & Kaminski, 2019).

Despite the use of the DSM-V-TR as one standard set of criteria to diagnose ADHD, practitioners in different countries may interpret diagnostic criteria differently and demonstrate subjectivity in applying criteria in the diagnosis of ADHD (Gascon et al., 2022). Similarly, the variety of cultural, political and educational approaches used in various countries could also impact on the country's acceptance of the criteria for diagnoses (Smith, 2017). For example, children in the USA are more likely to be diagnosed with ADHD and be prescribed methylphenidate than children in other countries, including Sweden, Norway, Japan and Denmark (MacDonald et al., 2019; Timimi , 2010). Further to this, increased diagnoses in Brazil and France could be attributed to medicalisation of social issues in these countries and the globalisation of healthcare, with many countries accessing and adopting the use of diagnostic criteria, such as those found in the DSM V-TR, as well as attribution of problematic behaviours to a medical cause instead of a social issue (Béliard et al., 2022). The medicalisation and pathologising of developmentally appropriate hyperactive, inattentive and impulsive behaviours as a disorder, instead of a childhood problem, has led to the increase in diagnosis of ADHD globally, specifically in countries outside of Canada, the USA and Australia (Gascon et al., 2021; Lusardi, 2019; Merten et al., 2019).

Conversely, certain conditions present very similarly to inattentive symptoms, such as diabetes, thyroid problems, sleep deprivation, inflammatory bowel disease, post-concussion states, anaemia and iron deficiency as well as disordered breathing (Sadek, 2023). Other conditions often misdiagnosed as ADHD, but which may also be co-morbid with ADHD, include Obsessive Compulsive Disorder (OCD), Autism Spectrum Disorder (ASD) or absence seizures (Abramovitch, 2016; Bélanger et al., 2018; Dreschler, 2020; Gunes, 2017; Stevens et al., 2016). As a result, ADHD could be underdiagnosed or misdiagnosed in these individuals.

Awareness of ADHD Symptomology

Since 2003, a heightened awareness of ADHD and a decline in stigmatisation of the disorder have been cited as reasons for the increase in the number of individuals diagnosed with ADHD (Bélanger et al., 2018; Davidovitch et al., 2017; Fairman et al., 2017; Hinshaw, 2018; Kazda et al., 2022; Manos et al., 2017; Merten et al., 2017). It is suggested that the portrayal of characters with ADHD in popular culture media, including television shows such as Phil Dunphy, father in *Modern Family*, and Bart Simpson from *The Simpsons* (Abdelnour et al., 2022; Bailey, 2015), and social media applications, including TikTok and X (formerly Twitter) have elevated awareness of the disorder (Abdelnour et al., 2022). However, content shared in the latter media is not always accurate, particularly when lay-persons create it (Yueng et al., 2022).

Despite the influence of socio-economic factors, the use of substandard diagnostic measures, and increased awareness of the disorder, other aspects related to personal characteristics of individuals could also result in diagnostic inconsistencies.

The Effect of Sex on Diagnosis of ADHD

Years of research on ADHD suggest that more boys present with ADHD features generally than girls. These results also show that boys generally tend to display more externalising behaviours, such as hyperactive/impulsive-related displays which could manifest as aggression and bullying, in comparison with girls who show more internalising inattentive-related actions (APA, 2022; de Schipper et al., 2015; Mowlem et al., 2018). These externalising behaviours tend to be noticed more easily than the more internalising behaviours, including depressive and anxiety-related symptoms, which are shown by girls (Abdelnour et al., 2022; de Schipper et al., 2015; Hinshaw et al., 2021; Martin et al., 2018) and, as a result, boys are often diagnosed earlier than girls (Caci et al., 2016; Fayyad & Kessler, 2015).) For similar reasons, parents tend to over-rate symptoms in boys and under-rate hyperactive-related symptoms in girls, once again due to the inattentive-related symptoms being less easily noticed (Mowlem et al., 2019). In sum, this reduced recognition of ADHD-related symptoms in girls, which may result in a referral bias, likely underscores the reason why girls are reportedly often less frequently referred for ADHD diagnoses and treatment than boys (Degroote et al., 2022; Furzer et al., 2022; Hinshaw, 2018; Hinshaw et al., 2022; Lynch & Davison, 2022; Schlechter, 2023; Young et al., 2020).

It is important to acknowledge that there have also been exceptions to this general trend, with research that suggests that boys present with symptoms across the various domains of ADHD (including hyperactivity/ impulsivity, inattention, conduct problems and

learning difficulties) compared to girls, although severity of symptoms does not appear to be different between the sexes, with children from both sexes who show externalising behaviours being referred for diagnosis and treatment more frequently (Kerner auch Koerner, 2021; Mowlem, et al., 2019; Wüstner, et al., 2019). Overall, it seems that ADHD is often underdiagnosed in girls, particularly when only showing attention-related difficulties (Hinshaw et al., 2023). Notwithstanding, other personal characteristics, such as the individual's race, culture and age, are also shown to relate to diagnostic issues.

The Influence of Race and Culture on Diagnoses

Research shows differences in the diagnostic rates of children from different racial groups being diagnosed with ADHD, with white children being more frequently diagnosed and ADHD being underdiagnosed in black, Hispanic, and Asian children (Abdelnour et al., 2022; Bozinovic et al., 2021; Coker et al., 2016; Shi et al., 2021). Research also shows that stereotyping and bias in diagnosis by healthcare professionals may be a concern with some behaviours being considered as normal in certain racial groups but problematic in others, also impacting on diagnostic rates (Shi et al., 2021). For example, there was a lower incidence of parents of Asian children seeking healthcare assistance for their children with ADHD due to concerns about racism in the healthcare system as well as differences in cultural values when compared to parents of white and black children in the same study (Shi et al., 2021).

Similar disparities are reported when it comes to cultural differences. First, cultural norms regarding the interpretation of behaviours could influence whether a child is diagnosed with ADHD in a certain culture or not, with research suggesting that in certain cultural groups there may be endorsement of some ADHD-related behaviours (APA, 2022; MacDonald et al., 2019; Slobodin & Crunelle, 2019). For example, impulsivity and hyperactivity are reportedly viewed as acceptable in boys in the Christian Lebanese and Muslim cultures and, therefore, are often underdiagnosed in these groups (Slobodin & Crunelle, 2019). Further to this, a study by Chan et al. (2022) found that parents of children in Hong Kong reprehended their children's ADHD-related behaviours more severely and expected higher levels of conformity and academic achievement from their children than parents of children in the United Kingdom (UK).

Second, and relatedly, the influence of the acceptance of norms, beliefs, approaches to medical assistance seeking, and cultural values also affect how members of different cultural groups perceive and seek assistance regarding behavioural problems in children (Filipe, 2016). For example, a study by Clerkley (2022) highlighted the impact of negative perceptions and social stigmas among black women, as well as a lack of trust in mental

healthcare providers and medical professionals, by the same young women being diagnosed with ADHD and receiving the needed treatment. The study suggests that black women (at least in their sample) did not identify the symptoms of ADHD in themselves from available research on the disorder. The issue reported was that these symptoms often emanate from the experience of ADHD by individuals from other racial groups, thus being far removed from their experience, resulting in possible underdiagnosis of the disorder in black women.

The Impact of Age on ADHD Diagnosis

Relative age effects seem to impact the number of children being diagnosed with ADHD, as findings from various studies suggest that children who are considered too young for the school year tend to be more frequently diagnosed with ADHD, and are prescribed medication more often. This is especially true for countries with higher incidence rates of ADHD in children (Holland & Sayal, 2018; Koutsoklenis et al., 2019), and for boys (Bonati et al., 2018). Reasons cited for this increase include teachers comparing younger children to more mature older children in the same grade-level and having the same expectations of both groups, thus noting more immature behaviours of younger children as being problematic. Accordingly, research shows that older children are also often undiagnosed (Furzer et al., 2022; Sayal et al., 2018).

Regardless of the reason for diagnostic inconsistences, whether resulting in over-, mis- or underdiagnosis, results could lead to patients misusing stimulant medications, other medical conditions not being treated sufficiently, or patients not accessing treatment for ADHD (Israel, 2023; Ramachandran, et al., 2018; Sadek, 2023; Suhr et al., 2020). Differential diagnosis of ADHD is, thus, vital to ensure the correct treatment is applied (Chronis-Tuscano, 2021). With a better understanding of the diagnosis of ADHD, insight will now be provided into the underlying pathophysiology of the disorder.

Pathophysiology of ADHD

Studies have shown that there are various physiological processes which underpin a diagnosis of ADHD in children and adults, the most cited of which include neurological factors and gut health issues.

Neurological Factors

Neurological deficiencies and neuroanatomical abnormalities are considered the main areas of difficulty in children with ADHD. The most commonly mentioned factors are further elaborated on.

Role of Neurotransmitters. Research has long identified the role of neurotransmitters in ADHD, including dopamine (Rosack, 2001; Volkow et al., 2007),

glutamate (Petroff, 2002; Ludolph et al., 2010) and noradrenaline/norepinephrine (Biederman & Spencer, 1999; del Campo et al., 2011).

Patients with ADHD are shown to have a significant increase in dopamine transporters which clear dopamine from the synapse, resulting in dopamine being re-absorbed by the presynaptic neuron. This affects the ability of the individual to maintain motivation and attention (Rosack, 2001). Likewise, presynaptic nerve terminals may re-absorb norepinephrine (noradrenaline) thus decreasing its availability in the synaptic cleft (Jamkhande et al., 2016; Zheng, 2016). This decreases alertness to the individual's environment and their attention (Biederman & Spencer, 1999). Recent research shows that poorly regulated dopamine and noradrenaline neurotransmission in the cortico-striatal circuits leads to increased distractibility, reduced ability to maintain attention, and reduced working memory, inhibition and control (del Campo et al., 2011; Dum et al., 2022). Dopamine receptor dysregulation also contributes to difficulties of memory, attention, impulsivity and executive functioning, inter alia (Dum et al., 2022), and is linked to impaired noradrenergic and/or glutamate regulation (Warton et al., 2009). In addition to lowered dopamine levels and impaired transmission of noradrenaline (Anand et al., 2017), subclinical increased levels of inflammation, specifically related to cytokines (Shirvani-Rad, et al. 2022), have been found to relate to the presence of ADHD in children (Çetin et al., 2022; Misiak et al., 2022).

It is important to bear in mind that glutamate is a neurotransmitter responsible for excitatory effects in the prefrontal cortex when interacting with dopamine and precursor to GABA, which is associated with inhibitory responses in the cortex and prefrontal cortex (Petroff, 2002). Glutamate is related to memory, mood regulation and cognitive processes (Pal, 2021), with the metabolism of glutamate reportedly playing a role in development of ADHD symptoms as described (Ludolph et al., 2010) and various theories explaining this phenomenon. For example, Lou (1996) hypothesised that the striatum in the basal ganglia is extremely vulnerable to ischaemia-induced metabolism of glutamate, as a result of lowered levels of blood and oxygen being made available to the brain. Additionally, Jensen et al. (2009) furthered the understanding of the role of metabolism of glutamate transmission at the synaptic level in the hippocampus. Furthermore, a study by Dorval et al. (2007) showed that learning-related impairments, hyperactivity and problems with spatial memory problems were associated with glutamate receptor genes. However, neurotransmitter function is not the only neurological changes noted in individuals with ADHD.

Neuroanatomical Differences. Incomplete formation of physical brain structures has also been identified in children with ADHD. Conventional Magnetic Resonance Imaging

(MRI) studies have confirmed decreased surface area in the corpus callosum as a whole and in the anterior middle-body, and poor myelination of the isthmus, the last of which contains fibres which connect posterior regions of the brain, resulting in problems with attention, task switching, and response inhibition (Bèdard, et al., 2014; Cao et al., 2008; Tamm et al., 2004).

Other areas affected include the sensory-motor cortical areas, the pre-motor region, and somatosensory cortices, with reduced grey matter volume in the bilateral frontal, parietal, and temporal lobes (particularly in the left temporal and right frontal lobes) which are related to symptom severity in impulsivity and hyperactivity as well as inattentiveness in pre-school children with ADHD (Jacobson et al., 2018).

Prior to this, abnormalities in the frontal lobes of the brain, including the lateral fronto-striato-parietal regions (affecting the ability to sustain attention), ventromedial orbitofrontal regions (indicating problems with cognitive-attentional and motivational neural networks) and ventromedial orbitofrontal deficits (found in patients with co-morbid Conduct Disorder (CD) were identified (Cubillo et al., 2012). Further impairments are noted in the medial and ventral regions of the prefrontal cortex, inclusive of the anterior cingulate cortex and the dorsolateral prefrontal cortex (Emond et al., 2009; Shaw et al., 2014), with reductions in total volume of the cerebrum, the basal ganglia (striatum), the prefrontal cortex, the corpus callosum, the cerebellum, and the dorsal anterior cingulate, and accompanying problems with attention, motivation and reward-seeking behaviours (see Bruya & Tang, 2021; Redcay & Schilbach, 2019). Similarly, the anterior cingulate cortex, responsible specifically for cognitive control and emotional regulation, is found to be under-activated in children with reading difficulties as well as with children with ADHD, thus accounting for the higher levels of prevalence of these co-morbid conditions (Etkin et al., 2011; Langer et al., 2019; Ridderinkhof, et al., 2004).

Correspondingly, basal ganglia, as the main part of the loops connecting the thalamus and cortex, aid many of the cognitive processes which are deficient in ADHD. For instance, one recent study reported hypoactivation in the frontal cortex, the dorsal anterior cingulate cortex and the basal ganglia (striatum) in individuals with ADHD resulting in difficulties in judgement, abstract thinking, maintaining socially appropriate responses and behaviours, and reward-related decision-making processes (Bush et al., 2001; El-Baba & Schury, 2023).

Neuroimaging studies suggest that there are other structural and functional alterations in regions outside the fronto-striatal circuitry, more significantly in the cerebellum and parietal lobes (Cherkasova & Hechtman, 2009; Durston et al., 2011), which relate to working memory deficits (Darki et al., 2015) and cognitive control mechanisms, including visuo-

spatial processing (Ivry et al., 2002), attention-shifting (Golla et al., 2005), and learning-related issues (Stein, 2013). Indeed, responsible for poor visuo-spatial working memory skills, deficient areas of the prefrontal cortex and along the intraparietal sulcus are often found in children with ADHD (Bèdard, et al., 2014). Moreover, Shaw et al. (2014) determined that the fixed surface area of the ventral striatal surface tended to decrease with age in individuals with ADHD resulting in difficulties with executive functioning, reward processing and motor planning.

However, results of many of the neuroimaging studies were obtained with PET and fMRI tests conducted while patients with ADHD completed neuropsychological tests, such as the Stroop test[3] and variations of the Stroop test (Cherkasova & Hechtman, 2009). As many people with ADHD present with problems with working memory, functional attention and inhibitory control during extended testing sessions, poorer performance on these measures would be expected (Cherkasova & Hechtman, 2009; Darki & Klingberg, 2015; Darki et al., 2020), which could affect correlation outcomes between neuropsychological and neuroimaging outcomes.

Further, research suggests that low motivation is related to neuroanatomical differences in the ventral striatum as a reward pathway, as well as decreased grey matter volume in the posterior occipital cluster, which is responsible for working memory problems and subsequent inattentiveness (Chen et al., 2020; Tripp & Wickens, 2009). It is also interesting to note that attention and motivation are related neuroanatomically with attention being easier to maintain when an individual is motivated to do so (Bruya & Tang, 2021). However, due to the importance of attention in the role of motivation and ADHD, this relationship will be discussed in more detail in Chapter Two.

Gut Health Issues

Studies also suggest the impact of gut health on the development of ADHD, with intestinal permeability and an imbalance of bacteria in the gastro-intestinal tract (dysbiosis) being associated with susceptibility to ADHD (Ming et al., 2018; Wang et al., 2023).

It is suspected that the gut microbiome could interfere with neurotransmission and may increase neuroinflammation and oxidative stress, which is present in ADHD (Checa-Ros, et al., 2021). Studies also show lowered levels of diversity of gut microbiomes (Wang et al., 2022) and lowered levels of plasma short-chain fatty acids (Yang et al., 2022) with

[3] The **Stroop test** measures the individual's ability to limit cognitive interference when processing a specific stimulus in the presence of a second stimulus (Scarpina & Tagini, 2017).

associated reduced levels of neuro-immunoendocrine functioning (Silva et al., 2020). Immunoregulation by gut flora may also lead to increased inflammation resulting in the progressive destruction of the blood–brain barrier and possibly the neuroinflammation as seen in ADHD (Cenit et al., 2017; Chung & Kasper, 2010; Donev & Thome; 2010).

It is further hypothesised that gut microbiota may indirectly or directly impact on levels of neurotransmitters, including serotonin and dopamine, thus affecting cognitive abilities, specifically executive functioning, and emotion (Floresco & Magyar, 2006; Galland, 2014). However, research on the relationship between ADHD and the gut microbiome is limited at this time with more research needed specially on the impact microbiome–gut–brain axis (MGBA)[4] on the development of ADHD and the possible impact on the severity of symptoms (Checa-Ros et al., 2021; Cickovski, et al., 2023).

Course and Development of ADHD

Although it is often diagnosed before the age of 12 years, the presentation of ADHD can change throughout a person's lifespan. According to the DSM-5 TR, many parents of children with ADHD notice undue levels of motor activity and hyperactive-impulsivity related behaviours in their young children (APA, 2022; Franke et al., 2018). Children with ADHD also often present with signs of irritability, temper tantrums and extreme emotional reactivity due to executive functioning and impulse control deficits (Kail and Cavanaugh, 2019; Nigg et al., 2020). Although often noted earlier, it is during the Foundation Phase[5] that the child's difficulties with attention become more prominent (Asherson, 2020). During childhood, children may present with educational problems, disruptive behaviours in the classroom and difficulties with peer relationships, which persist into adolescence (Bélanger et al., 2018; Cherkasova et al., 2013; DuPaul & Langberg, 2015; McQuade, 2020). Furthermore, children with ADHD tend to show poorer teacher-child relationships than peers without ADHD (Rushton et al., 2020). Despite the difficulties discussed, it is noted that more information is available regarding the symptomology of ADHD from adolescence onward than in preceding years (Franke et al., 2018; Nigg et al., 2020).

In early adolescence, there may be stability in ADHD-related symptoms with noted decline in hyperactivity-related symptoms, although some adolescents may also develop

[4] **The microbiome-gut-brain axis (MGBA)** refers to the bidirectional communication between the central nervous system and the gut microbiome (Wood, 2007). It includes neural, immune and neuroendocrine pathways.

[5] **Foundation Phase** in South Africa includes grade R, grade 1, grade 2 and grade 3. Foundation Phase is the start of compulsory formal education (Department of Basic Education, 2011). Intermediate Phase spans grades 4 to 6, Senior Phases from grades 7 to 9, and Further Education and Training from grade 10 to grade 12.

antisocial behaviours (Franke et al., 2018; Retz et al., 2021; Willoughby et al., 2019). Physical manifestations of hyperactivity, such as difficulty sitting still and climbing about, become less noticeable as the child enters adolescence and shows greater fidgetiness, with some adolescents reporting feeling restlessness and impatience. Adolescents with ADHD tend to be at increased risk for engaging in dangerous behaviours (such as substance abuse), they tend to be more emotionally immature than their peers, and they often underperform academically for reasons outlined later in this chapter (Adler et al., 2015; Retz et al., 2021).

From then, the difficulties with attention continue into adulthood, although symptoms related to impulsivity and hyperactivity tend to decrease; however, persisting difficulties with planning, initiation and completion of tasks, impulsivity, distractibility, and impatience lead to difficulties in interpersonal relationships as well as academic and occupational issues (Abagis, 2020; Adler et al., 2015; Schoeman & Liebenberg, 2017). There are elevated risks for substance abuse, delinquency, difficulties in relationships, occupational-related difficulties, increased rates of motor vehicle accidents, and increased risk for self-injurious behaviours, across the lifespan (Hinshaw et al., 2015; Bélanger et al., 2018).

Hence, ADHD can persist beyond childhood with further impairments in academic, psychosocial, and occupational functioning, with studies showing the persistence of symptoms of ADHD into adolescence and adulthood in 50% of children diagnosed with ADHD (APA, 2022; Bélanger et al., 2018). Thus, early identification and treatment of the disorder is important to limit the effect of ADHD on an individual's functioning (Evans et al., 2018; Rimestad et al., 2019; Shephard et al., 2022). However, ADHD often does not occur in isolation and may present with a variety of co-morbid conditions and associated features, including physical and sensory difficulties.

Co-morbid Conditions

There are many co-morbid conditions which can be experienced with ADHD. These can include CD, Oppositional Defiant Disorder (ODD), Epilepsy, substance abuse disorders, Disruptive Mood Dysregulation Disorder (DMDD), other mood disorders (Bélanger et al., 2018), anxiety disorders, and sleep disturbances (APA; 2022, Bélanger et al., 2018). Other neurodevelopmental disorders can also co-occur with ADHD, including Autism Spectrum Disorder (ASD), Specific Learning Disorders (SLD), and Tic Disorders (APA, 2022; Bélanger et al., 2018; Drecshsler , 2020; Kerner auch Koerner et al., 2021; Willis et al., 2017). Furthermore, there is a heightened risk for the development of psychosis following childhood ADHD (Nourredine et al., 2020). Somatic conditions, including obesity, can also be co-morbid (Lange, 2020; Li et al., 2020; Willis et al., 2017). For instance, according to a

multicentre observational study by Reale et al. (2017), only 34% of 1919 children and adolescents enrolled in a number of ADHD centres presented with ADHD alone. By comparison, 56% experienced co-morbid learning disorders, 23% were also diagnosed with sleeping disorders, 20% showed co-morbid ODD and 12% noted anxiety in addition to ADHD. Furthermore, a higher rate of co-morbidity was found in children and adolescents diagnosed with ADHD combined presentation and with severe impairment.

However, as the focus of both studies in the current dissertation is children, the functional outcomes of ADHD in children and adolescents will be explored in further detail and together, due to the overlap of the age groups in previous literature.

Outcomes of ADHD for the Child and Their Family

ADHD is recognised as a chronic, costly disorder that impacts the quality of life of the individual with the diagnosis, as well as their family (Schoemen & De Klerk, 2017). A variety of outcomes have been identified for children with ADHD occurring in isolation and as a co-morbid condition to other clinical presentations, including cognitive, behavioural, physical, psychosocial, educational-related, familial and financial (Hinshaw, 2018; Lee et al., 2021; Vacher et al., 2020). In addition, positive outcomes related to the diagnosis will also be explored.

Cognitive and Emotional Deficits

Executive and Other Cognitive Dysfunction. Due to the neurological impairments inherent in ADHD, there are associated cognitive deficits, primarily in executive functions, which impact negatively on the child's ability to cope (Wannapaschaiyong et al., 2022). These include inhibition, emotional control, response selection, processing speed, task-switching, working memory, attention, and organisation which are also affected by self-regulation problems and issues with motivation (Evans et al., 2020; Morsink et al., 2021) . Executive dysfunction can present as cognitive or behavioural problems. For example, impulsivity, as related to inhibition, emotional control and response selection, is expressed as difficulties with coping with delayed gratification (Shea et al., 2019).

Further, research has long maintained that children with ADHD, particularly the Inattentive type, present with deficits in processing speed (Arnett et al., 2015; Konrad & Eickhoff, 2010; Mayes et al., 2009). More recently, a study by Kofler et al. (2020) showed that working memory impairments influenced processing speed, although both working memory and processing speed impairments can occur independently in children with ADHD. Interestingly, it has also been proposed that, at a basic level, children with ADHD do not have difficulty with processing speed when compared to peers of the same age (Kibby et al.,

2019). Rather, it is suggested that processing speed in children with ADHD does not increase at the required levels as task demands increase (perhaps due to compensation for attentional and working memory challenges), possibly accounting for recorded comparative difficulties in processing speed. However, these findings should be treated with caution as they are based on only one study, whilst multiple studies confirm processing speed as problematic for children with ADHD (Kibby et al., 2019; Kofler et al., 2020).

Additionally, hyperfocus[6] has been found to be related to aspects of executive function difficulties such as task-switching (Groen et al., 2020; Ozel-Kizil et al., 2016; Pimenta et al., 2024; Sedgwick et al., 2018). However, due to the impact of ADHD symptomology on attention and working memory specifically, these will be explored in greater detail in Chapter Two.

Deficits in Self-regulation Skills. Related to inhibition of responses, self-regulation skills enable an individual to control their behaviour, thoughts and emotions to attain long-term goal ambitions and are essential to meeting the changing developmental demands of the various life stages (Cibrian et al., 2022). Deficits in self-regulation skills manifest as poor management of emotions, whether positive and negative emotions, which may result in compromised functional, behavioural and social outcomes, with adolescents with ADHD often experiencing emotional dysregulation and accompanying problems in social relationships (Bunford et al., 2015; Evans et al., 2020; McQuade, 2020; Nucifora & Walker, 2021).

As a result of emotional dysregulation problems, anger and hostility-related behaviours are shown more frequently than aggressive displays (Yoo et al., 2020). In their study of 2 432 adolescent students, Yoo et al. showed that due to problems with emotional regulation, adolescents tend to repeat frustrating situations to which they are more likely to respond in anger and hostility. For example, a systematic review conducted by Bishop et al. (2019) indicates that children with co-morbid anxiety and ADHD commonly displayed higher rates of aggression. However, aggressive displays tend to be more reactive than proactive, and related to emotional lability (Slaughter et al., 2019). Co-morbid CD, ASD, Tic Disorders, and disruptive impulse-control related disorders such as ODD which can impact on the individual's emotional state and functioning, are also common in children with ADHD (Elwin et al., 2020; Okumura et al., 2019; Zhu et al., 2021). Relatedly, in addition to anger

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[5] **Hyperfocus**: intense concentration experienced when an individual with ADHD engages with information they find interesting (Sedgwick et al., 2018).

and aggression, children with ADHD are at risk for performing self-harming behaviours (Hinshaw, 2019; Hinshaw et al., 2021, Owens et al., 2017). Due to self-harm overlapping with symptoms of ADHD and emotional dysregulation, it is speculated that emotional dysregulation and dysregulated ADHD both play a role in self-harm, with dysregulated adolescents expressing their strong emotions impulsively through self-harming behaviours (Meza et al., 2020; Ward & Curran, 2021). In addition to the problems with executive function, self-regulation and emotions, individuals with ADHD also often show impairments in motivation.

Limited Motivation. Adolescents and children with ADHD tend to lack motivation to complete cognitively challenging tasks including, but not limited to, academic tasks (Morsink et al., 2021). Despite being cognitively capable and having resourceful ideas, children and adolescents may still be unable to complete tasks and they may lack intrinsic motivation to utilise these ideas (Hinshaw, 2015). Further to these cognitive, self-regulation and motivation difficulties, psychosocial functioning can also be impacted by ADHD.

Psychosocial Functioning

Due to a variety of factors, including executive functioning impairments and a higher incidence of co-morbid mental health conditions, children with ADHD are at risk for experiencing various psychosocial problems (Al-Yagon et al., 2020; APA, 2022; D'Agati et al., 2019; Hartman et al., 2023; Okumura et al., 2019). Specifically regarding developmental trauma, a bidirectional relationship is shown between ADHD and trauma-related disorders with co-morbidity of both disorders worsening symptoms and outcomes of both, and also impacting negatively on the child's social and academic functioning (Boodoo et al., 2022; Miodus et al., 2021).

Social Problems. Children with ADHD often battle with friendships as they tend to have fewer friends, poorer interactions with friends, and consequently poorer quality friendships (Fenesy et al., 2019; Owens et al., 2017; Owens, 2020; Spender et al., 2023). As a result, they often have lower self-esteem and more peer relationship problems, with a tendency to be more frequently rejected by peers, frequently displaying bullying behaviours themselves (Becker et al., 2017; Beristain et al., 2020; Chou et al., 2018). Additional difficulties noted include fewer prosocial behaviours and poorer self-concept (O'Connor & McNicholas, 2020). For example, a study by Normand et al. (2019) indicates that children with ADHD tend to show lower levels of companionship, less co-operation, and they show less sensitivity to others when engaged in play. It was also noted that their play is characterised by higher levels of conflict than non-ADHD peers. They are at increased risk of

experiencing rejection by peers and being victimised by bullying (Evans et al., 2020). Interestingly, research indicates that, although some adolescents report a reduction in severity of ADHD symptoms as they near adulthood, they tend to experience more social problems, higher levels of depression and anxiety, as well as more aggression (De Rossi et al., 2023).

Social behaviour-related difficulties inherent in ADHD, such as the inability to inhibit responses, interrupting others and responding inappropriately to others, can annoy peers and, thus, negatively impact on social relationships as well as emotional functioning (McQuade in Becker, ed., 2020). Indeed, due to the symptomology of the disorder, children with ADHD also tend to show poorer interpersonal negotiation skills (Figueiredo et al., 2022), and they may experience difficulties with facial emotion recognition, which could also impact social interactions, and the establishment and maintenance of friendships (Staff et al., 2021).

Furthermore, stigmatisation, victimisation and labelling can influence a child with ADHD negatively thereby resulting in others alienating those with the disorder (Evans et al., 2019; Hinshaw, 2019; Lebowitz, 2016; Mykeltun et al., 2021; Schlechter, 2023; Sonuga-Barke et al., 2023). Findings from various studies show that negative attitudes towards those with ADHD and towards ADHD as a disorder, prevail in many communities with the misconceptions that pharmacological treatments are unacceptable, ADHD is over-diagnosed, and that individuals with ADHD tend to show poorer behaviour. In fact, research in this area has demonstrated this desire for sustaining social-related distance from those with ADHD in samples of non-ADHD individuals (Bissett et al., 2021; Meza et al., 2019). The review by Bissett et al. (2021) included studies from communities in Asia, Australia, the USA and Europe and found that, consistently, community members had differing levels of knowledge of ADHD; they expected those with ADHD to display negative behaviours, and they showed a preference for keeping social distance from ADHD-diagnosed individuals.

Similarly, labelling of a child, particularly by teachers, has also been shown to be a limiting factor in terms of how the teacher perceives the child's ability to achieve and act according to the set of behaviours associated with the diagnosis of ADHD (Koutsoklenis, 2020; Krtek et al., 2022). The importance of the teacher-child relationship is further verified by various studies over the years, showing that when children connect socially with others, improvements are noted in attention, motivation and reward-seeking behaviours (see Bruya & Tang, 2021; Redcay and Schilbach, 2019).

In contrast, a study by Speerforck et al. (2019) found that people tended to react with more pity and attempt to help a child with ADHD more than when interacting with adults with ADHD, as they tended to display more negative emotional reactions towards adults.

This attitude towards children with ADHD was attributed to possible perceptions that children were in need of protection and were blameless. Furthermore, labelling a child as having ADHD can also protect the child from being judged negatively for childhood behaviours by others (Meza et al., 2019).

Affiliate Stigma. Also related to stigmatisation and labelling, affiliate stigma in which caregivers and parents internalise others' negative attitudes towards their children with ADHD and themselves, has an impact on parental attitudes towards their children with ADHD and on their relationships with them (Chang et al., 2020; Mikami et al., 2014). This type of stigma affects more mothers than fathers with more mothers indicating negative behaviours towards children with ADHD, due to the assumption by others that mothers of children with ADHD are neglectful in their duty to discipline their children, as well as the fact that mothers tend to spend more time with their children, thus being seen as exerting more influence over aspects related to modifying their children's behaviours (Chang et al., 2020; Ohan et al., 2013; Tang & Chua., 2010). There have been inconsistent results in terms of whether such stigma is associated with being a parent of a boy with ADHD rather than a parent of a girl (Charbonnier et al., 2018; Pescosolido et al., 2008)), the converse (Fausett (2003)), or either a girl or boy with ADHD (Özaslan & Yıldırım, 2021). Despite differences being noted in the sexes of children with ADHD and parental affiliate stigma, all the referenced studies reveal the difficulties experienced by parents due to stigmatisation and prejudice against themselves and their children with ADHD.

Apart from the social issues many children with ADHD face, another outcome which is often adversely affected relates to the child's scholastic success (Visser et al., 2020).

Educational-related Outcomes

Due to the impact of ADHD symptoms on functioning and the high prevalence of co-morbid conditions, children with ADHD often encounter problems related to academic achievement as well as in their relationships with teachers (Cuffe et al., 2015; Miodus et al., 2021; Rushton et al., 2020; Visser et al., 2020).

Academic Achievement. ADHD symptoms can impact on the child's academic achievement. For example, impulsivity can affect the child's ability to transition through the different stages of education, be mindful of their goals and maintain effort over a period of time (Shea et al., 2019). Moreover, hyperactivity- and impulsivity-related symptoms place the child at risk for not completing their education, following an occupational training path, and finding employment (Fleming et al., 2017; Gordon & Fabiano, 2019; Owens et al., 2017; Wu et al., 2022). Similarly, inattentiveness in addition to hyperactivity and impulsivity,

interrupts the process of learning, leaving a lasting impact on the child's future (Colomer et al, 2017; Owens et al., 2017).

Children and adolescents with ADHD who lack motivation tend to show poorer performance on homework tasks and mathematical fluency tasks; in comparison, those who are more extrinsically motivated tend to perform better on homework tasks, and those who are more intrinsically motivated tend to fare better on reading accuracy tasks (Smith et al., 2019).

Moreover, studies indicate that, academically, children with ADHD tend to perform at a lower level than peers in learning-related tasks such as reading, written expression and mathematics (Tamm et al., 2021). This is due to a variety of factors, including but not limited to, deficits in cognitive processing, lack of motivation and the impact of symptoms of the diagnosis, presence of any co-morbid conditions, teacher-child relationships as well as socially related aspects. For example, researchers have reported a link between slower processing speed, working memory problems, and response selection and reading deficits and timeous completion of tasks in children with ADHD (Elfron et al., 2020; Jacobson et al., 2010; Kleinmann et al., 2005; Moses et al., 2022; Willcutt et al., 2010; Willcutt, 2018) and between attention difficulties and academic performance, especially regarding reading and mathematical abilities (Jenkins & Ogg, 2019). Moreover, other cognitive deficits associated with ADHD, such as lack of age-appropriate disinhibition and inaccurate time perception issues, are predictive factors for pre-schoolers being diagnosed with ADHD and potential learning problems at a later stage (Evans et al., 2019; Zheng et al., 2022).

Other behavioural manifestations of ADHD, such as impulsivity, slow pace of working and inattentiveness, can also be considered further factors negatively affecting academic performance with some long-standing studies suggesting that ADHD-associated behaviours impacted negatively on academic performance more than poor executive functioning skills (Barry et al., 2002; Flood et al., 2016; Merrell & Tymms, 2010), although, as noted, poor executive function skills and a range of behaviours overlap.

Teacher-child Relationships. Research shows that children with ADHD tend to experience more conflict in their relationships with teachers, and they tend to display more negative attitudes towards their schools and learning when compared to children without ADHD (Rushton et al., 2020). When a child is diagnosed with ADHD at a younger age and treated differently by teachers as a result of the diagnosis, they are at risk of having lowered expectations from teachers and fewer opportunities presented to them (Koutsoklenis, 2020). Research further indicates that, regardless of how a child with ADHD performs, it is more

likely that teachers will rate children with ADHD as achieving below the grade level with teachers also being less likely to acknowledge when the child exceeds grade-level expectations for subjective-specific assessments (Metzger et al., 2020). Although these attitudes by teachers can have a negative effect on the child's emotional well-being, improving the teacher-child relationship can have a positive impact on the child's academic performance and behaviour as well as improving the child's motivation levels with academic tasks (Ewe, 2019; Rogers et al., 2015).

Familial Outcomes

Having a child in the family with ADHD can negatively impact on the day-to-day experiences of caregivers, parents and family members due to strain on relationships and the influence of impulsivity and hyperactivity on social functioning (Flood et al., 2016). Additionally, the age at which the child is diagnosed with the disorder tends to influence the level of psychological distress experienced by family members as well as the overall functioning within the family (Laria et al., 2021). Families in which a child has been diagnosed with ADHD can be characterised by high conflict (Orm & Fjermestad, 2021), and lack of closeness or warmth, with sibling relationships often constrained (Hamilton, 2023). Three important areas which are affected in the family will be explored further: first through considering the effect on the parent-child relationship, then the impact on parental well-being will be examined, and, finally, the influence of ADHD on sibling relationships will be outlined.

Impact on the Parent-child Relationship. Over the years, parenting styles and the quality of interactions between children and their parents have been extensively researched with evidence provided that different styles of parenting can either improve or worsen ADHD symptoms (Kern et al., 2015; Modesto-Lowe et al., 2008; Moghaddam, 2013). Moreover, family environment aspects and parenting aspects (including but not limited to, quality of parent-child interactions, status of the parental relationship, child media exposure and harsh discipline) could impact on the likelihood of a child being diagnosed with ADHD (Claussen et al., 2022).

However, there is contrasting evidence regarding the impact of parenting styles adopted by parents of children with ADHD. A variety of studies show that parents of children

with ADHD predominantly use authoritarian[7] and permissive[8] parenting styles (Hutchison et al, 2016; Moghaddam et al., 2012; Qui, 2022; Stevens et al., 2018), while a further study in Indonesia found that parents of children with ADHD tended to use authoritative[9] parenting styles (Setyanisa et al., 2022). Moreover, a recent study showed that mothers of children with ADHD were less likely to adopt an authoritative parenting style, particularly in younger children, and that their children were more likely to display ADHD-related behaviours over time. Likewise, older children of fathers who use authoritarian parenting practices tended to display ADHD-related behaviours, and fathers were more likely to use authoritarian parenting practices over time when their children were diagnosed with ADHD (Allmann et al., 2022). Despite these inconsistencies, research supports the notion that adopting an authoritative parenting style shows lower levels of inattentiveness, hyperactivity, impulsivity and anxiety in children with ADHD with higher levels of warmth, lower levels of anger and parental consistency showing improved prosocial behaviours in children with ADHD (Qiu, 2022).

In addition to the possible role of parenting style on the internalising and externalising behaviours in children with ADHD, certain behaviours in children with ADHD may also trigger parents to respond and react in certain ways. As a result of the high rate of inheritability of the disorder, many parents of children with ADHD display ADHD-related behaviours themselves, such as impulsivity and emotional dysregulation, thus enabling the cycle of behaviour between parents and children to continue unabated if unmediated (Hinshaw, 2018). Finally, the effect of parental stress on the quality of life of the child (Galloway & Newman, 2017), and severity of symptoms (Craig et al., 2020) also need to be explored.

Impact on Parental Well-being. On a related note, parenting behaviours can be impacted upon by heightened levels of stress and challenges which are associated with raising a child with ADHD (Riany & Ihsana, 2021). For instance, research by Peasgood et al.

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[6]**Authoritarian parenting style**: This is portrayed by low levels of warmth and high levels of control with parents providing lower levels of support but maintaining high expectations from their children (Allmann et al., 2021).

[8] **Permissive parenting style**: Permissive parents tend to exert low levels of control and display high levels of warmth (Allmann et al., 2021). They do not maintain age-appropriate boundaries for behaviour, including setting of suitable routines.

[9] **Authoritative parenting style**: Parents adopting this style tend to exert adequate control and provide suitable levels of emotional warmth (Allmann et al., 2021). They are consistent in their expectations of their children and set age-appropriate boundaries for behaviour.

(2021) in the UK found that, raising a child with ADHD can negatively affect parents' mental health, fulfilment from intimate relationships, enjoyment of leisure time, sleep quality, and overall contentment with life. Also, previous research shows the meaning parents ascribed to their child's diagnosis of ADHD had an influence on their belief that they are able to cope with difficult behaviours and how they incorporate the diagnosis into daily life (Ringer et al., 2019).

There are also other factors that can affect a parent's perception of being able to cope better and subsequently with their child's behaviour. For example, as with neurotypical children, while earlier research suggests that maternal employment, psychological well-being and partner relationships can negatively impact the child's behaviour (Merson, 2012), more recent literature determined that maternal employment by mothers of children with ADHD can have a positive impact due to mothers reporting fewer depressive symptoms and related reduced levels of parental stress (O'Brein et al., 2016). In addition to the parent-child relationship and parental well-being, sibling relationships can also be impacted when one of the siblings presents with ADHD (Nachane et al., 2022).

Sibling Relationships. Research shows that children with ADHD tend to shower poorer sibling relationships with higher levels of antagonism and increased conflict (Kouvava & Antonopoulou, 2020; Messeter, 2019). As such, the sibling relationship is often characterised by less warmth, affection and nurturance (Nachane et al., 2022).

Siblings without ADHD report experiencing different treatment by their parents, including feeling rejected, being disciplined differently and often being parentified, as they are expected to care for their sibling with ADHD (King et al., 2016). Although this is a common experience for siblings of children with other neuro-diversities, siblings of children with ADHD may report feeling that their sibling with ADHD receives more attention (Hamilton, 2023; Hastings, 2003; King et al., 2016). Siblings also report feeling less happiness within their families and lives overall (Peasgood, et al., 2015). Siblings of children with ADHD are at risk for developing more mental health issues, they tend to show lower levels of resilience and they experience overall worse quality of life than siblings of children without ADHD (Heryputri, et al, 2022; Orm & Fjermestad, 2021).

However, in addition to family functioning, educational-related outcomes, and psychosocial well-being, there are other consequences to be considered when a child is diagnosed with ADHD. These include the economic expense as well as health-related issues that children with ADHD often experience.

Financial Outcomes

Having a child in the family with ADHD is associated with an increased economic burden to the family over the course of the child's development in addition to the related effects of caring for a child with ADHD, such as lowered work efficiency of parents, and the financial implications for parents related to absenteeism from work (Flood et al., 2016; Zhao, et al., 2019). Additionally, there are indirect costs, specifically related to special education provision where this is needed (Gupte-Singh et al., 2017; Howard et al., 2019; Schein et al., 2022). Annual health costs tend to be higher for people with ADHD than the general population (Gordon & Fabiano, 2019; Jennum et al., 2020; Schien et al., 2022) with increased in- and out-of-hospital treatments (Barkley, 2020; Scriberas et al., 2020).

Research further indicates that adults who were diagnosed with ADHD as children tend to fare worse financially than peers (Jennum et al., 2020; Pelham III et al., 2020), with young people diagnosed with ADHD being at risk for being marginalised in the labour market due to a higher risk for longer term sickness absence, long-term unemployment (Helgesson et al., 2021; Schein et al., 2022), increased risk for job instability and compromised work performance (Gordon & Fabiano, 2019; Scriberras et al., 2022). As a result, they tend to be at greater risk for being financially dependent on their parents as adults (Pelham III, et al., 2020).

Physical Health Outcomes

Notwithstanding the effects on others, children with ADHD are at greater risk of developing physical and neurological health problems with their overall physical well-being being poorer on average (Fard et al., 2022; Owens et al., 2017; Pan & Bölte, 2020).

Health-associated issues include heightened risk for various genetically-related conditions, such as cognitive deterioration and possible dementia in later years (e.g., Alzheimer's disease), in addition to autoimmune disorders in adulthood (Callahan et al., 2021; Lebeña, et al.,2023; Leffa et al., 2023). Moreover, children with ADHD are more likely to experience neurological difficulties and digestive problems (Pan & Bölte, 2020), including irritable bowel syndrome (Hamza, 2020), constipation and other gastrointestinal problems (Mathee et al., 2020; Zafari et al., 2021). Children with ADHD are at risk for coronary heart disease (Leppert et al., 2021) with adults often being diagnosed with vascular disease (Callahan et al., 2021), respiratory conditions, metabolic-related diseases, and musculoskeletal problems including fibromyalgia (Du Rietz et al., 2021; Pallanti et al., 2021).

Sleep disturbances are also commonly experienced by children with ADHD (Kalaskar et al., 2021; Lewis et al., 2022; Sonuga-Barke et al., 2023) with children experiencing overall

poor sleep quality (Lebeña, et al., 2023; Villalba-Heredia et al., 2021) and being at risk for subsequent impaired mental performance (Van Andel et al., 2020). Notably, time in bed, time spent sleeping, daytime sleepiness and awakening at night were determined to be important sleep-related aspects influencing academic performance in children with ADHD (Ruiz-Herrera et al., 2021).

Furthermore, epilepsy and dental caries are often co-occurring in children with ADHD (Aaberg, et al., 2016; Aricò , et al., 2020; Drumond et al., 2022; Galera et al., 2023; Rosenberg et al., 2014). Although originally thought to be related to decreased salivary production as a side effect of stimulant medications used to treat ADHD (Hidas et al., 2013), it was determined that poor oral hygiene played a role in the development of dental caries in children with ADHD, increased consumption of foods rich in sugar (Paszynska et al., 2020), and the incidence of ADHD-related behaviours, including hyperactivity and impulsivity, which impede adequate oral hygiene habits (Kohlboeck et al., 2013). Particularly, with regards to the co-occurrence of epilepsy with ADHD, studies have shown that the co-occurrence is deemed to be related to common neuroanatomical impairments, including reduced cortical thickness in the subcortical and cortical regions and higher levels of inflammatory markers in children who experienced active seizures (Aricò et al., 2020; Elhady et al., 2020; Wagner et al., 2020).

Additionally, children with ADHD tend to have higher Body Mass Index (BMI) scores than non-ADHD peers and are at higher risk for obesity (Cortese, 2019; Leppert et al., 2021; Owens et al., 2017; Paszynska et al., 2020). However, research is inconsistent in terms of which sex is more at risk with some research suggesting that this finding only applies to girls (Castaneda et al., 2016); moreover, findings indicate that obesity is more common in adolescents with hyperactivity and impulsivity symptoms rather than with inattentive symptomology (Kase et al., 2021). Binge-eating is another health issue which often co-occurs with individuals with ADHD with research suggesting that obesity in children with ADHD may be due to the influence of genes, problems with executive functioning, abnormal eating patterns, problems with sleep patterns, and inflammation-related mechanisms (Capusan, 2016; Cortese, 2019; Martin-Silva, 2021).

Furthermore, although there are no known physical attributes specific to ADHD, certain features show elevated risk including minor physical characteristics, such as high-arched palates and low-set ears (APA, 2022; Myers, 2019).

Children with ADHD may also show sensory processing and motor-related problems, including clumsiness, difficulties with balance and gait, involuntary movements and sensory

integration difficulties in individuals (APA, 2022; Delgado-Lobete, 2020; de Schipper et al.; 2015; Gong et al., 2015; Little, et al., 2018; Patankar et al., 2012). Correspondingly, there is a risk of physical injury in children with ADHD due to symptoms of ADHD, including impulsivity, hyperactivity and inattention; accident proneness; the presence of co-morbid conditions, particularly CD; engagement in dangerous behaviours and parental risk factors (Ayaz et al., 2016; Connolly et al., 2019; Brunkhorst-Kanaan et al., 2021; Shen et al., 2023). For instance, typical injuries include ingesting foreign objects (Turgut et al., 2019), burns (Emond et al., 2017), as well as brain and head injuries (Karic et al., 2019). However, this risk is lowered when the child or adolescent is medicated (Brunkhorst-Kanaan et al., 2021).

Related to physical injury, adolescents with ADHD are at risk for premature mortality (Dalsgaard et al., 2015; Schein et al., 2022; Sun et al., 2019). The most prominent reasons include accidental injury due to impulsivity and inattention, and the presence of co-morbid conditions and their associated difficulties (Chen et al., 2019; Dalsgaard et al., 2015; Faraone, 2015; Sun et al., 2019).

Positive Outcomes

Despite there being many negative functional consequences to ADHD, including cognitive, social, educational, familial, financial and physical problems (APA, 2022; McQuade, 2020; Morris et al., 2021; Tamm et al., 2021), there are specific positive attributes to having ADHD which can include creativity, increased optimism, and resilience (Dreschler, 2020). Research suggests that some of the positive attributes have been employed as coping strategies to overcome difficulties associated with the disorder (Grønneberg et al., 2023). Furthermore, characteristics of ADHD, such as increased energy levels, assist individuals positively, allowing them to engage in various activities without tiring easily (Gráinne et al., 2015; Grønneberg et al., 2023; Redshaw & McCormack, 2022).

Interesting findings are reported regarding empathy and warmth in children with ADHD. For instance, Grønneberg et al. (2023) indicated that difficulties with social interactions leading to exclusion and isolation, may enable children with ADHD to develop empathy and warmth. In contrast, a study by Ay and Kiliç (2019) showed no relationship between ADHD and the development of empathy, with adolescents with ADHD and co-morbid ODD displaying lower levels of empathy still. A similar result was obtained by Lee et al. (2021) who determined lower levels of empathy in adolescents with ADHD. Possible explanations for these inconsistent findings could be that results from the sample of the group in the Grønneberg et al. (2023) study are narrated from the children's own perceptions and may be biased as a result, whilst the studies by Ay and Kiliç (2019) and Lee et al. (2021)

included the use of standardised assessment measures to ascertain children's levels of empathy.

Studies linking creativity as a useful trait often associated with ADHD also show differing results (Hoogman et al., 2020). Fugate et al. (2013), for example, found that divergent thinking associated with ADHD can be useful for those with the disorder while additional studies revealed that inflexibility in thinking can hinder the ability to solve problems creatively (Aliabadi et al., 2016; Hoogman et al., 2020). To understand the differences, it is worth bearing in mind that researchers in the study by Fugate et al. (2013) worked with students classified as gifted, whereas the other two studies were not focused on the level of intelligence in their samples. Interestingly, studies further reveal a genetic link between creativity and ADHD related to dopaminergic action and axon pathfinding at the neuronal level as well as common cortical regions of the brain involved in both creativity and deficits found in individuals with ADHD (Cortese et al., 2012; Demontis et al., 2019; Hoogman et al., 2020; Taylor, 2018; Wu et al., 2015; Zabelina et al., 2016).

Summary and Conclusion

ADHD is a commonly diagnosed neurodevelopmental disorder. However, currently, there are many concerns regarding the diagnosis of the disorder, including lack of biological markers, as well as over-, mis- and under-diagnosis. For these reasons, a comprehensive evaluation is needed which includes consideration of information related to risk factors, associated features as well as co-morbid disorders as provided by various informants, including teachers and parents. Thereafter, understanding the pathophysiology and functional outcomes of the disorder, including cognitive and emotional functioning, psychosocial, educational-related, familial, and financial possibilities, are important before suitable treatment options can be considered.

To broaden the understanding of ADHD, Chapter Two provides a theoretical framework with a focus on attention-related difficulties, such as working memory and motivation, as well as specific learning theories as applied to ADHD.

Chapter Two

Theoretical Framework for Understanding ADHD

As outlined in Chapter One, ADHD is a complex and costly neurodevelopmental disorder that affects many children and their families. It is often co-morbid with other disorders, and it can have devastating consequences if left undiagnosed and untreated.

With this in mind, Chapter Two provides a theoretical framework for positioning the current research in terms of understanding the implications of the disorder by focusing on attention deficits and related theories, as well as relevant learning theories, information which is vital when planning behavioural treatments and interventions for children and their families.

Attention

Defining attention is complex, given its protean quality (Wu, 2024). Many different definitions of attention have been put forward, but all relate to the same construct. For example, Solso (1998) defined attention as the focusing of mental energy on mental actions or sensory occurrences, while Ganeri (2017), more recently, expanded this concept by stating that attention is elicited when an individual becomes aware of themselves in a space and, following that, experiences, and acts on stimuli in that space. Others have added that attention is crucial for daily functioning, whether for learning, health, performance, daily life or relationships, and that it is affected by other occurrences at that point in time, the task complexity, as well as an individual's ability to focus their attention (Bruya & Tang, 2021; Driscoll, 2005).

However, attention involves more than just attending to the environment. While various researchers have put forward different theories about the organisation and mechanisms of attention, some of the more relevant models for this dissertation are further elaborated on.

Posner's Neuroanatomical Network Theory of Attention

With the advent of neuroimaging and resulting neuroanatomical information from the late twentieth century, it became evident that attention is a function of different parts of the brain and not solely one region (Posnera & Dehaene, 1994). In response, Posner and colleagues have developed and revised a model over time to explain the mechanism of attention (Posner et al., 1980; Posner & Raichle, 1994; Posner & Rothbart, 2007; Peterson & Posner, 2012): the Neuroanatomical Network Theory of Attention.

Initially, the process of attention was theorised to be related to maintaining attention to a particular space in the visual field with accompanying saccadic eye movements[10], and the relevant neuroanatomy involved in motion and perception following the activation of visual pathways (Posner, 1980). However, this theory was broadened to include further neural networks involved in attention, in addition to the role of genetic differences, and the effect of the environment on attention (Peterson & Posner, 2012). Moreover, it was postulated that the attentional networks occur in an organised manner as the cortical-striatal loop which involves a number of regions in the brain (Swanson, 2003). In sum, Posner and colleagues stated that attention comprises three main actions: the alerting process, the orienting process, and the executing or executive control process. Each of these actions will be discussed, in turn, for clarity.

Alerting. In 2012, Peterson and Posner noted that alertness occurs when an individual shows a state of readiness to react to a stimulus, regardless of the stimulus being auditory or visual. They stated that, for an individual to be alert to a stimulus, there must be a decrease in neural distractors which would have the result, when a stimulus is presented, of increasing the amount of stimuli attended to, and decreasing the effect of distractors or background noise[11] (Cadence PCB, 2024). For example, individual A is sitting in a crowded room in which others are conversing. For individual A to be alert to individual B and respond appropriately in conversation, individual A would need to focus on what individual B is saying, and the noise from other conversations would need to be low enough for individual A to hear what individual B is stating. Peterson and Posner (2012) suggested that the alerting process can be achieved when an individual is given a warning promptly before a stimulus is presented, such as, in the prior example, if individual B calls individual A's name before asking a question. These researchers have determined that the right cerebral cortex, locus coeruleus, parietal cortex along with the frontal and cortical regions are involved in the alerting process, with the neurotransmitter, norepinephrine, identified as being important in this activity (Peterson & Posner, 2012; Posner & Rothbart, 2007; Ross & Van Bockstaele, 2021; Swanson, 2003).

Orienting. The orienting process occurs when an individual prioritises sensory input from one stimulus over other stimuli (Peteron & Posner, 2012). This process includes the level at which an individual is prepared for the stimulus (Swanson, 2003). For instance, if

[10] **Saccadic eye movements**: These eye movements occur when the fovea (small hollow in the in the retina where visual acuity is sharpest) is moved to a new focus area (Mack et al., 2013).
[11] Referred to as the **Signal-to-noise ratio**: the ratio of the chosen information to the background noise (Cadence PCB, 2024).

considering the previous example of individuals conversing in a crowded room, this would involve individuals A and B focusing on what each other is saying above the surrounding noise and conversations. The superior parietal lobe, and superior colliculus are reported to be responsible for attentional shifts in the orienting process towards a specific stimulus and involving voluntary eye movements in the frontal eye fields,[12] supported by the neurotransmitter acetylcholine (Klinkenberg et al., 2011; Posner & Rothbart, 2007; Posner & Niell, 2018). Should the stimulus originate from the peripheral field of vision, and thus be unexpected, the temporal parietal junction is involved (Posner & Niell, 2018; Posner & Rothbart, 2007).

Executing. The final process proposed then, the executive control or executing function, states that, should two or more conflicting responses be expected, the individual must constrain the overlearned response and execute a response specific to the situation (Swanson, 2003). Tang et al. (2022) add that executive control includes observing and deciding between conflicting stimuli, which can include emotions and thoughts, to maintain executive functioning and self-control. Expanding on the discussed example, this would occur when individual A can maintain conversation with individual B despite becoming triggered by something individual B says to them or having another stimulus in the environment distract individual A from the conversation at hand. Accordingly, the neurotransmitter, dopamine, appears to subserve the executive control network together with the anterior cingulate gyrus, anterior cingulate, prefrontal cortex, basal ganglia, and lateral ventral region of the brain (Posner & Rothbart, 2007; Swanson, 2003).

Posner's Neuroanatomical Network Theory of Attention aligns with other theories of attention, which put forward both basic and higher order attentional (control) functions, with those specialised attentional regions found in or connected to the frontal lobes described as the anterior attention system, while those related to the parietal lobe noted as the posterior attention system (Posner & Dehaene, 1994). Thus, a hierarchy to attention functionality is proposed (Almeida et al., 2021).

Sohlberg and Mateer's Clinical Model of Attention

Sohlberg and Mateer's (1987) Clinical Model of Attention notes a similar hierarchy to the attentional system that includes focused, sustained and selective attention, and divided and alternating attention (Sohlberg & Mateer, 1987; Thomson et al., 2005). Developed to

[12] **Frontal eye fields**: area in the dorsolateral prefrontal cortex; it indicates the position of a target and regulates the implementation of purposeful eye movements (Schall, 2009).

understand the role of attention in remediation of Traumatic Brain Injuries (TBI), this structured framework notes distinct levels of attention-related skills, with lower-level abilities forming the foundation for higher-level tasks as patients progress through recovery stages (Sohlberg et al., 2010; Sohlberg & Mateer, 1987).

While focused attention denotes the process in which an individual steers their attention to certain stimuli and responds accordingly, sustained attention involves continued observance of the stimuli. Selective attention describes the manner in which the individual maintains the same response to a continuous activity (Sohlberg & Mateer, 1987). For example, an individual could demonstrate focused attention when attending to information shared in a lecture. An individual would show sustained attention when maintaining that level of attention for a period of time in the same lecture, and selective attention could be shown if the same individual continues focusing on the lecture while filtering out distractions from an external source, such as noise from outside the lecture room.

Alternating and divided attention are more complex tasks involved in attention, with the former referring to the action of shifting from one activity to another, such as listening to a podcast and completing a writing task. On the other hand, divided attention occurs when an individual engages in two tasks at the same time, such as transcribing a verbal interview. The hierarchy of attention, moving towards higher order attention functions, then is: focused, sustained, selective, alternating, and divided attention (Sohlberg & Mateer, 1987; Thomson et al., 2005).

Chun's Taxonomy of External and Internal Attention

Similarly, a Taxonomy of External and Internal Attention is proposed by Chun (2011) to explain how the brain selects, moderates and maintains focus on specific information according to the relevance it bears to behaviour (Chun et al., 2009). According to the researchers, there are two main types of attention: internal and external attention. The researchers suggest that external attention comprises the choice of, and adjustment to, information from the senses; information that originates outside of the individual, also referred to as perceptual stimuli (Lim & Pratt, 2022) or selective attention (Sauce et al., 2014). In comparison, internal attention, also referred to as inhibition, denotes the choice, adjustment, and preservation of information from within the individual, such as from the working or long-term memory systems (Sauce et al, 2014). For external attention to be effective, the brain must filter out unnecessary information and focus on only relevant information (Keller et al., 2020). Should this not occur, the individual may feel overwhelmed, and they may be unable to attend effectively to important sensory stimuli (Keller et al., 2020).

Taken together, the theories provide explanations regarding how functions of attention relate to different parts of the brain, the various actions involved in attention, and they suggest a hierarchy through which the brain varies focus according to needs of the individual (Chun et al., 2009; Posnera & Dehaene, 1994; Sohlberg & Mateer, 1987).

With a more complete understanding of attentional processes, I will now consider the interplay between attention and other cognitive functions such as working memory, learning and motivation.

Attention and Working Memory

Closely related to attention is working memory with the same neural networks being involved in both cognitive functions (Angelopoulou & Drigas, 2021; Panichello & Buschman, 2021; Zavitsanou & Drigas, 2021). Working memory, defined as the "ability to maintain and manipulate information, necessary for an action, for short periods of time in the order of seconds" (Zavitsanou & Drigas, 2021, p. 2), holds information needed for manipulation and use in complex tasks over a limited time (Cockroft, 2015). Suppose one takes the commonly used Digit Span subtest (part of most Wechsler test batteries, e.g., WISC-V). In that case, the forward span measures basic attentional capacity, and short-term, passive retention of information. In contrast, the backward span measures the ability to hold but also manipulate similar kinds of information in mind (i.e., working memory). Additionally, information from working memory is associated with information from long-term memory to allow an individual to solve problems or understand the presented information, thus vital for development and learning (Cockroft, 2015; Woolfolk, 2010).

Related specifically to ADHD, when compared to non-ADHD children, children with ADHD are inclined to have limited rehearsal or storage capacity for information in working memory, as well as limited ability to manage increased demands on central executive processing (Kofler et al., 2009; Kofler et al., 2017). Hence, they tend to fare worse when required to remember increasingly larger amounts of phonological information, and being likely to remember phonological information better when presented in more than one mode, such as visual and auditory, instead of either visual or auditory, in isolation (Alderson, et al., 2014). Additionally, children with ADHD showed more hyperactivity during tasks in which visuo-spatial and episodic buffer-related skills were assessed (Kofler et al., 2017), also presenting with large-scale episodic buffer deficiencies not related to the visuo-spatial subsystem or domain-general central executive processes (Alderson et al., 2022). They demonstrate the most difficulty with maintaining and re-organising information mentally

when compared to other executive function impairments, with overall difficulties in central executive working memory mediating the severity of symptoms (Fosco et al., 2020).
In young children, attentional focus has been shown to subserve the relationship between attention and working memory, and not storage capacity of working memory, inferring that working memory impairments in children with ADHD could be more directly related to difficulties in focusing attention and not working memory capacity per se (Gray et al., 2017). Furthermore, it is worth bearing in mind that SES-related factors as relevant to both studies in this dissertation, including access to educational prospects, resources, and bilingualism, may affect the development of working memory and subsequent performance in academic tasks in children (Cockroft, 2015; Cockroft, 2022; Mooney et al., 2021).

Following, two models related to the overlap between attention and working memory as expressions of executive functioning, will be discussed: Baddeley's Model of Working Memory and Cowan's Embedded Process Model (Chai et al., 2018).

Baddeley's Model of Working Memory

Baddeley and Hitch proposed the Multicomponent Working Memory Model in 1974 to explain pertinent behavioural findings in the memory research while considering a variety of case studies related to neuropsychology (Buchsbaum, 2016). Originally, the model suggested that the working memory system involves three subsystems that control the storage of information for use in more complex tasks (Chai et al., 2018; Cockroft, 2015). The three initial subsystems included the phonological loop (referring to the verbal working memory, where acoustic, speech-based, and verbal information is held in temporary storage), the visuo-spatial sketchpad (referring to the visual-spatial working memory where information related to spatial, visual and possibly kinaesthetic information is temporarily held), in addition to the central executive (consisting of the attentional control system and denoting the attention-executive function overlap described before). The central executive starts decision-making processes and control through resolving any interference when stimuli are presented simultaneously, and it later transfers information from the working memory system to the long-term memory system through recoding and rehearsal (Ashcraft, 2002; Cowan, 2005; Mullane et al., 2016). This component can, however, become drained if the phonological loop or visuo-spatial sketchpad is overwhelmed (Ashcraft, 2002).

In 2000, a fourth subsystem, the episodic buffer, was included in the working memory model, which is a transitory storage mechanism that combines information from the visuo-spatial sketchpad and the phonological loop as well as long-term memory (Baddeley, 2000). The episodic buffer, operated by the central executive, holds incidents of information

temporarily and integrates them across time and space, such as remembering information from a particular place and time together in working memory (Baddeley, 2000). It further decodes the information and stores it in a multidimensional location which can be retrieved through deliberate awareness when needed (Semenza & Vivenzi, 2016).

Cowan's Embedded Process Model of Working Memory

A further model which could be useful in understanding the role of working memory in ADHD is the Embedded Process Model of Working Memory as proposed by Cowan (1999). There are five principles proposed in the model: arrangement of information in the working memory; differences in processing limits for each of the different faculties; voluntary and involuntary process controlling the focus of attention; stimuli which are relatively stable activating some aspects of the memory despite the individual not being consciously aware of this; and the impact of awareness on processing of information. These five tenets will be discussed in more detail.

Cowan (1999) suggested that activation, focus of attention, and long-term memory interpose in the working memory. These capacities are arranged hierarchically with information, which is being focused on, being the most readily available (Awh et al., 2006). As the scope of working memory is limited, and activation is limited by time, interference in suboptimal conditions can affect the processing of information from the environment (Awh et al., 2006; Cowan, 1999). Cowan further indicated that the focal point of attention is co-ordinated by the central executive through voluntary practices, and the orienting system of attention through involuntary practices. As individuals can only concentrate on a restricted amount of information at a time, individuals tend to focus selectively on certain information at the expense of other competing stimuli (Cowan et al., 2023). Moreover, he added that, should a stimulus' physical features stay moderately unchanged and remain of minimal importance to an individual, some characteristics of the memory will be triggered although the individual may not be aware of this activation. However, Cowan indicated that awareness is important for information processing, with perception affecting the number of attributes of a stimulus being encoded. Such awareness allows new episodic[13] depictions to become accessible through deliberate recall. For the purposes of this discussion, perhaps the most salient point made by Cowan is that attention, and long-term memory expediate the

[13] **Episodic memory**: this is the ability of an individual to encode and retrieve information regarding daily experiences (Dickerson & Eichenbaum; 2010). It refers to the deliberate recollection of a personal experience, including information about what happened, when it happened as well as the place it happened (Pause et al., 2013).

functioning of the working memory (Awh et al., 2006; Chai et al., 2018). Thus, the five principles of the model improve understanding of how memory retrieval and working memory relate to difficulties in learning for children with ADHD (Cowan, 1999).

Despite the contributions of Cowan's Embedded Process Model of Working Memory and Baddeley's Model of Working Memory to understanding working memory, there are noteworthy limitations in applying these to difficulties experienced by children with ADHD. For example, Baddeley's model does not take into account the focus of attention to presented stimuli, the theory oversimplifies the role of processing of information to the working memory, it does not clearly specify central executive processes, and it provides limited explanation regarding the integration of mechanisms in the episodic buffer (Adams et al., 2022; Chai et al., 2018; Korbmacher, 2019). On the other hand, Cowan's Embedded Process Model of Working Memory does not provide clarity on whether short-term memory is, in essence, activated long-term memory and it does not explain how the focus of attention is used in tasks of differing demands (Cowan, 2019; Dennis, 2017; Unsworth, 2006). Considered together, neither of the theories note the effect on memory retention of the extended time paying attention to a stimulus, an aspect which varies throughout childhood, and provide only hypothetical explanations regarding functioning of the working memory (Adams et al., 2018; Barrouillet et al., 2009; Ozimič, 2020).

Attention and Learning

As noted, ADHD can have devastating consequences on a child's functioning due to attention problems impacting negatively on learning (Al-Yagon, 2016; APA, 2022). To this end, the processes involved in conditioning will be reviewed, generally and specifically as related to attention, before exploring the relationship between learning and attention.

Overview of Conditioning

Before considering learning as specifically pertaining to attention, it is worth refreshing some of the basic tenets of conditioning and reinforcement, particularly as related to ADHD. A stimulus may become a reinforcer of behaviour if its appearance improves the likelihood of future incidences of the particular responses that generated it initially with learning occurring as a result of association between stimuli and responses (Johansen et al., 2002; Woolfolk, 2010). This learning of behaviour is known as conditioning, with initial learning of behaviours known as acquisition, and the cessation of deliveries of reinforcers leading to a process of extinction (Johansen et al., 2002). Additionally, the circumstances under which a response creates a reinforcer are termed reinforcement contingencies. As a

result, then, reinforcers affect responses that have already occurred by improving the probability of these responses occurring to the stimulus in future (Johansen et al., 2002).

Further to this, there are two main types of conditioning: classical conditioning during which the incidental utilisation of reinforcement creates a desired response, and operant conditioning[14], which involves the deliberate use of reinforcement to produce a desired response (Woolfolk, 2010).

Conditioning and ADHD

Research has long shown a link between ADHD-related deficits as a result of inefficiencies in conditioning, particularly classical conditioning, with differences noted in responses to stimuli (Johansen et al., 2002; Sagvolden, 1996). For example, an early study by Sonuga-Barke et al. (1996) considered the responses of two groups of children: one group presenting with signs of hyperactivity, and the other as a control group with no symptoms of ADHD, with both groups of children choosing, repeatedly, between larger delayed rewards and smaller instant rewards, the latter which is often referred to as delay aversion (De Meyer et al., 2019). Delays in reward presentation were controlled for in the study. Results showed that the group of hyperactive children tended to select the smaller instant rewards instead of the delayed rewards, suggesting that they had difficulty maintaining their delayed gratification of rewards. These findings by Sonuga-Barke et al. (1996) are supported by a variety of studies (see De Meyer et al., 2019; Douglas & Parry, 1994; Teichler et al., 2019). The results of this research indicate that children with ADHD responded with frustration during extinction tasks when rewards they expected, did not appear (Douglas & Parry, 1994). Boys with ADHD tended to behave with hyperactive-type responses during the reinforcement stage of a fixed interval schedule, and impulsivity during the extinction phase in the reinforcement contingency, indicating that lack of delayed gratification or delay aversion is a core component of ADHD due to impulsivity and hyperactivity as well as being linked to problems with sustained attention (De Meyer et al., 2019; Sagvolden et al., 1998; Teichler et al., 1996).

Similarly, with regards to self-control deficits and problems with conditioning and reinforcing of behaviours, a recent study by Smith et al. (2024) demonstrated that behavioural interventions targeting enhanced self-control through seeking delayed rewards are related to improved timing precision and temporal processing and attention, difficulties often associated with ADHD (Acosta-López et al., 2021; Chan et al., 2022: Noreika et al., 2012). Overall, the

[14] **Operant conditioning** is also termed “instrumental learning” in some sources (van der Oord & Tripp, 2020).

earlier research also shows that individuals with ADHD need stronger and more noticeable reinforcers (Kollins et al., 1997); impulsivity in motor responses intensifies as more reinforcers are present to change behaviour (Sagvolden et al., 1998); and frequent and strong reinforcers are needed to prevent cognitive impulsivity (Douglas, 1999).

Framework for Understanding Attention in Learning (Keller et al., 2020)

Since the focus of the current dissertation and related studies is children, I will be considering the role of attention as it relates to learning in the classroom through examination of a framework proposed by Keller et al. (2020) to explain the link between the two. These researchers postulated that there are two types of focus: when an individual is focused on a topic which relates directly to the information being learned; this is termed as on-topic information. In comparison, if the individual's attention is shifted to a topic which is irrelevant to the information being presented, this is known as off-topic attention. Keller et al. (2020) further stated that there are four ways in which attention in the classroom can be categorised. Each of these will be briefly described.

The first category is that of *On-topic External Attention*: the individual is focused on the information being presented and engages with the presented material; for example, when an individual pays attention to information being presented by the teacher in a lesson. The drawback of this mode of interaction could be that the individual may not necessarily be making connections and thinking critically about the information being presented, and their existing knowledge about the subject (Freeman et al., 2014). If an individual engages in an On-topic External Attention task in the short-term, such as learning information from notes the day before an examination without linking it to existing knowledge, it is unlikely that the information will be remembered in the long-term (Capeda et al., 2006).

The second mode, *On-topic Internal Attention*, often referred to as active learning, occurs when the individual is focused on an external stimulus but engages actively with the information being presented by thinking about the topic, and linking it to existing knowledge on the topic, practising metacognition (Owen et al., 2017; Tanner, 2012). The process of active learning can be summed up as the way an individual learns by relating new information and experiences to alter their current representations and understandings of how the world operates (Theobald et al., 2020).

By contrast, the third mode of *Off-topic External Attention* occurs when the individual is distracted by external stimuli which are not relevant to the information being presented (Keller et al., 2020), such as a clock ticking, vehicle driving past the venue, or movement by another individual.

With similar effects, Keller et al. (2020) proposed the final category, *Off-Topic Internal Attention*, also referred to as mind-wandering[15] (Randall et al., 2014). An Off-topic Internal Attention-type event could include an individual being present in a classroom and being taught about a topic, but thinking about a family situation, or worrying about a test in the next class. Research by Randall et al. (2014) supports the view that individuals with more limited cognitive resources tend to display more accounts of mind-wandering than individuals with higher levels of cognitive resources. From their research, this was noted more for complex tasks and not necessarily longer ones.

Interestingly, a descriptive study by Cicekci1 and Sadik (2019) involving 1023 students and 423 students from secondary schools found that teachers attributed attention problems in students to factors within the students, such as becoming bored and excessive anxiety as forms of Off-topic Internal Attention-related problems, while students themselves ascribed attention problems to problems within themselves (Off-topic Internal Attention-related) in addition to external factors, for instance being distracted by stimuli from outside a classroom (Off-topic External Attention-related). Students who recorded themselves as being distracted often stated that they attempted to refocus their attention on the topic at hand through behaviours, such as trying to make eye contact with their teachers. Additionally, mind-wandering is thought to be highly prevalent in individuals with ADHD who may fare worse in academic tasks, although, it can also occur in individual without the disorder (Alperin et al., 2021; Keller et al., 2020; Wammes et al., 2016).

Relatedly, Vatansever et al. (2018) determined that mind-wandering noted in ADHD could be an indirect result of insufficient control of continuous cognition in reaction to intensifying demands from the environment which could be, in part, due to dysfunction in the internal organisation of the frontoparietal network when not activated. Finally, researchers have also reported that lower levels of mind-wandering were related to motivation to attend to the information at hand (Bozhilova et al., 2018).

Learning Theories and the Dopamine System

Problems with learning in children with ADHD often originate from difficulties with reinforcement and extinction processes, which are largely related to ineffective functioning in the dopamine system. This affects the children's capacities to link consequences effectively with preceding behaviours, resulting in variable and often erratic learning patterns (Johansen

[15] **Mind wandering**: this occurs when an individual loses attention and focuses on task-unrelated, internal images and thoughts (Bozhilova et al., 2018).

et al., 2002; Johansen et al., 2009). To further explain the relationship between dopamine and learning, two theories will be explored: the Dynamic Developmental Theory (DDT; Sagvolden et al., 2005) and the Dopamine Transfer Deficit Theory (DTD; Tripp and Wickens, 2008).

DDT. The DDT states that the symptomology of ADHD emerge as a result of lowered dopamine signal when an individual anticipates a reinforcer, or after the reinforcer has appeared, leading to a sharp temporal discounting slope[16] (Sagvolden et al., 2005), and resulting in the individual preferring a lesser, but more immediate reward over a greater, although delayed reward (De Meyer et al., 2019; Sagvolden et al., 2005). This seems to be particularly true when the reinforcement tends to be slowed, with the speedy impact of the response of dopamine preventing a strong association from forming between the instrumental responses or conditioned stimuli and also reinforcing responses which lead to inattentive symptoms. This suggests that there is a smaller timeframe in which the individual may associate the stimuli and behaviour directly with their consequences (Aase & Sagvolden, 2005; De Meyer et al., 2019, Shindou et al., 2019). The dopamine concentration gradient[17] is also a result of lowered amounts of tonic (sustained) dopamine[18], and this causes drops in phasic (or more transient) dopamine after a reward is withheld, which, in turn, causes a reduced rate of extinction of behaviour (Wang & Day-Cooney, 2021).

It is further proposed that the functioning of dopamine performs a vital role in neglecting to regulate glutamate and GABA signal transmission sufficiently (Meyer et al., 2019; Sagvolden et al., 2005). Neuroanatomically, abnormally diminished functioning of the mesolimbic-cortical dopamine branch leads to changed reinforcement of behaviour and ineffective extinction of prior learned behaviour in children with ADHD, deficits in attentional response, and ineffective behavioural planning, including poor executive functioning (Hulsbosch et al., 2023; Johansen et al., 2002, 2005, Sagvolden et al., 2005). Relatedly, the under-functioning of the dopamine branch of the nigrostriatum results in reduced control of motor functioning and poor habitual learning (Sagvolden et al., 2005). Taken together, outcomes include delayed aversion, presentations of hyperactive behaviour in unusual situations, impulsivity, insufficient maintained attention, failure of the individual to

[16] **Temporal discounting slope**: the process in which an individual discounts rewards attainable in future when compared to more instantaneous rewards (Patt et al., 2021).
[17] Sometimes referred to as "**dopamine gradient**", this is the difference between action potentials from within and outside the neuron and this is responsible for the transmission of electrical impulses in the human body (creativecommons.org).
[18] **Tonic dopamine** is the sustained release of low levels of dopamine caused by firing of neurons; **phasic dopamine** refers to a fast, increased amount of dopamine being released (Grace, 1991)

inhibit their responses to stimuli, as well as increased unpredictability in behaviour in addition to amplified responding throughout continuous and partial reinforcement tasks (Hulsbosch et al., 2023; Sagvolden et al., 2005). Subsequently, these dopamine-related inefficiencies can lead to developmental delay, soft neurological signs, and difficulties in inhibition of responses (Sagvolden et al., 2005). This may be accompanied by deferred acquisition and learning of functional and complete sequences of behaviour, possibly being an underlying cause of regular shifts between activities, poor long-term planning skills, non-completion of activities and tasks, and poor self-control which are often considered as being results of impulsivity (Aase & Sagvolden, 2005).

The relationship between ADHD and ineffective learning of functional, complete sequences of behaviour, has been confirmed by several studies (see Kalff et al., 2003; Leisman & Melillo, 2010; Mioni et al., 2019; Yan & Thomas, 2002). However, a more recent meta-analysis found that learning of procedures in a sequence may not be impaired in individuals with ADHD when comparing their performance to individuals without ADHD, but rather due to problems with underdeveloped motor planning skills as related to visuo-motor tracking problems experienced by some individuals with ADHD related to underlying cerebellar pathology (Kurdziel et al., 2015; Sanjeevan et al., 2020; Tirosh et al., 2006). In sum, despite the theory originally being proposed to explain the role of dopamine in the development of schizophrenia, DDT provides insight into the effect of dopamine functioning in ADHD (Howes et al., 2017; Tripps & Wicken, 2008).

DTD. The DTD was propositioned by Tripp and Wickens (2008) to clarify reasons for individuals with ADHD showing different positive reinforcement patterns when compared to individuals without the disorder. The theory relates predominantly to abnormally diminished functioning of dopamine in children with ADHD (De Meyer et al., 2005). Tripp and Wickens (2008) suggested that children with ADHD have trouble with dopamine firing[19] following presentations of unexpected rewards, which is notably true with regards to intermittent or delayed reinforcement. The researchers stress that the problem with dopamine firing leads to decreased learning resulting from the delayed reinforcement and inefficiency of reinforcement (Catania, 2005; Tripp & Wickens, 2008).

Furthermore, a stimulus, which holds potential for positive reinforcement, loses its value at a fast pace due to the intense dopamine gradient firing following a postponement in

[19] **Firing**: this refers to the process in which a neuron emits a nerve impulse, or action potential (Wang & Day-Cooney, 2021).

transmission, with the changed sensitivity of reinforcement relating to altered action in phasic dopamine responses (Sagvolden, et al., 2005; Wang & Day-Cooney, 2021). The dopamine release happens at the optimal time to improve synaptic connections at a neural level, regardless of any deferments of the behavioural reinforcer, with the effectiveness of the process reliant on the individual's capacity to learn the association between the stimulus and reward, and resultantly, to complete the dopamine transfer from signal to cue (Tripp & Wickens, 2024). The mechanism behind the dysfunction, according to DTD, is as follows: after a positive reinforcer is presented, under circumstances in which reinforcement is delayed, a slower rate of the dopamine cell response occurs, resulting in protracted dopamine signal transmission with learning possibly being inhibited or, if present, being sluggish (Tripp & Wickens, 2008).

Furthermore, children with ADHD would not assume the normal levels of cell activity when anticipating dopamine that children without ADHD would, particularly in situations in which partial reinforcement is offered, with the lack of anticipatory dopamine accompanying partial reinforcement, and leading to faster extinction of preferred behaviours as well as a lower level of partial reinforcement extinction effect (PREE; Hulsbosch et al., 2023; Tripp & Wickens, 2008). The increased sensitivity to singular occurrences of reinforcement indicates that children with ADHD could be more intensely affected by contingencies of reinforcement with which they may be in direct contact, as well as being less affected by their own internal overall contingencies for behaviour, related to difficulties regarding self-control, impulsivity as well as distractibility (Sagvolden, 2005; Tripp & Wickens, 2008). Notably, difficulties with attention have also been suggested as related to ineffective dopamine functioning, and which further affect learning through reinforcement (Nissan et al., 2023; Tripp & Wickens, 2008).

Despite differences in the two theories (e.g., reasons for extinction of behaviours and reinforcement processes involved in learning), both theories broaden our understanding of how irregularities in dopamine functioning may result in difficulties in individuals with ADHD (Hulsbosch et al., 2023; Pollak, 2023, Sagvolden, et al., 2005; Tripp & Wickens, 2008, 2024; Wang & Day-Cooney, 2021).

The Relevance of Learning Theories to Children with ADHD

In summation, as noted previously, children with ADHD are at heightened risk for experiencing learning-related difficulties with symptomology as well as associated executive functioning deficits affecting academic performance (APA, 2022; Colomer et al., 2017). Regarding the impact of executive functioning, notably, motivation for, persistence in, and

attitude toward learning have been identified as being particularly influential on the success of learning, with deficits in reading and mathematics being linked to poorer executive functioning skills (Colomer et al., 2017; Holmes et al., 2021). Children with ADHD often display lower motivation to participate in learning-related tasks, thus also affecting academic achievement, with difficulties noted specifically for reading abilities (Smith & Langberg, 2018).

Attention, Emotion and Motivation

Before considering how attention, emotion, and motivation are connected, I note a few definitions of motivation. Previously, Dörnyei and Ottó (1988, p. 65) formalised a definition of motivation as: "the dynamically changing cumulative arousal in a person that initiates, directs, coordinates, amplifies, terminates and evaluates the cognitive and motor processes whereby initial wishes and desires are selected, prioritised, operationalised and (successfully or unsuccessfully) acted out". More recently, Dörnyei and Ushioda (2021) have updated the definition, describing motivation as a form of goal-directed behaviour, and the intensity with which the behaviour is performed. They add that motivation provides the reasoning behind why people perform certain behaviours, and the length of time they can engage in the behaviour.

As previously mentioned, research has established a link between increased attention and increased motivation (Agar et al., 2016; Bozhilova et al., 2018; Chelazzi et al., 2013; Engelmann & Pessoa, 2007; Engelmann et al., 2009). On the one hand, attention affects behaviour when an individual chooses stimuli which are relevant to the current task at the cost of excluding information that is not relevant to the task, as in the case of voluntary and goal-driven attention (Bourgeois et al., 2016). On the other hand, motivation affects behaviour by strengthening actions that are believed to improve an individual's suitability for an environment, with attention and motivation inter-relating through the refining of attention during tasks which are considered as being important to the individual (Bourgeois et al., 2016; Engelmann et al., 2009; Engelmann & Pessoa, 2014). Moreover, individuals tend to pay more attention to stimuli which elicit an emotional response than to neutral stimuli (Maratos & Pessoa, 2019; Vuilleumier, 2005). Thus, a relationship is shown between emotion, attention and motivation with the three processes contributing to which information an individual prioritises and selects over other information (Raymond, 2009).

Traditionally, it was believed that attention was indirectly affected by reward through modulation of task-exclusive motivation as well as the effect of motivation on voluntary selection of stimuli on which to focus attention (Krebs et al., 2012). However, findings

suggest that the processing of a reward could directly influence which stimuli are focused on with participants in their study not selecting a specific stimulus if rewarded for doing so (Della Liberia & Chelazzi, 2006). Positive reinforcement of a behaviour and perceptual learning occur as a result of an external stimulus being identified in addition to internal motivation from within the individual to attend to the stimulus (Della Liberia & Chelazzi, 2006). The seeking of a reward could result in an individual prioritising the selection of a stimulus in future, if the stimulus is associated with a reward due to past experiences (Anderson, 2015; Bourgeois et al., 2016; Della Liberia & Chelazzi, 2009).

However, reward-seeking is only one of two processes found to be linked to motivation (Engelmann et al., 2009). Maratosa and Pessoa (2019) found that threat aversion is also a motivating factor for attention with individuals prioritising and processing threatening stimuli over other stimuli which are considered neutral, or even positive. They argue that this occurs as threatening stimuli may place an individual's survival in jeopardy, particularly biologically related threats, such as risks to an individual's physical survival. They add that these stimuli are prioritised through prompt visual processing as a means of engaging attention and are often related to negative learning experiences, among others. In summation then, what these studies suggest is that, considered in totality, motivation enhances attention (Engelmann et al., 2009).

Neuroanatomically, motivation and attention share some of the same neuroanatomical pathways. For example, with the support of dopamine, rewards are generalised and declarative memories are formed in the hippocampus (important for memory and learning, according to Eichenbaun, 2001) through the process of prioritising certain information (mediated by motivation) and resulting in attention being paid to the relevant stimulus, which may be achieved through a neural network connecting the anterior cingulate cortex and mid prefrontal cortex to the hippocampus (Miendlarzewska et al., 2016; Posner & Rothbart, 2014).

Further structures indicated in attention, including the lateral intraparietal sulcus, are shown to manage contingencies linked to reward. These structures are also postulated to be concerned with the assimilation of motivation and attention supported by dopamine as related to reward-seeking behaviours (Engelmann et al., 2009; Platt & Glimcher, 1999; Posner & Rothbart, 2007; Surgue et al., 2004). Although the studies by Platt and Glimcher (1999) and Sugrue et al. (2004) involved monkeys as subjects, results were generalised to animals and possibly humans. Likewise, the frontoparietal network in the cortex was found to be related

to attention and responsive to suitable stimuli in goal-directed behaviours (Bourgeois et al., 2016).

Summary and Conclusion

This chapter shared an understanding of the role of attention as related to working memory, motivation, and learning. In addition, two prominent theories, the DDT and DTD, were discussed to shed light on the role of dopamine in learning for children with ADHD. This information is important when planning behavioural treatments and interventions for children and their families.

As outlined in a critical analysis by Van der Oord and Tripp (2020), BPT programmes used with teachers and parents of children with ADHD tend to rely on operant learning ideals, including continuously reinforcing positive behaviours in addition to increasing the discriminatory value of the stimuli with the goal of supporting the learning of more functional behaviours (Van der Oord & Daley, 2015).

With this in mind, Chapter Three presents the results of Study One in which the extent of undiagnosed attention problems and associated risk factors were explored in a sample of Foundation Phase learners attending a school educating children from low SES areas in Ekurhuleni.

Chapter Three

Study One: An Exploration of the Extent of Possible ADHD in a Sample of Foundation Phase Children Attending a School for Children from a Low SES Community in Ekurhuleni, Gauteng

In this chapter, I describe Study One of the current dissertation in which an exploration of the extent of undiagnosed attention problems (and possible ADHD) was conducted in a school educating learners from lower SES areas. Further to this, identified risk factors for such attention difficulties in the sample are discussed.

Before reporting on the actual study, as a manner of contextualising the findings regarding the prevalence of attention problems at the research site, I first consider the epidemiology of ADHD globally and in South Africa. Furthermore, as this chapter will report on the prevalence of risk factors in the sample, consideration will be given to known risk factors for ADHD.

Epidemiology of ADHD

ADHD affects approximately 5.29% of the population, globally (Smith, 2017), although different studies show variances across countries and regions. For example, in the USA, between 2011 and 2013, it was estimated that 9.5% of children aged between 4 and 7 years were diagnosed with ADHD, whereas in Germany, a lower prevalence rate of 2.5% of children aged 3 to 17 years was reported for 2012 (Davidovitch et al., 2017).

According to a previous report by Hoseini et al. (2014), there are estimations that between 5.4% to 8.7% of children in Africa present with ADHD symptoms, making it one of the most commonly diagnosed neurodevelopmental conditions on the continent. More recently, Ayano et al. (2020) indicated that 7.47% of children in Africa are diagnosed with ADHD. Information from 2020 suggests that 5 - 7% of children in South Africa present with ADHD with approximately 5 - 8% of children in the Foundation Phase showing ADHD symptomology (ADHASA, 2020; Chinawa et al., 2014; Perold et al., 2010). Although these rates may inform current prevalence rates, data is scant with limited studies presenting findings on prevalence rates for the different provinces of South Africa. For example, one study identified that between 6 – 11% of children in grade one in the Free State were identified with ADHD (De Milander et al., 2020), and a further study noted that 2.7% of children in the Western Cape presented with ADHD (Schoeman et al., 2018). In Gauteng specifically, prevalence rates between 4 - 7 % have previously been reported (Kern et al., 2015). Additional issues pertaining to epidemiology, such as diagnosis of ADHD, current treatment options, and barriers to treatment, will be discussed in Chapter Four.

Risk Factors for ADHD

Notwithstanding the pathophysiology described in Chapter One, research suggests various factors occurring throughout an individual's life that may place a person at risk for developing ADHD (APA, 2022). The interplay between maladjusted environmental influences and neurobiological structures are important factors to consider when planning treatments (Hinshaw, 2018; Russell et al. 2019). With this in mind, various risk factors are described below.

Prenatal, Neonatal, and Early Childhood Risk Factors

Several prenatal, neonatal and early childhood risk factors have been identified in literature (Dooley et al., 2023; Shishido & Zabel, 2022).

Prenatal Risk Factors. There are several prenatal risk factors for the development of ADHD. According to the DSM-5-TR, although most children with very low birth weight (less than 1500 grams) do not develop ADHD, there remains some risk for this outcome (APA, 2022). In addition, premature birth and postmature birth are considered possible prenatal determinants for the child being diagnosed with ADHD (Corrigenda, 2018; Franz et al., 2018; Guney, et al., 2015; Hanć, 2018; Rommel et al., 2017). However, although it was previously considered a risk factor for the development of ADHD, results relating to intrauterine growth restriction to the development of ADHD are inconsistent (Chen et al., 2016; Dooley et al., 2022; Dooley et al., 2023; Heinonen, 2010).

Comparatively, as related specifically to maternal health during pregnancy, research shows the effect of maternal prenatal viral infections as possible prenatal determinants, including genitourinary infections during the second or third trimesters, and respiratory infections during the second trimester when accompanied by fevers (Ayubi & Mansori, 2022; Walle, et al., 2022). Additionally, pre-eclampsia during pregnancy, as related to hypertension, is shown to be a risk factor for ADHD in the child later in life (Han et al., 2021). Relatedly, various studies have found relationships between maternal hypertension occurring in isolation and development of ADHD in children (Maher et al., 2018; Pohlabeln, et al., 2017).

By the same token, studies have shown a link between maternal depression perinatally, with exposed children presenting with ADHD later in childhood (Han et al., 2021; Wolford et al., 2017). Other studies indicate that both paternal and maternal depression increases the likelihood of a child being diagnosed with ADHD, although the presence of maternal depression is more directly influential in the development of ADHD (Cheung et al., 2018; Rasic et al., 2014; Robinson et al., 2022; Tucker et al., 2021; Wolford et al., 2017). With regards to maternal depression, the effect of stress during pregnancy, in addition to

maternal depression after pregnancy, has also been related to children being diagnosed with ADHD (Say et al., 2016). Relatedly, less support for mothers from depressed fathers during the pregnancy could have adverse effects on the developing foetus, with studies linking paternal depression as a risk factor for the development of ADHD in children (Gentile & Fusco; 2017)

Further, research has shown that maternal diet (Galera et al., 2018; Li et al., 2019; Rijlaarsdam et al., 2017) and exposure to neurotoxins during pregnancy (including lead, mercury and polychlorinated biphenyls; Pessah et al., 2020; Smith, 2017; Xi & Wu, 2022) are risk factors for ADHD in the developing child. Maternal alcohol use during pregnancy has also been linked to the development of ADHD in some studies (Driga & Driga, 2019; Pagnin et al., 2019), although this is inconclusive in other studies (Eilertsen et al., 2017; Garrison-Desany et al., 2022). Additionally, exposure to tobacco (or smoking) during pregnancy has been identified as a possible determinant of the development of ADHD (Huang et al., 2017; Smith, 2017; Zhu et al., 2014) with concurrent substance use during pregnancy, particularly alcohol and opioids as well as cannabis and opioids, placing children at a compounded risk for the development of ADHD (Garrison-Desany et al., 2022; Tadesse et al., 2024). Interestingly, contradictory results shows only a negligible risk, at best, for the development of ADHD following maternal use of cannabis in isolation prenatally (Andrade, 2024; Tchuente et al., 2022). Also, extremely high levels of coffee consumption (more than eight to ten cups daily), especially in early pregnancy, is a further risk factor for ADHD in children in some studies (Hvolgaard Mikkelsen et al., 2017; Linnet et al., 2009).

Neonatal and Early Childhood Risk Factors. Research conducted regarding likely neonatal determinants of ADHD include jaundice (Lipińska et al., 2021; Tsao, 2020), small size at birth (Lahti, 2006), diagnosis of hydrocephalus (Melaknia & Chalamalla, 2022; Shishido & Zabel, 2022), and the experience of colic in the neonatal period (Indrio et al., 2023; Vercruyssen, 2020). Interestingly, studies do not demonstrate a relationship between the development of ADHD and later milestone attainment (see Farran et al., 2020; Lee et al., 2021). In fact, research suggests that children later diagnosed with ADHD tend to reach their developmental milestones earlier, specifically with regards to walking (Hannigan et al., 2021).

However, pregnancy, birth-and early childhood-related issues are not the only risk factors associated with the development of ADHD.

Genetic and Environmental Risk Factors

A number of genetic and environmental risk factors are associated with the development of ADHD in children.

Genetic Risk Factors. Studies confirm an elevated risk for children to develop ADHD if one of their first-degree relatives has the disorder (Bigg & Faraone, 2018; Chudal et al., 2020; Grimm et al., 2020; Willoughby et al., 2019; Wüstner et al., 2019). Specifically with regards to sibling reoccurrence rates, research shows that having a sibling with ADHD places a child at a heightened risk for being diagnosed with the disorder while children with ASD are also at elevated risk for diagnosis of ADHD (Charman & Jones, 2018; Miller et al., 2018).

Relatedly, several psychological disorders, including ODD, CD, substance abuse disorders and antisocial behaviours, show a shared genetic origin with ADHD (Faraone & Larsson, 2019: Pettersson et al., 2016). It is suggested that genes responsible for encoding proteins or receptors in the serotoninergic, but more so in the dopaminergic systems, are implicated in the heightened genetic risk for ADHD with other disorders (Gatt et al., 2015).

Furthermore, the incidence of various rare genetic variants as well as genetic syndromes, such as Williams syndrome[20], tuberous sclerosis complex (TSC)[21], Fragile X syndrome (FXS)[22], and 22q11 deletion syndrome[23], are often identified in children with ADHD (APA, 2022; Grimm et al., 2020; Lo Castro, et al., 2011).

Environmental Risk Factors. Issues related to attachment are also identified as likely determinants of the development of ADHD (Frick et al., 2021; Rasmussen et al., 2021; Wylock et al., 2021). For instance, the early childhood relationship with parents, particularly those expressed as insecure and disorganised attachment styles, are associated with the presence of ADHD and attention difficulties more generally (Scholtens et al., 2014; Sempio et al., 2016; Storebø et al., 2016), despite a study by Hornstra et al. (2019) negating the effect

[20] **Williams Syndrome (WS)**: complex disorder presenting with various neurodevelopmental concerns (including developmental delay and mild intellectual disability), unusual personality traits, abnormalities with connective tissues, growth-related abnormalities, cardiovascular issues, joint hypermobility, and short stature (Morris, 2023).
[21] **TSC**: distinguishing characteristics include skin abnormalities, brain-related abnormalities (such as seizures and developmental delays), kidney and heart-related issues (Northup et al., 2021).
[22] **FXS**: considered the most common single genetic cause of autism and intellectual disability, FXS is noted by the following symptoms: repetitive behaviours, hyperactivity, problems with cognitive flexibility, seizures, increased anxiety, and hypersensitivity to sensory stimuli (Razak et al., 2020).
[23] **22q11 deletion syndrome**: characterised most often by chronic infections, congenital heart disease, feeding difficulties, speech and developmental delays, deficits in learning, and behavioural differences in children (Cortés-Martín, et al., 2022).

of attachment style on development of attention difficulties due to social desirability bias[24] and positive illusory bias[25].

Furthermore, children who have a history of adverse childhood experiences (ACEs) and who are exposed to trauma generally, including neglect, child abuse and developmental trauma, are at risk for later development of ADHD (and Major Depressive Disorder in some studies; Golm et al., 2020; Semiz et al., 2016; Stern et al., 2018; Zhang et al., 2022). Thus, ACEs present additional risk factors due to environmental, emotional, and social-related issues (Keefe et al., 2021; Lee et al., 2020; Nilsen & Tulvem 2020; Pitt School of Education Office of Child Development, 2016). Malhi and Bharti (2020) and Brown et al. (2017) concur, indicating that children who have experienced emotional, physical and sexual abuse are at risk for medical and mental health problems later in life and may display behavioural symptoms consistent with the diagnosis of ADHD.

Furthermore, there is an elevated risk for the development of ADHD (termed Secondary ADHD [s-ADHD]) following severe TBI (Asarnow, et al., 2020), with elevated risk for children who have experienced adverse life experiences and are from lower SES homes (Max et al., 2005; Max et al., 2022). Relatedly, a heightened risk for the diagnosis of ADHD is noted for children who experienced acquired brain injury resulting from hydrocephalus, with the diagnosis of ADHD being secondary to the brain injuries acquired as a result of hydrocephalus (Dasher et al., 2024; Maleknia et al., 2022). However, a decreased risk for s-ADHD is noted following mild to moderate TBI due to fewer changes in the neurological structures associated with higher order functioning (Ryan et al., 2023). Researchers found that children with s-ADHD and TBI could be at increased risk for the development of noteworthy impairments in the early adolescent years as the children move to more autonomy from more controlled environments of pre-adolescence (Narad et al., 2020).

Correspondingly, there are other likely and confirmed environmental-related determinants of ADHD such as the occurrence of childhood obesity, congenital heart disease and coronary disease as co-morbid conditions with ADHD (Czobor et al., 2021; Leppert et al.,2021; Tang et al., 2023). Additional influences on ADHD symptoms also include sleep disorders, hearing and visual impairments, deficiencies in nutrition, and idiopathic epilepsy (Ahmed et al., 2022; APA, 2022) with poor diet shown as central to the development of

[24] **Social desirability bias**: the tendency of a person to present themselves in a particular manner to appear more favourable to others (Crowne & Marlowe, 1964).
[25] **Positive illusory bias** occurs when an individual over-estimates their own abilities and skills (Abu-Ramadan, et al., 2023).

ADHD (Ji et al., 2018; Lipińska, 2021). Relatedly, the incidence of Klinefelter Syndrome[26] has also been identified in children with ADHD (Lo Castro, et al., 2011).

As the known risk factors of and epidemiology for ADHD have provided a context for reference, the aim, method, results, and discussion of Study One will now be presented.

Aims

Given the limited information available regarding prevalence rates of ADHD in South Africa and specifically in Ekurhuleni, Gauteng, the aim of Study One was to explore the extent of attention problems and possible risk factors for such problems, in a sample of Foundation Phase learners from low SES communities. Study One also aimed to compare those identified as having possible attention problems with those who did not across a range of measures of such challenges and possible risk factors. Study One laid the foundation and served as a preliminary study for Study Two, which is focused on the implementation of a teacher-led BPT programme delivered to parents of children with diagnosed attention difficulties.

Method

Study Setting and Design

Study One was quantitative and descriptive. As mentioned previously, children from disadvantaged areas, such as informal settlements, often have limited access to assessment and treatment for ADHD (Schoeman et al., 2018) and are therefore likely to be undiagnosed in terms of ADHD. Thus, the school site was determined based on the child and parents' SES, with many of the children and their parents residing in lower income areas, including Reiger Park, Angelo Squatter Camp, and Delmore Park, and being representative of other low SES areas.

Gauteng is the most populous of South Africa's nine provinces with approximately 15 million people residing within its borders, characterised by large disparities regarding quality of life across the province (Ndagurwa et al., 2024; Statistics South Africa, 2021). Ekurhuleni, one of the metropolitan areas of Gauteng, consists of major cities and towns, such as Boksburg and Benoni (Bonner & Nieftagodien, 2012). According to the latest available statistics, 53.8% of residents in Boksburg have access to plumbed-in water (piped water inside the dwelling), and 69% of residents have access to electricity (Statistics South Africa,

[25] **Klinefelter Syndrome (KS)**: a chromosomal disorder found in some males: characterised by small testes, less body and facial hair, less muscular body, increased breast tissue, and broader hips (Sinéad et al., 2019).

2021). Reiger Park, a suburban area in the Ekurhuleni city of Boksburg, renowned for gangsterism and instability, houses mixed-race inhabitants in Gauteng who speak a diverse array of languages, including English (Nelson, 2013). Moreover, the informal settlements[27] of Angelo Squatter Camp[28] and Denmore Gardens also lie near Reiger Park in Boksburg, Ekurhuleni.). Despite the lack of municipal services for residents, statistics from 2023 determined that 91.2% of households in South Africa used mobile phones exclusively, with 96.1% of households owning at least one mobile phone, and 76.2% of households in metropolitan areas having access to the internet (Statistics South Africa, 2023).

Importantly, the current study took place and had to be adapted for implementation with the COVID-19 lockdown, which prohibited in-person (face-to-face) contact with children, their parents and teachers from state schools.

Sample

The target sample for Study One is in line with recommendations of White Paper 6 [29] and due to the age ranges of the data measures employed: children aged between 8 and 12 years of age attending a school educating children from low SES settings in Ekurhuleni. With this in mind, to identify the child participants for Study One, a total of 120 invitations were circulated to parents at the school from May 2020 to May 2021, with 53 completed responses received by May 2021. Furthermore, to provide information related to the child participants' background history and problems at home, parent participants were included. Teacher participants were involved as they could indicate difficulties which child participants experienced in the school setting.

Participant Recruitment

I delivered invitation letters to the school for teacher and parents of child participants to take part in Study One. Parent letters were circulated to parents by Foundation Phase teachers with child participants being recruited through this same process. The deputy principal of the school shared teacher participant letters with teachers for their inclusion.

[27] **Informal settlements** are established when residents erect shacks in which to reside on land which is not inhabited. Residents are usually poor (Nkoane, 2019).

[28] **Squatter camps** are informal settlements in which conditions of basic housing are lacking in at least one regard, such as lack of access to water or sanitation (University of Dublin, Trinity College, 2015).

[29] **White Paper 6** is a policy implemented by the South African government in 2001 outlining recommendations regarding inclusive education. The document states that, with early intervention, children in the Foundation Phase could attain more favourable outcomes for academic success and their futures (Department of Education, 2001).

Measures

To establish whether a child may be diagnosed with ADHD, a comprehensive assessment would be required which should include the following: use of a reliable rating scale for ADHD (based on DSM-V TR diagnostic criteria), cognitive assessment (with subtest scores indicating areas of weakness often associated with children presenting with ADHD), scholastic assessment (due to the possibility of a co-morbid learning disorder) and emotional evaluation due to possible emotional co-morbid conditions (Kevill, 2012). In the past, the following measures were recommended by American medical societies, such as the American Academy of Pediatrics and the American Medical Association: rating scales completed by parents and teachers, and measures to determine differential diagnoses and developmental testing (Gualtieri & Johnson, 2005). Further to this, clinical observations would be noted through working directly with the child and could include aspects related to the child's interaction with the observer, speech production, behaviour and other similar aspects (Staff et al., 2021). Likewise, reports which are usually completed by parents, teachers and the children themselves through the use of standardised rating scales, provide insight into how the child is perceived by themselves and others and, when combined with clinical observations and background information, could provide insight into the child's difficulties. However, it is worth noting that the commonly accepted practice of clinical observations and direct reports by parents, teachers and young people is subjective (Hall et al., 2014).

Recent research indicates that the use of behaviour rating scales in addition to neuropsychological testing are widely used for diagnosis of ADHD (Visser at al., 2015). As such, I administered the Brown Executive Function / Attention Scale (Parent, Teacher and Self-Report Forms) to initially identify attention difficulties and subsequent follow-up, with additional assessment instruments and rating scales to parent and child participants during the interviews to provide supplementary information that could be useful in identifying attention difficulties. These included the Child Behaviour Checklist (CBCL), Positive and Negative Affect Schedule for Children (PANAS-C), a developmental questionnaire and verbal observations. The selected measures could be administered remotely (telephonically and virtually) according to COVID-19 lockdown restrictions to all participants. These are described below.

Measures Identifying Attention Difficulties. Various standardised measures were employed to identify attention difficulties.

Brown Executive Function / Attention Scales (Brown EF/A; Parent, Teacher and Self-Report Forms). These rating scales were developed for use by parents, teachers and children to identify 18 core behaviours associated with ADHD in line with DSM-5 criteria (Pearson Education, 2019). The scales, which focus on the severity of symptoms, can be administered to children from 3 to 18 years of age, and contain parent, teacher, and child self-report scales for children from 8 years of age. The scales can be administered in-person, telephonically, or virtually, and are used to screen for symptoms of ADHD and related difficulties, in addition to monitoring response to treatment. They further address situational variability as children with ADHD tend to find it easier to focus on tasks which they find interesting (Pearson Education, 2019).

Studies reveal a correlation between the Brown EF/A Scales and other widely used ADHD screening scales, such as the Behaviour Assessment System for Children – Third Edition (BASC-3), Behaviour Rating Inventory of Executive Function 2 (BRIEF2) and Conners-3 (Brown, 2019; Pearson Education, 2019). Sex-specific and combined sex norms are available for each age group. Additionally, internal consistency measures between 0.74 and 0.98 were obtained for the standardisation sample of the Brown EF/A Scales and between 0.70 to 0.97 for the clinical sample (Brown, 2019 & Pearson Education, 2019). Test-retest reliability coefficients at 1 – 4 weeks are 0.71 to 0.95, make the scales ideal for use as a pre- and post-intervention tool (Brown, 2019). In addition, inter-rater consistency levels are good (Brown, 2019).

Although the rating scales are available in traditional pen-and-paper as well as the online formats, using the Q-Interactive platform of Pearson Assessments, the pen-and-paper format was utilised in Study One, through completion of the relevant rating scale; filling in of the related hand-scoring worksheets for each scale then consulting the norms for each age category: either 8 - 9 years, or 10 -12 years. All child participants were scored according to norms for their sex, as indicated by parents.

Although no studies could be found regarding the use of the Brown EF/A Forms in South Africa, the clinical sample utilised during the development of the measure included individuals from a range of demographic groupings, including different racial groups (Brown, 2019).

In terms of scoring, T-Scores of 70 and above are considered indicators of very significant problems (markedly atypical); 60 – 69 show significant problems (moderately atypical); 55 – 59 display possible significant problems (somewhat atypical), and scores of 54

and below are suggestive of an unlikely significant problem (typical presentation; Brown, 2019).

Measures Identifying Collateral Information. In addition to attention problems being identified, collateral information was also considered in providing a fuller understanding of the child's difficulties as well as risk factors for the presence of attention problems.

Child Behaviour Checklist (CBCL). The Child Behaviour Checklist (CBCL) Parent Report Form consists of two age-range (preschool and school age) specific assessment measures in the Achenbach System of Empirically Based Assessment (ASEBA): three forms used for preschool children, and the CBCL School Age (CBCL/ 6 – 18). The latter was utilised in Study One. The CBCL/6 - 18 is used for children from 6 years of age to 18 years of age. It consists of the Parent Report Form which is completed with parents (CBCL/ 6 – 18), the Teacher's Report Form 6 – 18 (TRF 6 -18) which teachers complete, and the Youth Self Report 11 – 18 (YSF 11- 18), which is completed by children aged 11 years to 18 years.

The empirically based syndrome scales of all three of the ASEBA assessments identify problems in the following areas of the child's functioning: Withdrawn/ Depressed, Anxious/Depressed, Social Problems, Somatic Complaints, Attention Problems, Thought Problems, Aggressive Behaviour and Rule Breaking Behaviour. All three ASEBA assessments comprise items consistent with the following DSM-5 categories: Attention Deficit/Hyperactivity Problems, Depressive Problems, Somatic Problems, Anxiety Problems, Oppositional Defiant Problems, Obsessive-Compulsive Problems, Conduct Problems, Stress Problems, and Sluggish Cognitive Tempo (www.aseba.org). Symptoms are grouped according to Internalising, Externalising, Total, and Other problem groupings / Syndrome scales.

The CBCL items are each rated on a three-point scale, with indications of "not true", "somewhat true" or "very true/ often true" with which respondents denote the frequency of each specific behaviour or emotion for the 6 months preceding administration of the CBCL.

Although the CBCL is widely used across the world and in South Africa, no norms have yet been identified for the South African population (Louw, et al., 2016). With a high test-retest reliability range of 0.93 to 0.94, and inter-rater reliability of 0.93 to 0.96, the CBCL measures children's behaviour consistently across a period of time (Achenbach et al., 2003). Furthermore, as consistency values lie between 0.71 and 0.89, the CBCL is considered a suitable indicator of aspects related to children's behaviours. Cronbach's α values fall

within the range of 0.72 - 0.97 signifying good internal consistency among items (Achenbach & Rescorla, 2011; Nakamura et al., 2008).

Due to time constraints as well as the employment of the standardised Brown EF/A Scales and other evaluation measures, parents or caregivers were contacted telephonically or virtually to complete only the items in the CBCL/ 6 – 18 Parent Report Form which related to symptoms consistent with attention deficit problems.

Positive and Negative Affect Schedule for Children (PANAS-C). The 10-item Positive and Negative Affect Schedule for Children (PANAS -C) is a widely used self-report psychometric tool to measure affect and it consists of two scales (Serafini et al., 2016). First, the Positive Affect (PA) subscale assesses the child's positive attributes and is described by the following terms, inter alia: attentive, enthusiastic, excited, and determined. By comparison, the Negative Affect (NA) subscale provides information about the child's negative emotions and can be described by the following attributes: hostile, irritable, distressed, and upset, among others (Watson et al. 1988).

The PANAS-C has previously been used in South Africa with each subscale functioning similarly across sex and ethnicity (Guse & Van Zyl, 2018). With test-retest reliability factors ranging from 0.68 to 0.71, and consistency values between 0.87 and 0.88, the PANAS-C is considered a reliable and consistent measure of children's emotional states (Watson et al, 1988). The test meets acceptable internal consistency levels with Cronbach's α-values between 0.86 and 0.89 (Ebesutani, 2012).

The PANAS-C was conducted with child participants telephonically/ virtually and results were used to indicate whether there were emotional concerns which needed further investigation, thus warranting referral of child participants to suitable specialists or state hospitals or clinics. The PANAS-C is reproduced as Appendix A for reference.

In addition to the three scales described above, non-standardised measures were also utilised to provide information about the child participants: firstly, with completion of the developmental questionnaire and, secondly, through me noting verbal observations made by child participants during their interviews.

***Developmental Questionnaire*.** According to Brown (2013), background information for the child or individual presenting with attention problems is best derived through an extended clinical interview (approximately two hours long). The developmental questionnaire (Appendix B) was only administered telephonically / virtually to parents of children whose scores for the Brown EF/A Parent and Teacher Scales and CBCL fell within the clinical

ranges (Brown EF/A: composite T-score above 50; CBCL scores T-scores above 65), according to printouts or scoring sheets.

The developmental questionnaire is an abbreviated version of the one used at the paediatric neuropsychology clinic at the Red Cross War Memorial Children's Hospital in Cape Town, where my research supervisor is also a clinical supervisor. Questions were focused on gaining an understanding of the child's current functioning, background and developmental history and information which would be used to identify possible stressors and/or predictors of the child's current functioning (such as home, school and pre-school histories, including prenatal development and attainment of milestones). Family histories of learning, behavioural or emotional problems were considered as these could indicate possible elevated risk for the child. The length of the telephonic/ virtual contact depended on how much time parents had available as well as additional questions I needed to ask parents, after consideration of information provided to me in the questionnaire.

***Observations of Verbal Behaviours*.** Before restrictions were imposed by the Gauteng Department of Education (GDE) on the mode of interaction with child participants, planned observations of verbal and non-verbal behaviours formed part of the proposed assessment process for ADHD in the current study (McConaughy et al., 2009; Shapiro & Heick, 2004; Staff et al., 2021). However, this was amended in light of the COVID-19 restrictions, to exclude all non-verbal, in-person / direct observations, with the final Observation Checklist (Appendix C) utilised during the telephonic or virtual child participant interviews.

In the checklist, I noted the display of specific behaviours which I have noted as possibly being related to attention problems from my own previous experience in practice (as an Educational Psychologist registered with the Health Professions Council of South Africa - HPCSA) as well as diagnostic criteria for ADHD. These latter criteria included, but were not limited to, the child participant not seeming to hear or understand items and instructions, showing excessive talkativeness, asking for items to be repeated, interrupting when items were read, or instructions explained, and answering impulsively. It was also noted if the child seemed to have difficulty with speech or appeared to have possible hearing-related problems. This information was used in conjunction with information from other measures for referral purposes.

Speech or hearing-related problems were differentiated from inattention difficulties through consideration of collateral information, including information provided by parents in their interviews on the existence of hearing problems. Accordingly, I noted when children expressed each of the behaviours indicated on the Observation Checklist as an indication of

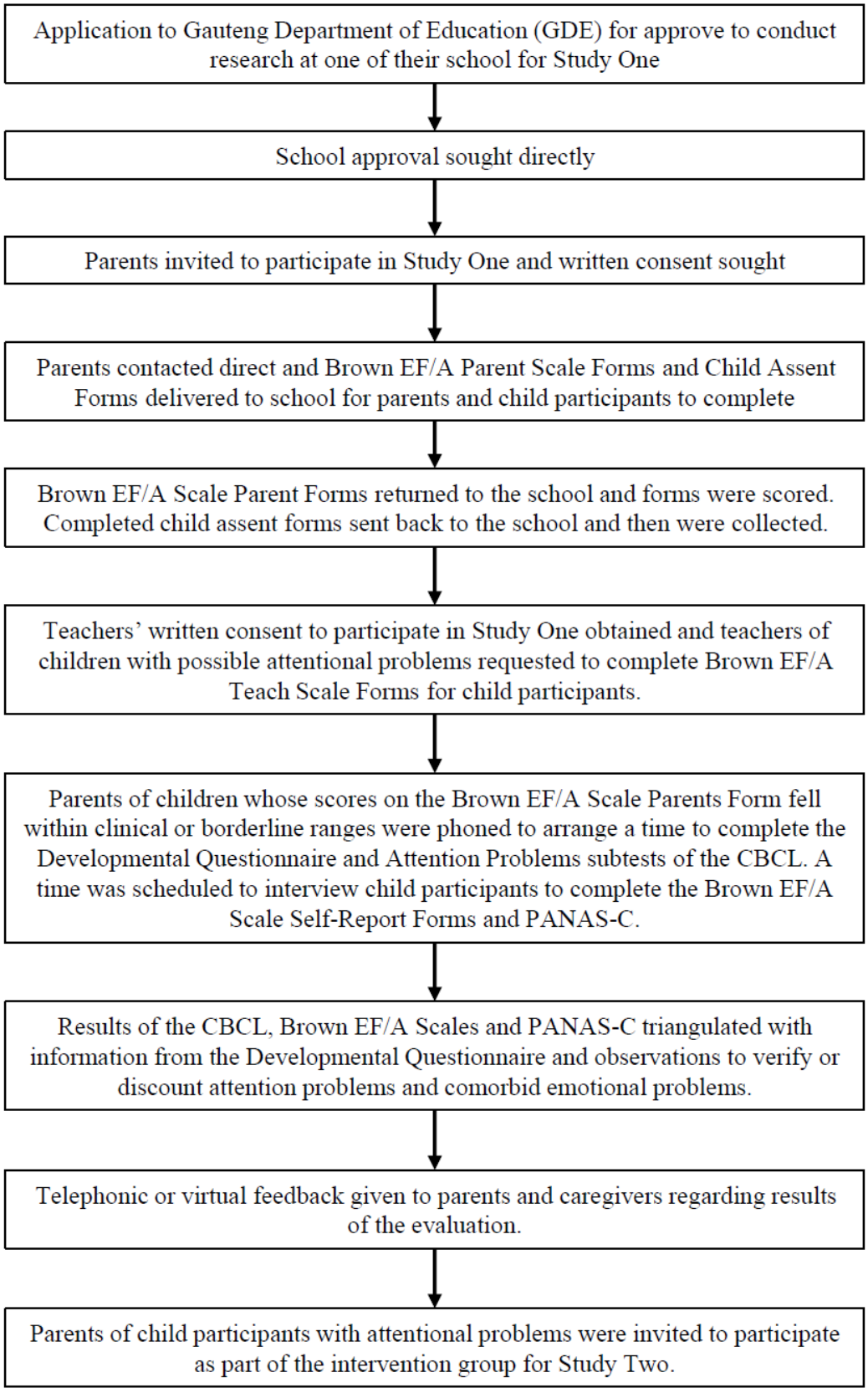
possible inattention-related behaviours. However, it is noted that this non-standardised measure could only provide collateral information for the screening of attention-related problems and may not constitute / replace actual clinical observations, given the manner in which data was obtained due to contact restrictions resultant of COVID-19 restrictions.

Procedure

Due to time constraints and GDE and COVID-19 related restrictions for working with research participants during the time in which the research was conducted (February 2020 – October 2021), but in line with the above diagnostic practices, a comprehensive interview was conducted virtually or telephonically during which the various assessment instruments and rating scales were administered to parents / caregivers, and child participants. Figure 1 depicts the various steps involved in Study One and is elaborated on below.

Figure 1

Flow Chart Detailing Overview of Procedure in Study One



Following approval from the UCT Research Ethics Committee (REC; reference number: PSY2020-004; Appendix D), I contacted the GDE by email, requesting permission to conduct research at one of their schools which was selected due to many of the learners residing in low SES areas in Boksburg. Initially, I contacted three schools with learners from disadvantaged areas in Boksburg, to determine if they would be interested in participating in Study One. However, as sufficient responses were received from one school which educated children from the aforementioned areas, it was not necessary to further any contact with the other schools and this information was shared with the schools in question. This proved to be more convenient for planning and implementation of training sessions as well as collection of completed forms as parent and teacher participants were sampled from the same school. Furthermore, this supported limitations of interpersonal contact according to the COVID-19 lockdown measures at the time of data collection.

Permission was granted (reference number: 8/4/4/1/2; Appendix E) with the following important restriction in place: research could be conducted between the second week of February and start of term four (October) [30] as the GDE does not permit research with learners during the final term, as this may impact on preparation for final examinations. Next, I contacted the school directly where I initially met with the principal and deputy principal, and later with the School Governing Body (SGB), to explain the nature of the research as well as outline the research process. Approval was then gained from the SGB (signed consent letter: Appendix F)

Initially I planned to commence Study One in April 2020 after learners had returned from first term school holidays as this complied with the time restrictions of the GDE for conducting research at one of their schools, and it would also allow teachers time to become more familiar with learners in their classes. However, due to the COVID-19 pandemic lockdown and school closures at the end of March 2020, this start date was postponed. Study One was further delayed as learners started returning to school in groups on a rotational basis[31] from August 2020. Due to concerns around teachers being unable to complete questionnaires to provide fair reflections of the learners' difficulties after only being in their

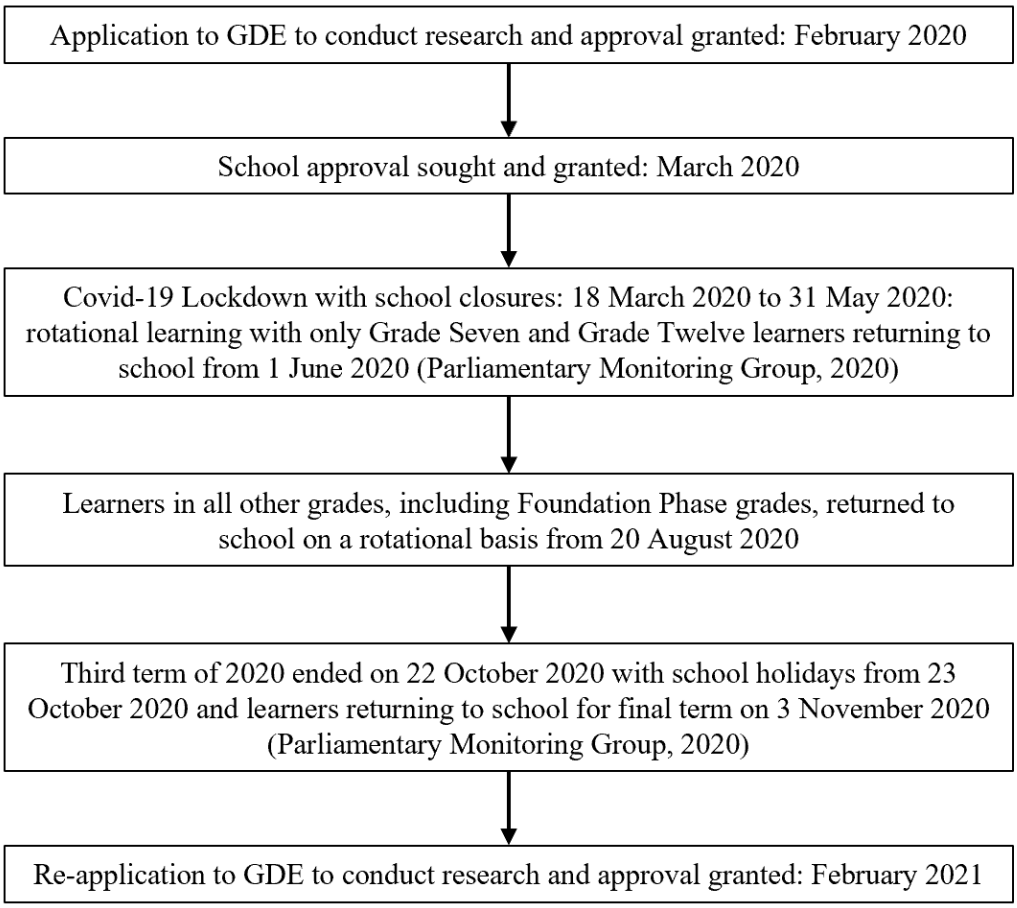
[30] The **school year** in South Africa is divided into three or four terms with the school year spanning from January to December. Most state schools follow a four-term planner. Term One usually starts in January and ends towards the last week of March. Term two starts around mid-April and ends usually in June. Term Three starts mid-July and finishes towards the end of September. Term Four starts around the second week of October and ends the school year at the beginning of December. Term dates change from year to year.

[31] Learners returned to some schools on a **group rotational basis** to limit their contact with other learners and teachers. This could include one group of learners in a class only attending school physically on some days of the week or attending school physically every second week.

company for a few weeks before the start of Term Four, the study was postponed, to commence in February 2021. Figure 2 shows the impact of the school closures due to COVID-19 on commencement of Study One.

Figure 2

Flow Chart Showing the Timelines and Delays due to COVID-19 Restrictions



After approval was again received from the GDE to continue the research in 2021 (Appendix G), at that time the GDE placed restrictions on face-to-face interactions with parents, children and teacher participants. As the original study planned to include a psycho-educational assessment as part of the diagnostic process which would include face-to-face contact with learners, this was altered due to the GDE research COVID-19 restrictions which only allowed virtual/ telephonic contact with learners, parents and teachers. Consequently, the research protocol was amended in April 2021 and approved to accommodate screening for attention difficulties which could be conducted telephonically or virtually with parent and child participants.

As I was not allowed direct access to learners, parents and teachers, I delivered 120 invitation letters (Appendix H) to the school to distribute to parents and teachers to participate in Study One (Appendix I); envelopes addressed to me were also provided which could allow parents and teachers to return their replies to the school in a confidential manner and without in-person contact. In accordance with COVID-19 regulations, I printed the invitation letters myself in my sanitised office environment and prepared these with envelopes stapled to the letters, then packed these in a separate space in my office cupboard two weeks in advance of the delivery dates. Likewise, when I collected the responses and closed envelopes, I packed these in the same separate cupboard area of my office and did not handle the envelopes or forms for two weeks after collecting, according to COVID-19 procedures.

The original sampling method I planned to employ was snowball sampling which could allow children in one grade to receive invitations and, should there be insufficient numbers, children in the next grade within the Foundation Phase could be included. However, the teachers at the school misunderstood instructions and sent letters to children whom they suspected to have attention difficulties (albeit undiagnosed), employing a purposive sampling method. This was shared with me after a few weeks had passed and 21 parents had already indicated their willingness to participate. I then clarified with teachers that all children in a grade were to receive invitations using the snowball sampling method, and this was employed in the recruitment process for the remaining 50 participants.

Nonetheless, parents of child participants who indicated their agreement to participate completed reply-slips from the invitation letters and sent these back to school in the envelopes provided to their children's teachers, and teachers sent these directly to the school's principal. Teacher participants who consented to participate also sent their completed reply-slips in the provided envelopes to the principal. After I had collected these from the school's principal and collated the information, I delivered the Brown EF/A Scales Parent Forms to the school's principal who forwarded them to the child participants' teachers to distribute to consenting parents of child participants to complete as well as Assent Forms (Appendix J) for each child participant to complete. Once they completed these and sent them back to their children's teachers, who sent them on to the school's principal, I collected these and scored each one.

After I scored these measures, I contacted parents of children whose scores fell within the clinical ranges telephonically to arrange a virtual/ telephonic interview. During these interviews, I administered the following measures to determine whether child participants

could be diagnosed with attention problems: the CBCL and a developmental questionnaire (Appendix B), which I used to guide an in-depth parent interview. Parents were also thanked for their time and informed that telephonic/ virtual feedback would be provided once all information from the various sources was collated.

Thereafter, I scheduled a separate time to assess child participants virtually/ telephonically during which we completed the items of the Brown EF/A Self-Report Form and PANAS-C. After obtaining their verbal assent for participation, rapport was established by thanking each child participant for assisting me in completing my *university homework task* and asking children to tell me about themselves. Although some interviews occurred over WhatsApp video call and Zoom meetings, telephonic contact seemed to work more effectively than virtual contact over Zoom, WhatsApp video call or Teams, as parents often had limited access to data and this manner of contact was not impacted when loadshedding [32] occurred. At this stage of the research, network data was not allocated to participants. Overall, there did not seem to be any major differences in participation between video and telephonic contact.

Furthermore, teachers of child participants whose scores for the Parent and Self-Report Brown EF/A Scales Forms and CBCL were within the borderline or clinical range, and teachers of any other children who were suspected of having attention difficulties were asked to complete the Brown EF/A Scales Teacher Form for each respective child. Thereafter, results of the Brown EF/A Scales and the PANAS-C were scored according to the manual guidelines, and results of the CBCL/ 6 – 18 were computed online via the ASEBA online portal. Data was then triangulated with information from the developmental questionnaire and verbal observations made during the child interviews, to identify child participants with attention difficulties and possible co-morbid conditions.

Finally, parent and caregiver participants were contacted telephonically to share the results of the findings of the various assessment instruments employed, and those whose children presented with clinically significant indications of attention difficulties across various measures, as assessed by me in my professional capacity as a registered Educational Psychologist, were invited to participate in Study Two.

[32] **Loadshedding** is a state-implemented electrical energy reduction measure during which electrical supply is disconnected from geographic areas on a rotational basis for a period of time, usually from two to four hours. During this time, internet connections are less stable than cellular network connections. Load shedding occurs in stages, with higher stages indicating longer periods of no access to electricity.

Statistical Analysis

Data was analysed using SPSS Version 25. First, I present a range of descriptive statistics for the sample, including the frequency at which attention problems were identified in the sample. I then divided the sample into two groups: the child participants identified as having attention difficulties and the child participants who did not present with attention difficulties to compare the incidence of risk factors and associated difficulties. As there was a relatively large difference in group sizes, it was important to determine whether parametric measures could be employed in data analysis. With significance levels of lower than 0.001 ($p < 0.001$), data was determined not to be distributed normally, according to the Shapiro Wilks test on SPSS. As such, non-parametric measures were thus employed: the Mann-Whitney *U*-test in cases of continuous variables with means indicated and Chi-square / Fisher's Exact Test with cross-tabulations and means for categorical variables. In all instances, exact significance (2-tailed) of 0.095 ($p = 0.05$) was considered.

Ethical Considerations and Permissions

Approvals

Approvals were sought from different organisations before commencement of Study One, including from UCT, the GDE, and the school.

Ethical Approval from UCT. Approval for Study One was obtained from the UCT Research Ethics Committee (REC) in June 2019 following submission of the research proposal for the current dissertation. During this process, I was afforded the opportunity to explain the research and answer questions related to the research to a panel comprising senior academic staff of the UCT Psychology Department. Approval was then granted (reference number: PSY2020-004; Appendix D) with amendments to the study approved on 2021-04-29.

Approval from GDE. In addition to the approval from the UCT Department of Psychology's REC, permission was also needed from the GDE to conduct research at one of their schools. To this end, I contacted the GDE directly and requested permission through completion of the GDE Research Request Form in February 2020. Permission was subsequently granted (reference number: 8/4/4/1/2; Appendix E). However, due to COVID-19 lockdown restrictions, research could not commence as previously explained. Permission was requested again in February 2021 and granted with restrictions imposed on face-to-face contact with parents, teachers and learners in line with COVID-19 restrictions (Appendix G). Again, further permission was requested and obtained in February 2022 to complete Study One (Appendix K).

Approval from the School. Permission was granted by the school and the principal at that time and the SGB representative signed the consent form (Appendix G).

Participant Permissions and Considerations

Participant Rights. Informed consent was obtained from parents of child participants and from teachers, and assent was granted by child participants for their own participation. Consent forms included information about how the research would be used, who would have access to the information of the research, as well as a detailed description of the research process. In addition, risks and benefits of participation were explained. Participants were informed that their participation was voluntary, and they had the right to withdraw from the study at any stage of the research. Participants were further notified that their identities would not be disclosed and were also informed of their right to privacy and confidentiality (Cohen & Swerdlik, 2010). Information was shared in an age-appropriate manner with child participants. Consent and assent forms as well as letters requesting participation that were used in the study are attached as addenda (Appendices F, H - J).

Risks and Benefits to Participants

Considerations for the School. The school was made aware of the following risks, harms and inconveniences following participation in Study One: there could be the risk of possible loss of confidentiality when teachers, parents/caregivers, and their children participate. However, to minimise this risk, I collected all completed documentation personally and ensured that teachers and parents were provided with envelopes to put completed forms into and seal, before sending these back to the school for me to collect.

On the other hand, there were several benefits for the school. This included selected children attending an interview during which attention difficulties were identified which assisted in early detection of possible problems, and referral for assistance where indicated.

Considerations for Parents of Child Participants. Numerous risks needed to be considered by parents of child participants. For instance, they could feel uncomfortable attending the virtual/ telephonic interview if someone interrupted them; however, to minimise this risk, parents were encouraged to select a more private venue in their homes or workplaces should this occur. Additionally, I recognised that parents could experience emotional distress depending on the results of the evaluation of their child; if this happened, I would assist with parental guidance or counselling (in my capacity as a registered Educational Psychologist) at no cost to participants. Parents were also informed they would need time to complete the various questionnaires and to answer questions about their child's development and background; their child's teacher would become aware that the child was

participating in Study One and that, although I would take sufficient measures to safeguard information provided by parents and teachers, I could not guarantee that information would be kept fully secure.

Despite these risks and inconveniences, there were benefits for parents of child participants. For example, parents were made aware that, if their children presented with any significant attention or emotional difficulties, they would be informed of these at the conclusion of Study One. Additionally, they were provided insight into some of their children's difficulties.

Considerations for Teacher Participants. It was explained to teacher participants that they may need to complete questionnaires which would take some time. In addition, although I tried to ensure the confidentiality of information provided, I was unable to guarantee this as other persons were also involved in collection of forms, such as the school principal and parents who would be collecting forms from teachers.

Nonetheless, there were benefits for teachers to participate, such as being made aware of their learners' difficulties which could assist them in helping children to overcome these problems in the classroom.

Considerations for Child Participants. In an age-appropriate manner, it was explained to child participants in the letter of assent that they could feel uncomfortable attending the virtual/ telephonic interview if someone interrupted them. However, if this occurred, they were then encouraged to select a more private venue in their homes to complete the interview. It was further explained to child participants that they could experience some emotional distress depending on the results of the evaluation if their parents shared these with them and that I would assist with parental guidance with parents or counselling with child participants at no cost should this happen. Additionally, it was explained to child participants that some of the items presented in questionnaires could be difficult to answer. Issues related to loss of confidentiality were also explained to child participants in an age-appropriate manner.

However, despite the risks and potential harms, there were benefits for child participants, such as learning more about themselves from participation in Study One and possibly being assisted and helped by their teachers and other professionals if referred.

Data Management

Data was stored electronically on my laptop computer, which is password protected, as well as, where applicable, in hard copy handwritten notes taken by myself, the latter of which were locked in a secure cupboard in my office to which I alone have access. Data was

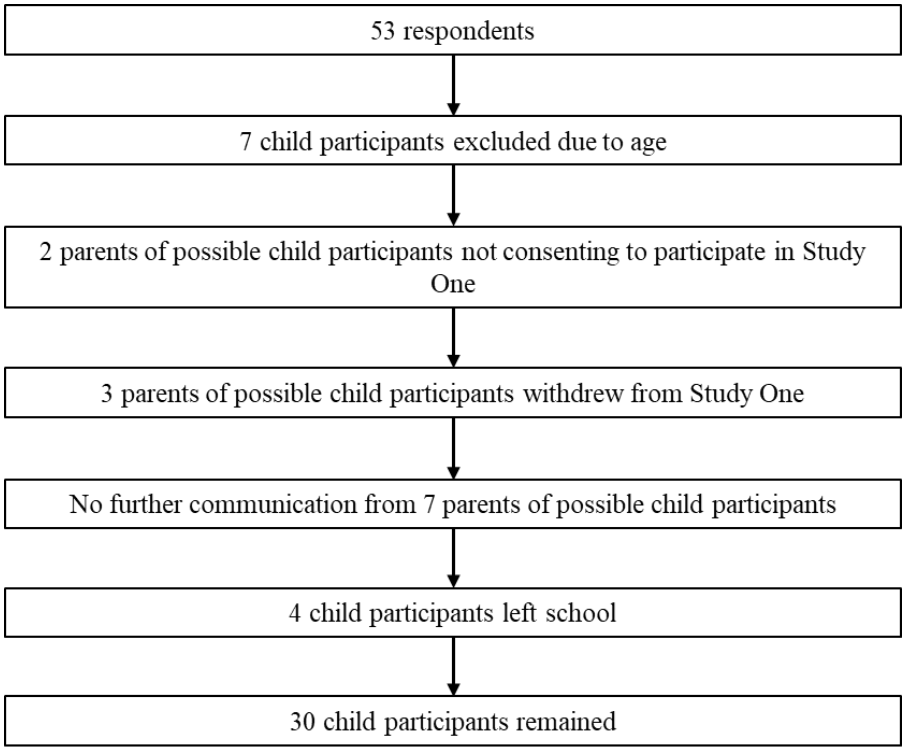
uploaded daily and encrypted using a secure cloud-based database management account to which I solely have access codes. In addition, only encrypted virtual platforms, such as Zoom or WhatsApp, were utilised for virtual interviews. Zoom has a further safety feature which is enabled on my paid subscription account which allows me to lock the meeting to only permit participants to gain access.

Results

A total of 53 parents responded to the invitation to participate in Study One. However, for reasons outlined in Figure 3, only 30 child participants remained, and are reported on here.

Figure 3

Flow Chart: Process of Recruitment of Participants



Note. Parent participants did not supply reasons for not consenting to participate or withdrawing from Study One.

Preliminary Analysis

The preliminary results of Study One are presented below. For ease of reference, data relating to the child participants who presented with difficulties with attention (*n*=22) are referred to as the ATT-DIFF group, and the group of child participants who did not present

with attention difficulties (*n*=8) are referred to as the No-ATT-DIFF group. Therefore, out of a sample of 30 learners, 73% present with attentional problems, which may indicate ADHD. I, of course, acknowledge the limitation imposed by the initial purposive sampling by the teachers.

I now consider data for both groups, together. Regarding the age of the child participants, the application of the Mann-Whitney *U*-Test (see Table 2) shows that there was a slight difference in the average age for the two study groups, with ATT-DIFF child participants being 7 months older than the No-ATT-DIFF group. This translates into the child participants in the ATT-DIFF group being, on average, about 9 years old, while those in the no-ATT-DIFF group were about 8.5 years old. However, the difference noted is not significant.

Table 2

Age of Child Participants in Study One: ATT-DIFF (n=22) vs. No-ATT-DIFF (n=8)

Variable	ATT-DIFF			No-ATT-DIFF			*U*	*p*
	M ***(m)***	***SD*** ***(IQR)***	**Range**	***M*** ***(m)***	***SD*** ***(IQR)***	**Range**		
Age [a]	108.27 (106.50)	9.61 (17)	96-128	101.00 (100.50)	2.62 (4)	97-105	53.50	.105

Note. Data are not normally distributed and hence, descriptive statistics include *m*=median and *IQR* =interquartile range in parentheses. Mann-Whitney *U*- Test utilised to determine statistical significance of group differences. *ATT*-DIFF: children with attention difficulties; No-ATT-DIFF: children without attention difficulties. [a] Age indicated in months; ages indicated on date of completion of child participant interviews

Tables 3 and 4 show that child participants and their parents also differed in other demographic variables. For example, descriptive statistics for the categorical variables reflected in Table 3 show that there were more males than females in the ATT-DIFF group (*n*=13/22 males; almost 60%) and more females than males in the No-ATT-DIFF group (*n*=5/8 females; 62.5%). However, this result needs to be interpreted cautiously given the small sample size of both groups with no significant association identified between sex and group (*p*= .417).

Regarding home languages, descriptive statistics show that more children in the ATT-DIFF group spoke English more than other identified languages. In contrast, more children spoke Sesotho as their home language (1 more than those who spoke English) in the No-ATT-DIFF group with the difference between the two groups not being significant (*p* = .393).

Table 3

Demographic Categorical Variables of Child Participants in Study One: ATT-DIFF (*n* = 22) vs *No-ATT-DIFF* (*n* = 8)

Variables	**ATT-DIFF (*n*=22)**	**No-ATT-DIFF (*n*=8)**	***p***
Sex of child participants			
Male	13 (59.09%)	3 (37.50%)	.417[a]
Female	9 (40.91%)	5 (62.50%)	
Home language of child participants			
English	8 (36.36%)	2 (25.00%)	.393[a]
Sepedi	4 (18.18%)	0 (0.00%)	
Sesotho	4 (18.18%)	3 (37.50%)	
isiZulu	3 (13.64%)	1 (12.50%)	
isiXhosa	2 (9.09%)	0 (0.00%)	
Xitsonga	1 (4.55%)	2 (25.00%)	

Note. ATT-DIFF: children with attention difficulties; No-ATT-DIFF: children without attention difficulties. Data presented as count (%). [a] Fisher's exact test run as more than 20% of cells have an expected count of less than 5.

Further to this, the demographic information of parents of child participants is summarised in Table 4. Although all information regarding parental educational levels is presented, there are some findings worth noting. For example, there were 2 parents in both groups who were full-time students, and 4 parents working as housekeepers/ cleaners at the time of the study. Another 6 parents were general workers (including administration- and sales-related workers) while 4 parents were unemployed. Regarding educational levels, although most parents completed compulsory education (12 years), some mother participants were unaware of the educational levels of some of the child participants' fathers.

Table 4

Demographic Variables of Parents of Child Participants in Study One: ATT-DIFF (n =22) vs No-ATT-DIFF (n=8)

Variables	ATT-DIFF		No-ATT-DIFF	
	Parental highest levels of education			
	Father	Mother	Father	Mother
0 – 11 years	2 (9.09%)	3 (13.64%)	1 (12.50%)	0 (0.00%)
12 years	9 (40.91%)	8 (36.36%)	6 (75.00%)	5 (62.50%)
13 years +	9 (40.91%)	9 (40.91%)	1 (12.50%)	3 (37.50%)
Unknown	2 (9.09%)	2 (9.09%)	0 (0.00%)	0 (0.00%)
	Parental employment			
	Father	Mother	Father	Mother
Business Owner	2 (9.09%)	0 (0.00%)	3 (37.50%)	1 (12.50%)
General worker; administration; sales	5 (22.73%)	7 (31.82%)	2 (25.00%)	2 (25.00%)
Skilled and semi-skilled	3 (13.64%)	0 (0.00%)	1 (12.50%)	0 (0.00%)
Technical or IT	6 (27.27%)	2 (9.09%)	1 (12.50%)	0 (0.00%)
Professional	2 (9.09%)	3 (13.64%)	0 (0.00%)	0 (0.00%)
Manager	1 (4.55%)	1 (4.55%)	0 (0.00%)	0 (0.00%)
Housekeeper/ cleaner	0 (0.00%)	3 (13.64%)	0 (0.00%)	1 (12.50%)
Home-maker	0 (0.00%)	1 (4.55%)	0 (0.00%)	3 (37.50%)
Student	1 (4.55%)	1 (4.55%)	0 (0.00%)	0 (0.00%)
Unemployed	0 (0.00%)	4 (18.18%)	1 (12.50%)	1 (12.50%)
Unknown	2 (9.09%)	0 (0.00%)	0 (0.00%)	0 (0.00%)

Note. ATT-DIFF: children with attention difficulties; No-ATT-DIFF: children without attention difficulties. Data presented as count (%); SA schools include 12 years of formal education (grades 1-12). The first 7 years constitute primary school education (elementary school/ grade school) and the remaining 5 years as secondary/ high school education.

Prevalence of Attention Difficulties: CBCL, Brown EFA Scales Self, Parent and Teacher Forms and PANAS-C

As discussed previously, behavioural assessment outcomes, information from the developmental questionnaire, and feedback from interviews during which the study measures were administered, were used to determine whether or not the child participants were purported to have attention difficulties, and, consequently, which subgroup they would be allocated to.

For ease of reference and comparison, test statistics for the standardised measures of the CBCL attention-related subscales, Brown EF/A Forms and PANAS-C are reported in Table 5.

Table 5

Results from Standardised Measures: ATT-DIFF (n=22) vs No-ATT DIFF (n=8)

Measures	ATT-DIFF			No-ATT-DIFF			*t*	*p*
	M **(*m*)**	***SD*** **(IQR)**	**Range**	***M*** **(*m*)**	***SD*** **(IQR)**	**Range**		
Brown EF/A Scales								
Teacher Form	63.09 (61.50)	11.72 (19)	45-88	62.13 (58.50)	15.08 (29)	42-81	.19	.855
Parent Form[a]	62.59 (63.00)	12.60 (23)	45-86	51.38 (48.50)	13.89 (10)	41-84	2.10	.045*
Self-Report Form[a]	63.41 (63.50)	13.26 (22)	44-89	49.75 (42.00)	13.11 (25)	39-70	2.50	.018*
CBCL								
ADHD Syndrome Subscale[a]	66.18 (66.00)	10.07 (12)	51-88	55.25 (51.50)	7.72 (9)	50-72	2.78	.010**
ADHD DSM-Oriented Scale[a]	67.55 (66.00)	10.41 (17)	50-90	58.63 (53.00)	14.20 (11)	50-92	1.88	.070
PANAS-C								
PANAS-C PA subscale [a]	50.27 (50.00)	10.98 (11)	26-67	53.13 (51.50)	10.99 (22)	39-68	-.63	.534
PANAS-C NA subscale	42.32 (45.50)	12.97 (21)	18-63	37.38 (40.00)	11.14 (18)	17-50	.96	.348

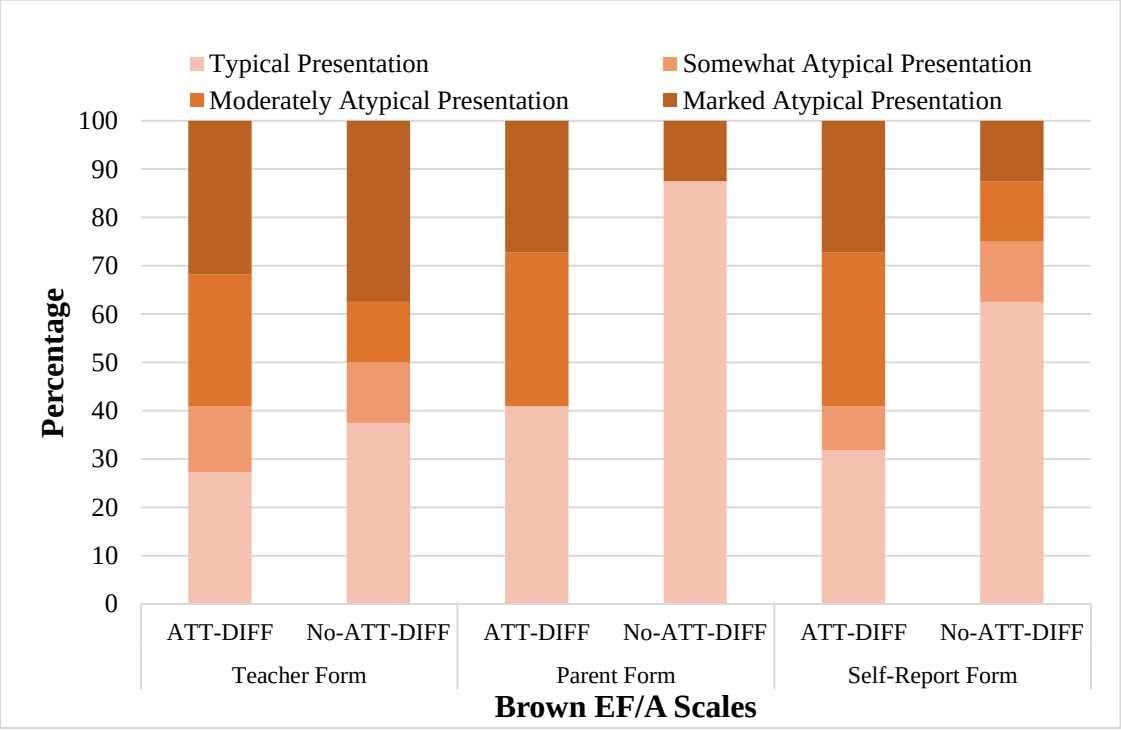
Note. [a] Data are not normally distributed and hence, descriptive statistics include *m*=median and *IQR* =interquartile range in parentheses. ATT-DIFF: children with attention difficulties; No-ATT-DIFF: children without attention difficulties; Brown EF/A Scales: Brown Executive Function/ Attention Scales; CBCL: Child Behaviour Checklist as completed by parents; PANAS-C: PA = Positive and NA = Negative Affect Schedule for Children; Brown EF/A Scales: T-Scores Interpretation: 70<:indicators of very significant problems (markedly atypical); 60 – 69: significant problems (moderately atypical); 55 – 59: possible significant problems (somewhat atypical), scores of 54>: unlikely significant problem (typical presentation; Brown, 2019); CBCL score interpretation: below 65: not clinically significant; 65 and above: clinically significant; *p < 0.05. **p < 0.01. ***p < 0.001

Prevalence of Attention Difficulties: Brown EF/A Scales. As noted in Table 5, mean and median scores for ATT-DIFF child participants are significantly higher than those of No-ATT-DIFF child participants, thus suggestive of the presence of attention difficulties as rated in the forms parents and children themselves. Ratings by teachers of ATT-DIFF child participants are only marginally higher than No-ATT-DIFF child participants. Furthermore, results from all three forms report higher minimum and maximum scores for ATT-DIFF child participants when considering scores of No-ATT-DIFF child participants, which is also indicative of attention difficulties in the ATT-DIFF group.

A closer examination of the results of the Brown EF/A Teacher Form is shown in Figure 4. The results show that teachers rated the same number of child participants in the Typical and Marked atypical presentation categories for the No-ATT-DIFF group. In addition, teachers scored more child participants in the atypical ranges for both groups, when compared to parent and child participants themselves.

Figure 4

T-Score Results from Brown EF/A Scales as Percentages for Each Group: ATT-DIFF (n=22) vs No-ATT-DIFF (n=8)



Note. EFA: Brown Executive Function/ Attention Scales; ATT-DIFF: children with attention difficulties; No-ATT-DIFF: children without attention difficulties; T-scores above 69: marked atypical; 60 – 69: moderately typical; 55 – 59: somewhat atypical; below 55: typical presentation (Brown, T, 2019); X-axis: number of child participants; Y-axis: groups in study.

Similarly, the mean and median scores for the ATT-DIFF and No-ATT-DIFF groups, as shown in the Teacher Forms, are not as vastly different from each other as those reported by parent and child participants, verifying that teacher participants may have appraised some behaviours as more problematic than parents and child participants across both groups (see Table 5).

In determining whether a child may present with attention difficulties, consideration was also given to parent participants' estimation of their children's behaviours as reflected in the Brown EF/A Parent Form. As shown in Table 5, parents perceived significantly more attention difficulties in the ATT-DIFF group than in the No-ATT-DIFF group (p = .045) as compared to teacher participants.

For a fuller understanding of child participants' difficulties, scores from the completed Brown EF/A Self-Report Form were also considered. Notably, more ATT-DIFF child participants tended to report their behaviours as falling within the Moderate to Marked Atypical ranges, indicative of attention difficulties, with the highest p-value (p = .018) reported among the three Brown EF/A scales (see Table 5).

Although the Brown EF/A Scales provided insight into the prevalence of attention difficulties, results of other standardised scales were also considered.

Prevalence of Attention Difficulties: CBCL ADHD Syndrome Scale and ADHD DSM-Oriented Scale. Results from the CBCL ADHD Syndrome Scale and ADHD DSM-Oriented Scale were computed for each child participant.

As Table 5 shows, the mean and median values for the ATT-DIFF child participants are significantly higher than the value for the no-ATT-DIFF child participants (p = .010) which supports the utilisation of the CBCL Attention Deficit Subscale in identifying attention difficulties in the ATT-DIFF group. However, computation of a Fisher's exact test shows, with p = .092, there is no significant relationship determined between attention grouping and T-score results of the ADHD Syndrome Subscale, despite 7 of the 8 No-ATT-DIFF T-scores (87.5%) falling below the clinical significance score of 65, and 12 of the 22 ATT-DIFF T-scores (54.54%) noted as clinically significant (65 and above). This comparison can be clearly noted in Table 6.

When considering results of the CBCL ADHD DSM-Oriented Scale as noted in Table 5, higher means and medians are also noted for ATT-DIFF child participants when compared to No-ATT-DIFF child participants, although these are not significantly different. However, although application of a Fisher's exact test shows a significant relationship between T-score

results for the ADHD DSM-Oriented Subscale and attention grouping (ATT-DIFF vs No-ATT-DIFF; p= .039), these results may be at risk of inflated error rates.

This contrast is further presented in Table 6, indicating 59.09% of ATT-DIFF scores (n = 13/22) within the clinical significance range, and 87.5% of No-ATT-DIFF scores being below clinical significance (n = 7/8) in this scale.

These results are further visually represented in Figure 5, where one is able to see a more nuanced comparison.

Table 6

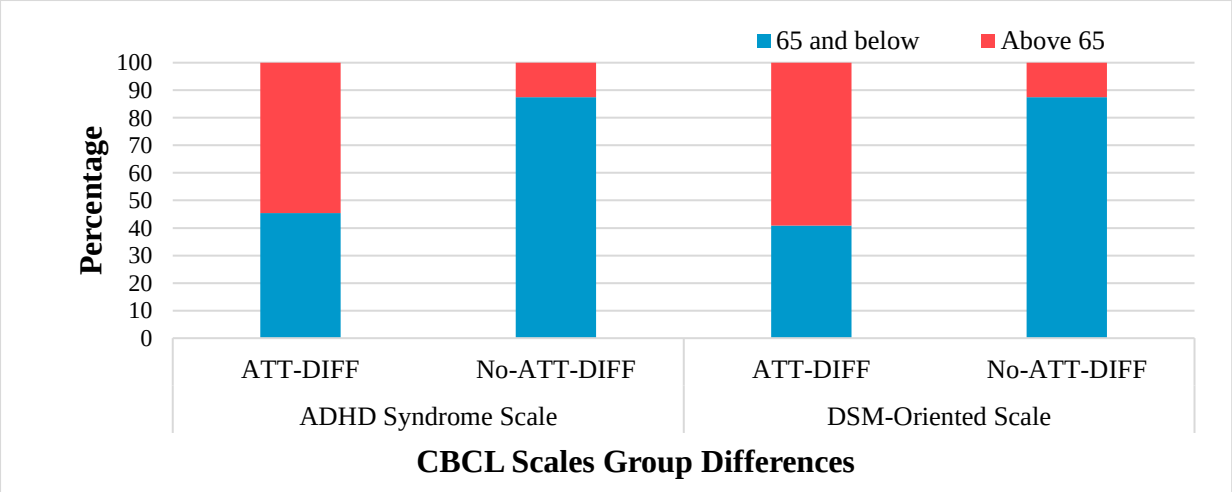
Between-group Comparisons for CBCL: ATT-DIFF (n=22) vs. No-ATT-DIFF (n=8)

CBCL Scales	ATT-DIFF	No-ATT-DIFF	*p*
ADHD Syndrome Scale			
Below clinical significance	10 (45.45%)	7 (87.50%)	.092[a]
Above clinical significance	12 (54.55%)	1 (12.50%)	
ADHD DSM-Oriented Scale			
Below clinical significance	9 (40.91%)	7 (87.50%)	.039[a]
Above clinical significance	13 (59.09%)	1 (12.50%)	

Note. ATT-DIFF: children with attention difficulties; No-ATT-DIFF: children without attention difficulties. Data presented as count (%). [a] Fisher's exact test run as more than 20% of cells have an expected count of less than 5.

Figure 5

Comparison of CBCL Scales t-score Results as Percentages Per Group: ATT-DIFF (n=22) vs. No-ATT-DIFF (n=8)



Note. ATT-DIFF: children with attention difficulties; No-ATT-DIFF: children without attention difficulties; T-scores of 65 and above are considered clinically significant (ASEBA Software, 2020).

The CBCL ADHD-related scales and Brown EF/A Scales were also used in conjunction with other measures. As such, results of the PANAS-C will be explored as pertaining to identifying any emotional-related problems.

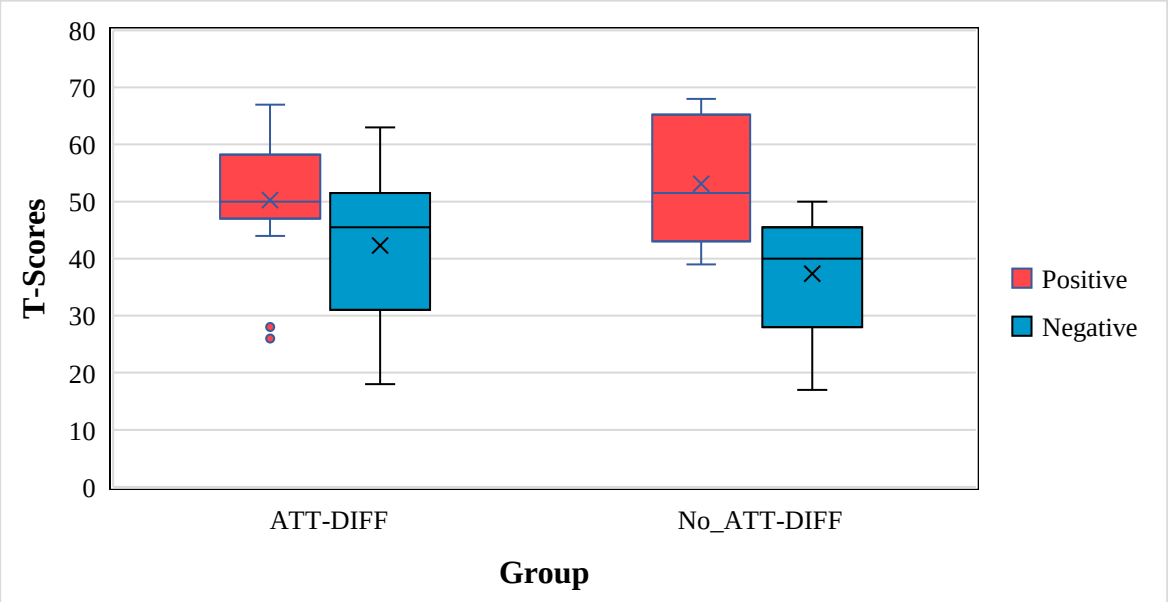
Prevalence of Emotional Problems: PANAS-C. The PANAS-C was administered to child participants virtually/ telephonically to determine the prevalence of positive and negative emotions as an indicator of possible emotional problems. As I noted that some of the child participants did not seem to understand descriptor words used to name some of the emotions, I explained the relevant items using age-appropriate language. Although this appeared to assist them to some degree, I cannot be absolutely certain that they understood all of the descriptors as intended. As such, data can be considered supplemental, and was not used in determining prevalence rates of possible ADHD.

At first glance, as indicated in Figure 6, ATT-DIFF and No-ATT-DIFF child participants' scores for PANAS-C PA subscale tended to fall predominantly in the mid-range of 41-60. By comparison, more No-ATT-DIFF child participants recorded lower scores for the PANAS-C NA subscale items, in contrast to higher means and median reported for ATT-DIFF for the PANAS-C NA subscale (see Table 5), thus suggesting that child participants in the ATT-DIFF group reported experiencing more negative emotions that child participants in the No-ATT-DIFF group. Nonetheless, although the results are not significant, the means and medians are in the expected direction with higher scores for ATT-DIFF group for the PANAS-C NA and lower scores in the PANAS-C PA in the same group (see Brown, 2019 & Dreschler, 2020).

In contrast, as reflected in Table 5, higher means and medians for the No-ATT-DIFF child participants was reported in the PANAS-C PA subscale showing the presence of more positive emotions than negative emotions as reported by the No-ATT-DIFF group, at least descriptively, as the difference was not significant. These comparisons for the PANAS-C results are presented in Figure 6.

Figure 6

Results from PANAS-C PA and NA Subscales: ATT-DIFF (n=22) vs. No-ATT-DIFF (n=8)



Note. ATT-DIFF: children with attention difficulties; No-ATT-DIFF: children without attention difficulties.

Standardised measures were of course not used in isolation, with further information obtained from the developmental questionnaire.

Analysis of Information Provided in the Developmental Questionnaire

Apart from providing information about the difficulties experienced by the child participants through standardised measures, I identified various predisposing and risk factors for ADHD in the current study through responses to the open-ended questions of the developmental questionnaire. These will be discussed in turn, with test statistics summarised below.

Pregnancy Complications. As evidenced in Table 7, overall, the frequency of recorded pregnancy complications for mothers of ATT-DIFF child participants is higher than those for the No-ATT-DIFF child participants, despite no significant associations calculated between the ATT-DIFF and No-ATT-DIFF groups on all reported issues.

Table 7

Between-group Comparisons for Pregnancy Complications: ATT-DIFF (n=22) vs. No-ATT-DIFF (n=8)

Variables	ATT-DIFF	No-ATT-DIFF	*p*
Premature birth	1 (4.55%)	0 (0.00%)	1.000[a]
Postmature birth	1 (4.55%)	0 (0.00%)	1.000[a]
Viral infection	1 (4.55%)	1 (12.50%)	.469[a]
Maternal depression during pregnancy	1 (4.55%)	0 (0.00%)	1.000[a]
Intrauterine growth restriction	1 (4.55%)	0 (0.00%)	1.000[a]
Mother receiving ARV treatment	1 (4.55%)	0 (0.00%)	1.000[a]
Insufficient blood	1 (4.55%)	0 (0.00%)	1.000[a]
Hypertension	3 (13.64%)	0 (0.00%)	.545[a]

Note. ATT-DIFF: children with attention difficulties; No-ATT-DIFF: children without attention difficulties. Data presented as count (%). [a] Fisher's exact test run as more than 20% of cells have an expected count of less than 5.

Neonatal Complications. Results reported in Table 8 indicate that there is no significant association between groups with regards to all of the risk factors regarding neonatal complications identified, despite the ATT-DIFF group reporting more such complications.

Table 8

Between-group Comparisons for Neonatal Complications: ATT-DIFF (n=22) vs. No-ATT-DIFF (n=8)

Variables	ATT-DIFF	No-ATT-DIFF	*p*
Breathing difficulties	2 (9.09%)	0 (0.00%)	1.000[a]
Colic	1 (4.55%)	0 (0.00%)	1.000[a]
Digestive issues	0 (0.00%)	1 (12.50%)	.267[a]
Heartbeat problem	1 (4.55%)	0 (0.00%)	1.000[a]
Hydrocephalus	1 (4.55%)	0 (0.00%)	1.000[a]
Hypoglycaemia	1 (4.55%)	0 (0.00%)	1.000[a]
Intubated	1 (4.55%)	0 (0.00%)	1.000[a]
Jaundice	1 (4.55%)	1 (12.50%)	.469[a]
Meningitis	0 (0.00%)	1 (12.50%)	.267[a]
Nuchal cords[33]	1 (4.55%)	1 (12.50%)	.469[a]
Small size at birth	1 (4.55%)	0 (0.00%)	1.000[a]
Umbilical hernia	1 (4.55%)	0 (0.00%)	1.000[a]

Note. ATT-DIFF: children with attention difficulties; No-ATT-DIFF: children without attention difficulties. Data presented as count (%). [a] Fisher's exact test run as more than 20% of cells have an expected count of less than 5.

[33] A **nuchal cord** is the term used to describe when a baby's umbilical cord is wrapped 360˚ around its neck (Peesay, 2017).

Attachment-related Issues. Table 9 shows that more ATT-DIFF child participants experienced attachment-related problems than No-ATT-DIFF child participants in the form of early separations from caregivers, although these differences are not significant in the current study.

Table 9

Between-group Comparisons for Attachment-related Issues as Identified in Parent Participant Responses: ATT-DIFF (n=22) vs. No-ATT-DIFF (n=8)

Variables	ATT-DIFF	No-ATT-DIFF	*p*
Father working away from home	1 (4.55%)	0 (0.00%)	1.000[a]
Mother working long hours	2 (9.09%)	0 (0.00%)	1.000[a]
Living with another family member	2 (9.09%)	2 (25.00%)	.284[a]
No contact with biological father	4 (18.18%)	0 (0.00%)	.550[a]

Note. ATT-DIFF: children with attention difficulties; No-ATT-DIFF: children without attention difficulties. Data presented as count (%). [a] Fisher's exact test run as more than 20% of cells have an expected count of less than 5.

Developmental Issues. Table 10 demonstrates few issues related to development were identified for both groups of participants with no significant relationship for each developmental issue between the ATT-DIFF and No-ATT-DIFF groups.

Table 10

Between-group Comparisons for Developmental Issues: ATT-DIFF (n=22) vs. No-ATT-DIFF (n=8)

Variables	ATT-DIFF	No-ATT-DIFF	*p*
Parent unsure	1 (4.55%)	0 (0.00%)	1.000[a]
Later than normal milestone attainment	1 (4.55%)	0 (0.00%)	1.000[a]
Not crawling	2 (9.09%)	1 (12.50%)	1.000[a]

Note. ATT-DIFF: children with attention difficulties; No-ATT-DIFF: children without attention difficulties. Data presented as count (%). [a] Fisher's exact test run as more than 20% of cells have an expected count of less than 5. Parent unsure: parents were unsure of milestone attainment.

Health Issues. When comparing the two groups, the overall trend from Table 11 suggests that more health issues were reported by parents of ATT-DIFF child participants. Visual problems were only reported for the No-ATT-DIFF group. Nonetheless, there is no significant relationship shown between prevalence of any of the health problems reported by parents and attention difficulties in child participants in the sample.

Table 11

Between-group Comparisons for Health Issues: ATT-DIFF (n=22) vs. No-ATT-DIFF (n=8)

Variables	ATT-DIFF	No-ATT-DIFF	*p*
Adenovirus	1 (4.55%)	0 (0.00%)	1.000[a]
Allergies	1 (4.55%)	0 (0.00%)	1.000[a]
Asthma	1 (4.55%)	0 (0.00%)	1.000[a]
Difficulty breathing	1 (4.55%)	0 (0.00%)	1.000[a]
Ear infections	2 (9.09%)	0 (0.00%)	1.000[a]
Epilepsy	1 (4.55%)	0 (0.00%)	1.000[a]
Febrile convulsions	1 (4.55%)	0 (0.00%)	1.000[a]
Nosebleeds	1 (4.55%)	0 (0.00%)	1.000[a]
Undiagnosed possible visual problem	1 (4.55%)	0 (0.00%)	1.000[a]
Visual problems	0 (0.00%)	2 (25.00%)	.064 [a]
Wax impaction	1 (4.55%)	0 (0.00%)	1.000[a]
Overall poor health	2 (9.09%)	0 (0.00%)	1.000[a]

Note. ATT-DIFF: children with attention difficulties; No-ATT-DIFF: children without attention difficulties. Data presented as count (%). [a] Fisher's exact test run as more than 20% of cells have an expected count of less than 5.

Emotional Trauma. The experience of emotional trauma by child participants was also explored, with Table 12 presenting the different traumas they experienced, as reported by parent participants. When comparing the ATT-DIFF and No-ATT-DIFF groups, although more events related to emotional trauma were reported by parents of ATT-DIFF child participants as evidenced from higher mean scores, these differences were not statistically significant.

Table 12

Between-group Comparisons for Emotional Trauma: ATT-DIFF (n=22) vs. No-ATT-DIFF (n=8)

Variables	ATT-DIFF	No-ATT-DIFF	*p*
Absent father	1 (4.55%)	0 (0.00%)	1.000[a]
Change of schools	1 (4.55%)	0 (0.00%)	1.000[a]
Death of family member	2 (9.09%)	0 (0.00%)	1.000[a]
Death of pet	1 (4.55%)	0 (0.00%)	1.000[a]
Extended family members relocating	0 (0.00%)	1 (12.50%)	.267 [a]
Father relocated from mother and child	1 (4.55%)	0 (0.00%)	1.000[a]
Moving home	1 (4.55%)	0 (0.00%)	1.000[a]
Separation from father	1 (4.55%)	1 (12.50%)	.469[a]
Separation from mother	1 (4.55%)	0 (0.00%)	1.000[a]

Note. ATT-DIFF: children with attention difficulties; No-ATT-DIFF: children without attention difficulties. Data presented as count (%). [a] Fisher's exact test run as more than 20% of cells have an expected count of less than 5.

Apart from the neonatal complications, birth issues, attachment problems, health concerns and emotional trauma reported on, there are other risk factors worth noting, including educational issues, and family history of various disorders.

Educational Issues. Table 13 demonstrates that child participants in Study One reportedly experienced a variety of educational issues, although the comparison between the ATT-DIFF and No-ATT-DIFF groups shows no significant association between educational issues and attention difficulties. Interestingly, as noted from a higher sum of percentages of all educational issues, more educational issues are reported by parents in the No-ATT-DIFF group.

Table 13

Between-group Comparisons for Educational Issues: ATT-DIFF (n=22) vs. No-ATT-DIFF (n=8)

Variables	ATT-DIFF	No-ATT-DIFF	*p*
Forgets work during tests	1 (4.55%)	0 (0.00%)	1.000[a]
Poor academic progress	1 (4.55%)	1 (12.50%)	.469[a]
Reading difficulties	1 (4.55%)	0 (0.00%)	1.000[a]
Repeating grade	1 (4.55%)	1 (12.50%)	.469[a]
School refusal	0 (0.00%)	1 (12.50%)	.267 [a]
Slow learner	3 (13.64%)	1 (12.50%)	1.000[a]
Working at a slow pace	2 (9.09%)	0 (0.00%)	1.000[a]

Note. ATT-DIFF: children with attention difficulties; No-ATT-DIFF: children without attention difficulties. Data presented as count (%). [a] Fisher's exact test run as more than 20% of cells have an expected count of less than 5.

Family History of Mental and Other Health Conditions. In this study, parents also reported different medical diagnoses with regards to health and mental health conditions within biological extended and immediate family members of the child, as reported in Table 14. However, between group analysis indicates no statistical difference in the incidence of mental and health conditions and attention difficulties in child participants.

Table 14

Between-group Comparisons for Family History of Mental and Other Health Conditions: ATT-DIFF (n=22) vs. No-ATT-DIFF (n=8)

Variables	ATT-DIFF	No-ATT-DIFF	*p*
ADHD	2 (9.09%)	0 (0.00%)	1.000[a]
Asthma	2 (9.09%)	0 (0.00%)	1.000[a]
Bipolar Mood Disorder	1 (4.55%)	0 (0.00%)	1.000[a]
Depression	1 (4.55%)	2 (25.00%)	.166 [a]
Diabetes	2 (9.09%)	0 (0.00%)	1.000[a]
Epilepsy	0 (0.00%)	2 (25.00%)	.064 [a]
Generalised Anxiety Disorder	1 (4.55%)	1 (12.50%)	.166 [a]
Hypertension	1 (4.55%)	0 (0.00%)	1.000[a]
Post-Partum Depression	2 (9.09%)	0 (0.00%)	1.000[a]
Schizophrenia	1 (4.55%)	0 (0.00%)	1.000[a]

Note. ATT-DIFF: children with attention difficulties; No-ATT-DIFF: children without attention difficulties. Data presented as count (%). [a] Fisher's exact test run as more than 20% of cells have an expected count of less than 5.

Apart from the risk factors discussed, parent participants also noted the use of various medications with their children, including past and present use of certain medications.

Medication. Several parents indicated regular use of medication with their children in the past to alleviate attention difficulties as illustrated in Table 15, specifically methylphenidate (Ritalin and Neucon), Royal Jelly supplement (anti-inflammatory and immune booster) and Biostrath (nutritional and immune support). As such, I confirmed with parents that their children were not taking any of these medications at the time of participation in the present study and for at least three months prior. When performing a between-group analysis, it is noted in Table 15 that only ATT-DIFF child participants received some form of medication in the past to alleviate attention-related problems, suggesting that some of the parents were previously aware of their children's issues. However, there is no significant difference regarding the past use of medications between the two groups.

By comparison, at the time of this study, ATT-DIFF child participants utilised a variety of other medications (Allergex – allergies; Epilim – epilepsy, and Mentat syrup – memory and cognition problems) not utilised by children in the No-ATT-DIFF group, as noted in Table 15.

Table 15

Between-group Comparisons for Past and Current Medication of Child Participants: ATT-DIFF (n=22) vs. No-ATT-DIFF (n=8)

Variables	ATT-DIFF	No-ATT-DIFF	*p*
Past Medication			
Biostrath	1 (4.55%)	0 (0.00%)	1.000[a]
Methylphenidate	2 (9.09%)	0 (0.00%)	1.000[a]
Royal Jelly	1 (4.55%)	0 (0.00%)	1.000[a]
Current Medication			
Allergex	1 (4.55%)	0 (0.00%)	1.000[a]
Epilim	1 (4.55%)	0 (0.00%)	1.000[a]
Mentat Syrup	1 (4.55%)	0 (0.00%)	1.000[a]

Note. ATT-DIFF: children with attention difficulties; No-ATT-DIFF: children without attention difficulties. Data presented as count (%). [a] Fisher's exact test run as more than 20% of cells have an expected count of less than 5. Past medication: medication was used up to 3 months prior to the child participant's participation in Study One.

Again, findings show there is no significant difference indicated by the between-group analysis despite only ATT-DIFF participants' parents reporting the use of medications at the time of Study One.

In addition to the predisposing and risk factors described thus far, some parents specified other issues which they deemed concerning.

Other. In addition to emotional regulation and other attention-related problems which parents reported in the standardised assessment measures, parents also noted sibling rivalry and lack of independence as concerns in their responses to questions in the developmental questionnaire (see Table 16). However, there is no significant difference for either of these issues between the two groups.

Table 16

Between-group Comparisons for Other Issues Reported by Parents: ATT-DIFF (n=22) vs. No-ATT-DIFF (n=8)

Variables	ATT-DIFF	No-ATT-DIFF	*p*
Overly dependent on a parent	1 (4.55%)	0 (0.00%)	1.000[a]
Sibling rivalry	1 (4.55%)	0 (0.00%)	1.000[a]

Note. ATT-DIFF: children with attention difficulties; No-ATT-DIFF: children without attention difficulties. Data presented as count (%). [a] Fisher's exact test run as more than 20% of cells have an expected count of less than 5.

Multiple Risk Factors. Interestingly, most child participants presented with at least one risk factor, with 12 child participants (40% of the total sample) noting more than one, as

demonstrated in Table 17. Also noted is the fact that high numbers of risk factors (5 and above) are recorded for 7 ATT-DIFF child participants and only 1 No-ATT-DIFF child participant. This also suggests that at least five risk factors were reported for 8 of the total 30 participants (26.6% of the sample). In addition, only 12.5% of the total sample of child participants in the No-ATT-DIFF group showed five or more risk factors in total.

Table 17

Spread of Risk Factors for Child Participants (N=30)

ATT group	Pregnancy	Neonatal	Attachment	Developmental	Health	Emotional Trauma	Educational	Family history	Total for child participant
ATT-DIFF	0	1	0	0	2	0	0	1	4
ATT-DIFF	0	1	1	0	0	1	0	4	7
ATT-DIFF	1	0	0	0	0	0	1	0	2
ATT-DIFF	0	1	0	1	2	0	0	0	4
ATT-DIFF	0	0	0	0	0	0	0	1	1
ATT-DIFF	0	0	0	0	0	1	1	1	3
ATT-DIFF	0	0	2	0	0	1	0	0	3
ATT-DIFF	0	0	0	0	1	0	2	1	4
ATT-DIFF	0	0	1	0	0	1	2	1	5
ATT-DIFF	0	2	1	0	2	0	0	0	5
ATT-DIFF	1	2	0	1	1	0	0	0	5
ATT-DIFF	1	3	0	0	1	0	0	0	5
ATT-DIFF	0	0	0	0	0	0	0	0	0
ATT-DIFF	1	0	0	0	0	0	0	0	1
ATT-DIFF	1	0	1	0	0	1	0	0	3
ATT-DIFF	0	0	1	0	0	0	0	0	1
ATT-DIFF	0	0	0	0	1	0	0	0	1
ATT-DIFF	0	0	1	0	1	2	0	0	4
ATT-DIFF	1	1	0	1	0	1	1	1	6
ATT-DIFF	1	0	0	0	2	0	0	2	5
ATT-DIFF	0	0	1	0	0	2	0	0	3
ATT-DIFF	0	0	1	0	0	0	0	1	2
No ATT-DIFF	0	0	0	0	0	0	0	1	1
No ATT-DIFF	0	1	1	0	0	0	1	0	3
No ATT-DIFF	0	0	0	0	1	0	0	0	1
No ATT-DIFF	0	1	0	0	1	0	0	1	3
No ATT-DIFF	0	0	0	1	0	1	0	2	4
No ATT-DIFF	0	0	1	0	0	0	0	1	2
No ATT-DIFF	0	0	0	0	0	0	0	0	0
No ATT-DIFF	1	2	0	0	0	1	1	2	7
Total Risk Factors	8	15	12	4	15	12	9	20	95

4	risk factors
3	risk factors
2	risk factors
1	risk factors
0	risk factors

Note. ATT-DIFF: children with attention difficulties; No-ATT-DIFF: children without attention difficulties.

Supplemental Information: Observations

Observations of verbal interactions noted during the interviews with child participants included difficulty with speech, not seeming to hear or understand items or instructions, being easily distracted, difficulty waiting their turn, excessive talkativeness, blurting out answers, not seeming to listen when spoken to directly, asking for items or instructions to be repeated, and interrupting when items are read, or instructions are explained (see Appendix C: Observation Checklist).

Due to the subjective nature of this data, between group analysis was performed (see Table 18), specifying the types of observations each child participant portrayed. Of interest, although results are not significant, more observations are noted in ATT-DIFF child participants for all variables except blank spells, difficulty waiting one's turn, and blurting out answers.

Table 18

Between-group Comparisons for Observations: ATT-DIFF (n=22) vs. No-ATT-DIFF (n=8)

Variables	**ATT-DIFF**	**No-ATT-DIFF**	***p***
Difficulty with speech	2 (9.09%)	0 (0.00%)	.531[a]
Difficulty with hearing	2 (9.09%)	0 (0.00%)	.531[a]
Difficulty with vision	0 (0.00%)	0 (0.00%)	[b]
Excessive talkativeness	2 (9.09%)	0 (0.00%)	.531[a]
Blank spells	0 (0.00%)	1 (12.50%)	.267[a]
Not seeming to listen when spoken to directly	8 (36.36%)	3 (37.50%)	.637[a]
Asking for items/instructions to be repeated	9 (40.91%)	5 (62.50%)	.263[a]
Interrupting	4 (18.18%)	1 (12.50%)	.595[a]
Impulsive answering	0 (0.00%)	0 (0.00%)	[b]
Not seeming to hear or understand instructions/items	20 (90.91%)	7 (87.50%)	.621[a]
Easily distracted	4 (18.18%)	1 (12.50%)	.595[a]
Difficulty waiting turn	2 (9.09%)	2 (25.00%)	.284[a]
Blurting out answers	1 (4.55%)	1 (12.50%)	[b]
Difficulty sitting still	1 (4.55%)	1 (12.50%)	[b]
Taking long time to respond	1 (4.55%)	1 (12.50%)	[b]

Note. ATT-DIFF: children with attention difficulties; No-ATT-DIFF: children without attention difficulties. Data presented as count (%). [a] Fisher's exact test run as more than 20% of cells have an expected count of less than 5. [b] Fisher's exact test or Chi-square test could not be run.

Discussion

Although it has been estimated 5 - 8% of children in the Foundation Phase in South Africa show ADHD symptomology, with ADHD prevalence rates of 4 – 7% of children in Gauteng, no recent data is available regarding the incidence of ADHD in children with

ADHD in Gauteng and Ekurhuleni specifically (ADHASA, 2020; Chinawa et al., 2014; Kern et a; 2015; Perold et al., 2010). To this end, the aim of Study One was to investigate the extent of attention problems and possible risk factors for such problems in a sample of Foundation Phase learners from low SES communities as a preliminary study. I discuss the outcome with regards to the proportion of child participants who presented with attention difficulties in the sample first, followed by the comparisons between the ATT-DIFF and no-ATT-DIFF on the range of risk factors explored.

Prevalence of Attention Problems

As noted, 22 (73%) of the 30 child participants in Study One presented with attention problems. When compared to other prevalence data, although this number is high, it likely reflects the effect of purposive sampling, small sample size, statistical issues related to small sample size, and sample bias, with parents who were aware their children may have symptomology of ADHD being more prone to participate in Study One (see ADHASA, 2020; APA, 2022).

Demographic Variables

Age of Child Participants. Results note that ATT-DIFF child participants were on average, older than No-ATT-DIFF child participants (see Table 2). In contrast, previous research indicates that younger children tend to be diagnosed with ADHD more frequently than older children due to relative age effects (Furzer et al., 2022; Koutsoklenis et al., 2019). The impact of the purposive sampling method employed by teacher participants may account for this discrepancy, as teachers may have selected child participants with whom they are more familiar, and thus in higher grades and subsequently older, than the originally planned snowball sampling method which may have yielded a more accurate reflection of the age demographics of child participants with attention problems at the site.

Sex of Child Participants. Additionally, most ATT-DIFF child participants are male (refer to Table 3). Although these findings are not significant, they are congruent with previous literature. For example, studies suggest boys tend to be diagnosed with ADHD more frequently than girls, due to externalised behaviours which boys tend to show more readily than girls, and which are more easily noticed than internalising behaviours which girls tend to demonstrate more frequently (see APA, 2022; Hinshaw et al., 2021; Martin et al., 2018; Mowlem et al., 2018).

Home Language of Child Participants. Across both groups, most child participants spoke languages other than English at home, as shown in Table 3. This may reflect the overall demographic language profile of South Africa with only 8.7% of the population

speaking English as their home language (Statistics SA, 2022). Although higher than the overall population data, with a combined total of 33.3% of total child participants in Study One speaking English as their home language, the results could reflect the fact that learners are taught in English at the school, with parents possibly selecting to educate their children at a school educating children in English. To understand why parents may have chosen to educate their children in English, some context is needed.

Multilingualism in education has been a concern for many years (see Brezinger, 2017; Desai, 2001; Desai, 2018; Webb et al., 2010). Currently in South Africa, 12 official languages are recognised: English, Afrikaans, Sepedi, Sesotho, isiNdebele, Siswati, Xitsonga, South African Sign Language, isiZulu, isiXhosa, Tshivenda and Setswana (Gordon et al., 2024). Reasons noted for educating a child in English instead of a home language include: perceived better opportunities for children, lack of educational materials in other home languages, teachers' poor self confidence in their ability to teach in other home languages, failures of the educational system, time constraints regarding translating materials into home languages, lack of involvement of parents, and the number of staff needed to educate learners in a single school in all 11 languages and associated financial viability, inter alia (Khanyile & Awung, 2022; Mashiya, 2011; Sibanda, 2019; Stein, 2017). As a result, with English being the most common medium of instruction in South Africa, and the most common language in which information about learning is shared (Márquez &Porras, 2020; Van Wyk, 2014), several research studies have argued that poor educational performance of black children, particularly in rural and low SES areas, are related to lack of education in their home languages, thus leading to fewer opportunities for children to succeed (Van Wyk, 2014; Webb et al., 2010; Zhou et al., 2020). Nonetheless, English is the predominant language of learning and teaching, further entrenching inequality, disadvantaging speakers of other languages and, thus, negatively affecting their educational outcomes (Govender, 2010; Mbude, 2020).

Parental Highest Level of Education. Results show that, interestingly, an equal number of parents (both mothers and fathers) in the ATT-DIFF group completed formal education until the end of secondary/ high school (12 years), and further studies (13 + years; see Table 4). This is in contrast to the No-ATT-DIFF group, with fewer parent participants completing tertiary studies (13+ years) than those completing only high school (12 years).

Although some studies show a link between children with ADHD and parental level of education, studies also show that ADHD in children is linked to lower levels of education of parents regardless of these risk factors, with one study noting higher education levels being

associated with higher prevalence rates of ADHD for adolescent girls (Chen et al., 2024; Fakhrunnisak & Patria, 2022; Jin et al., 2016; Tovrik et al., 2020; Volotinen et al., 2023). It is hypothesised that parental education levels inform parenting behaviours and involvement, and parents may subsequently employ ineffective parenting strategies. Thus, lower levels of education may result in children showing more behavioural problems and hyperactive behaviours, which could be confused with ADHD symptomology (Jin et al., 2016).

Parental Employment. In a related manner, levels of parental employment have been linked to the prevalence of ADHD (Davis-Kean et al., 2021). In Study One, most parents in both groups were employed, although fewer parents in the ATT-DIFF group were unemployed at the time of the study (with a total of 18.18%) than parents in the No-ATT-DIFF group (25% in total; see Table 4). The differences in this finding may be attributed to the small sample size.

Despite this, taken together, educational attainment of parents and employment status affect SES levels (APA, 2024). Previous research notes significant associations between lower SES and higher incidence of ADHD in children (Russell et al., 2016). Reasons for this include more stressful events, traumatic experiences and family adversity being experienced by lower SES groups (Markham & Spencer, 2022; Reiss et al., 2019), ineffective parental approach and less parental involvement in children's lives (Russell et al., 2015), and lack of access to resources for support for the child and family (Claussen et al., 2021), among others. In consideration of findings from Study One, the relationship between SES and ADHD is not supported. This could be due to other aspects of SES not being investigated, such as financial security and subjective perceptions of social class (APA, 2024), as well as the impact of the small sample size; therefore not being fully representative of the actual picture of SES and ADHD in the sample.

With an understanding of how demographic variables of the sample relate to findings from other literature, focus will now move to the incidence of the noted risk factors in the sample and how these outcomes relate to previous research.

Risk Factors

Pregnancy Complications. Of particular interest regarding pregnancy complications (see Table 6), hypertension was reported by three ATT-DIFF mothers during their interviews, which is in line with results, as noted in the literature review (see Maher et al., 2018; Pohlabeln, et al., 2017). Studies support vulnerability to attention problems in children when mothers experience pre-eclampsia accompanying hypertension (Dimitriadis, at el., 2023; Kong et al., 2022; Maher et al., 2020). Also, despite previous research supporting the

incidence of viral infections, results from Study One do not support a significant relationship between viral infections and the incidence of ADHD in the two groups (see Ayubi & Mansori, 2022; Walle, 2022). Premature birth (see Corrigenda, 2018; Franz et al., 2018; Rommel et al., 2017), postmature birth (see Hanć, 2018; Guney, et al., 2015), and maternal depression (see Wolford et al., 2017), were also not significantly related to the incidence of attention difficulties in the two groups, despite research showing a relationship between each issue and children later diagnosed with ADHD. Moreover, recent research indicates that although previously considered a risk factor for ADHD, intrauterine growth restriction is not an issue (Chen et al., 2016; Heinonen, 2010), with this sentiment echoed in the findings from Study One. One ATT-DIFF parent reported "insufficient blood" which could not be verified in other literature, due to the parent possibly using the incorrect terminology to describe the problem. Although studies confirm the relationship between use of Antiretroviral (ARV) treatment during pregnancy and children later developing ADHD (Burkey et al., 2015; Ezeamama et al., 2016), no significant relationship was found between the use of ARV treatment during pregnancy and the incidence of attention difficulties in Study One.

Despite these findings regarding individual pregnancy complications, a correlation has been determined between low SES and many preterm complications, including gestational diabetes and preterm birth, which may account for the presence of the preterm risk factors reported in Study One (see Bushnik et al., 2017; Liu et al., 2018; Song et al., 2017).

Neonatal Risk Factors. As noted in Table 7, Study One's findings support results from other research with regards to the experience of the following as neonatal risk factors for the development of ADHD: colic (see Indrio et al., 2023; Vercruyssen, 2020), nuchal cords (Zhu et al., 2016), jaundice (Lipińska et al., 2021; Tsao, 2020), breathing difficulties (Amor et al., 2005), heartbeat-related problems (see Dooley et al., 2023), hypoglycaemia (Nivins & Klingberg, 2023), and small size at birth (Lahti, 2006) with one report of meningitis in the No-ATT-DIFF group noted in spite of it being shown as a risk factor for the development of ADHD (Hadzic et al., 2017). Also, as noted with ADHD symptoms being secondary to the diagnosis of hydrocephalus, one ATT-DIFF child participant was previously diagnosed with the latter condition, a risk factor which is also verified by other studies (Melaknia & Chalamalla, 2022; Shishido & Zabel, 2022). Notwithstanding, some of the neonatal risk factors identified in the ATT-DIFF group are not present in existing research, such as digestive issues, intubation, and umbilical hernias.

Attachment-related Issues. Possible / risk for attachment-related issues, in the form of early separations from a parent, were evident in the sample, with 9 of 22 (40.9%) ATT-DIFF child participants, and 2 of 8 (25%) of No-ATT-DIFF child participants reporting such separations (see Table 9).

Studies have shown that early separations from a caregiver (within the first five years of life) may be particularly detrimental to a child's future health and well-being, including mental health and the possibility of developing psychopathology (Frick et al., 2021; Humphreys, 2018; Rasmussen et al., 2021). For example, two recent studies found that parental migration from the home for work may negatively affect the child's emotional health, especially with regards to maternal migration and related repeated separations from the young child (Shi et al., 2021 Van Luot & Dat, 2017).

It is worth bearing in mind, however, that although separations in the form of parents working long hours and working away from the home for extended periods of time have been found to be potentially harmful to the parent-child relationship and resulting attachment difficulties, in isolation, these behaviours are not necessarily impactful on a child's well-being (Gadsen et al., 2014; Humphreys, 2018). What has been considered crucial is the parent's ability to continue to be responsive to their children's needs when at home, despite the increased demands placed on their time and lower energy levels as a result of long hours at work, especially during the first two years of life. Thus, it is rather the parent's ability to balance the roles of parenthood and employment that can affect the quality of the attachment, possibly becoming an attachment-related risk factor for the development of psychopathology, including ADHD, if problematic (Kassamali & Rattani; 2014). For these reasons, the inclusion of a parent working long hours and working away from home have been included as risk factors for the development of ADHD.

Developmental Issues. Furthermore, with regards to developmental issues, despite later milestone attainment being reported for one ATT-DIFF child participant, this is not identified as a risk factor for ADHD in the literature (Farran et al., 2020; Lee et al., 2021). Although other neurodevelopmental disorders were not screened for in Study One (refer to Table 10), research shows that later walking has been associated with a diagnosis of ASD in girls (Hannigan et al., 2021), delayed motor development has been linked with problems with fine and gross motor co-ordination, and balance (Hua et al., 2022), and development of tic disorders may follow later motor milestone attainment (Bowler et al., 2024). It is also interesting to note that some parents were unsure of developmental milestones due to not living with the child participants during early childhood.

Health Problems. Regardless of literature findings noting a relationship between ADHD and visual problems (APA, 2022), this association could not be verified in Study One with visual problems reported for two No-ATT-DIFF child participants. However, when comparing the two groups, the overall trend from Table 11 suggests that more health issues were reported by parents of ATT-DIFF child participants, which is supported by other research concerning health issues in children with ADHD. For example, child participants in the ATT-DIFF group reportedly experienced the following: allergies (see Miyazaki et al., 2017), asthma (Cortese et al., 2018; Miyazaki, et al., 2017 reference the same), mouth breathing and related sleeping difficulties (Kalaskar et al., 2021), ear infections (see Voukon, 2011), and epileptic seizures (Aaberg et al., 2016; Ahmed et al., 2022). Although the association is not significant in Study One, research suggests that children with ADHD tended to show digestive health issues (Pan & Bölte, 2020).

Emotional Trauma. While findings from Study One do not show statistically significant correlations between emotional trauma and presence of attention problems (see Table 12), other research suggests the contrary (see Brown et al., 2017; Malhi & Bharti, 2020). For example, children who are exposed to emotional trauma are at risk for ADHD and Major Depressive Disorder specifically (see Lee et al., 2020; Miodus et al., 2021), and children who experience emotional, physical, and sexual abuse are at risk for mental and medical health issues throughout their lives (Malhi & Bharti, 2020). These children often display behavioural symptoms, which are consistent with a diagnosis of ADHD, with trauma also worsening pre-existing ADHD in children. It is also worth remembering that children from low SES groups are at greater risk for experiencing trauma than other higher SES groups, and this is further compounded by limited access to treatment (Assari, 2020; Craig et al., 2020; Pumariega et al., 2022).

With regards to Study One, the difference in results, when compared to other research, may be due to parents not being aware of some of the extent of the child participants' traumas, as in the case of child participants who lived with other caregivers for a period of time in the preschool years.

Educational Issues. As noted in Table 13, academic problems, including reading difficulties, slow pace of working, and poor academic performance, are reported for children with ADHD (see Jenkins & Ogg, 2019; Kibby et al., 2018; Tamm et al., 2020). These problems were also indicated by parents of ATT-DIFF child participants, although results were not significant.

A relationship has also been established between ADHD symptomology, the prevalence and aetiology of academic achievement problems, as well as co-morbid conditions, such as CD and depression, although these concerns may occur independently of each other (Visser at al., 2020). The incidence of ADHD and reading difficulties is well-documented, with literature noting that children with ADHD tended to show more academic impairments than non-ADHD peers, including problems with reading, writing, and mathematics (Kofler et al., 2019; Mowlem et al., 2018; Singh et al., 2022; Tamm et al., 2021; Tistarelli et al., 2020). Notwithstanding, child participants in the No-ATT-DIFF groups also presented with learning problems, which may also be related to children from low SES-communities tending to have fewer positive educational opportunities in the home and community leading to a higher incidence of difficulties with learning (Ozernov-Palchik, et al., 2019; Peng & Kievit, 2020).

Family History of Mental and Other Health Conditions. In this study, parents also reported many different medical diagnoses regarding health and mental health conditions within biological immediate and extended family members of the child participant, although the relationship was not statistically significant (Table 14 refers). Various studies have shown a link between parental health problems and the development of ADHD in children, especially ADHD (Wüstner et al., 2019), and depression in mothers (Cheung et al., 2018; Robinson et al., 2022; Tucker et al., 2021). Post-partum Depression (Christaki et al., 2022), Generalised Anxiety Disorder (Vizzini et al., 2019), Type-2 Diabetes (García-Marín et al., 2021), Bipolar Mood Disorder (O'Connell et al., 2021), Schizophrenia (Loohuis et al., 2021) and hypertension (Thapar, 2018) are also identified as being familial mental and health conditions in Study One and other studies. It is worth noting that a small, but non-significant relationship was identified between attentional difficulties and a family history of epilepsy in the No-ATT-DIFF group (p = .064), despite results supporting findings from other research (see Ahmed et al., 2022; APA, 2022) and two instances of familial ADHD, as reported for the ATT-DIFF group, supporting findings from other research which highlights a heightened genetic risk for ADHD (see Bigg & Faraone, 2018; Chudal et al., 2020; Grimm et al., 2020; Willoughby et al., 2019; Wüstner et al., 2019).

Multiple Risk Factors. As noted in results for Study One, most child participants presented with at least one risk factor for ADHD, and 40% of the sample noted more than one risk factor. This finding is consistent with results from other research, suggesting a compounding effect on the likelihood of developing ADHD following the incidence of more than one risk factor (Claussen et al., 2022; Kim et al., 2020), such as those discussed above.

In sum, as can be deduced from the findings, no significant relationships were found between the different risk factors reported on and the incidence of attention problems and possible ADHD. However, Study One provides a rich descriptive data set of a local, albeit small sample, attention problems, and related risk factors. I have presented and discussed the demographic variables of parents and child participants in Study One, the results of the standardised and non-standardised measures, and identified relationships between known and study-specific risk factors for ADHD and attention difficulties as identified from responses to the developmental questionnaire. However, through this process, I have become aware of several limitations which will be explored further that may have impacted on the results of this study and limits the generalisation thereof. I present these alongside ideas for future study directions.

Limitations and Future Directions of Study One

Perhaps the greatest limitation of Study One was due to changes made to the procedure as a result of the COVID-19 lockdown measures enforced by the Government of South Africa, which restricted me from engaging face-to-face with learners at schools in the study setting. This precluded the learners from participating in a psycho-educational assessment as part of the diagnostic process to determine the actual prevalence of ADHD, in accordance with the original research proposal for this study. Although I attempted to mitigate the effects of this through diagnosing attention difficulties instead of making a diagnosis of ADHD, the impact on this study is evident. For example, data collected for the various measures for ATT-DIFF child participants may not be entirely comparable to existing data on children with ADHD, which may explain why some results do not correspond with findings from existing studies. The fact that objective testing could not be carried out further heightens the subjectivity of some of the assessments, as was noted for the study observations, which were then positioned as a supplemental source of information, in comparison to clinical behavioural observations which could form part of an objective assessment (Staff et al., 2021). If replicating this study, I would proceed with the originally proposed research plan, by including an extended face-to-face interview with each parent participant to discuss the full background history of the child and extent of the difficulties. Thereafter I would administer a psycho-educational assessment face-to-face with each child participant, incorporating a cognitive assessment, scholastic assessments, and emotional evaluation, from which I could obtain clinical observations, in addition to completed rating scales by parent and teacher participants, as well as child participants. This process would provide a differential profile of the child participant’s difficulties, screen for emotional and

learning problems, and could verify or rule out a diagnosis of ADHD. Further to this, following the original research plan may have provided clearer prevalence rates. In terms of future directions, prevalence rates of ADHD in South Africa and in larger cities within the country, could help with future planning for educational and health-related interventions. This could be facilitated through completion of a large-scale version of the original proposed study, possibly by a governmental department or similar organisation with resources to conduct such research.

There were various limitations noted with regards to sampling. The first relates to the sample size of the study which influenced the meaningful interpretation of results. The use of convenience sampling in recruiting participants from only one school undermined the statistical power for the analyses, which impacted the between-group analyses and the extent to which outcomes could be generalised. Working with more than one school would have entailed contact between myself and staff at different schools for delivery and collection of forms, whereas, working with participants from only one school limited the contact between different groups of people which again was done given restrictions related to the COVID-19 pandemic. Also, as Study One was a precursor study for Study Two, through screening participants for the latter, I assumed at the time that working with parent participants from only one school would be safer as I surmised that face-to-face contact would only be allowed in small groups and thus accepted that data collection could only be carried out at one school. It is also worth mentioning that the sample size was calculated based on the original planned research protocol, which included a psycho-educational assessment leading to a possible diagnosis of ADHD, not the amended plan in which attention issues were screened, therefore the smaller sample size was erroneously deemed adequate as noted in Figure 3: Flow chart: Process of Recruitment of Participants. However, due the negative impact on the generalisability and richness of data from the study, I would rather consult with a larger sized sample of parent, child and teacher participants from a wider range of schools to provide comprehensive data.

Following from sample size, Type I errors became more likely due to multiple analyses being run on the same limited data set. Consequently, the results may need to be interpreted with caution due to possible inflated error rates.

Similarly, due to large variance in the two group sizes with ATT-DIFF (n =22) and No-ATT-DIFF group (n=8), Type II error rates are more possible. This may have impacted on the results of the various analyses run, possibly making some results invalid.

Additionally, the employment of purposive sampling of child participants instead of exclusively snowball sampling was a further limitation of Study One. Snowball sampling may have provided a clearer indication of the prevalence of attention difficulties in the sample as participants would have been recruited in a more randomised manner through inclusion of all children from a particular grade, and not only those whom teachers suspected as having attention difficulties. The effect of the use of purposive sampling, in addition to uneven group sizes, could be part of the reason why there were no significant differences for participants in the two groups across many of the measures and factors assessed. If I repeated the study, I would co-ordinate better with the teachers and staff at the schools to ensure the use of snowball sampling for recruitment of parent and child participants.

Further to this, it is possible that only parents who felt they could benefit from participation responded to the invitation to participate in Study One, thus resulting in fewer responses from parents who did not suspect attention problems in their children and leading to self-selection bias. To avert this, if I were to reproduce the study, I would outline the benefits in greater detail in the invitation letters sent to parent participants, which could encourage other parent participants to take part. Also, given restrictions and concerns around the pandemic at the time, parents were likely apprehensive about their children participating in research studies at the school.

Regarding study measures, use of only two scales of the CBCL may have impacted negatively on the results of Study One. As previously noted, although this approach was taken as these scales provided supplementary information used in addition to the standardised measures of the Brown EF/A Scales and PANAS-C, and non-standardised verbal observations, developmental questionnaire, completing the full CBCL with parent participants may have yielded richer and more complete data regarding the extent of child participants' difficulties. The inclusion of the full CBCL could be a consideration for future study.

An additional limitation is that several parents were unable to provide details about some of their children's difficulties, such as not knowing terminology for some of the medical conditions. This may have been due a variety of unverified factors, such as medical professionals not providing feedback in a language which the participants may have understood at the time, parental difficulties with understanding my questions in English during the interviews with them, or parents possibly forgetting some of the information. Although I asked as many questions as possible regarding vague information provided by parents and clarified as best as possible to minimise the effect of this on Study One, the lack

of details provided may have affected the accuracy of information and consequent results of some of the analyses of data. Although only parent and child participants were expected to be conversant in English for inclusion in Study One, should the study be duplicated, assistance of a translator during all interviews may be useful. The translator would need to be fluent in the most predominant languages of Gauteng, such as isiZulu and Sotho (Statistics South Africa, 2022).

Similarly, it also became apparent that some parents could not provide information about developmental issues, such as age at which their children attained developmental milestones. This could be due to some parents not living with their children during the early childhood phase or parents being unable to remember problems with development. The impact of this was minimised by asking parents questions related to milestone attainment in relation to the climatic seasons (winter, summer, spring and autumn), before correlating this information with the child's date of birth. For example, if a parent stated that they were unsure when their child first walked, I would ask if they remembered if it was summer, spring, winter, or autumn and if they remembered another milestone for the child around that same time, such as the child's first birthday. I then calculated an approximate month based on the child's date of birth and shared this information with the parents for verification. Thus, use of a calendar may be useful should the study be replicated.

Likewise, it was not determined whether results of measures were aligned well with expectations for child participants. This may have negatively affected the integrity of results of Study One, when data did not correspond well for some of the child participants.

Relatedly, another problem which arose was the overlap of problems related to attachment-related and emotional problems, such as seen in cases where emotional trauma was experienced by child participants as a result of being separated from their primary caregiver. To this end, to ensure information was captured as accurately as possible, overlapping identified difficulties were included in both categories, such as "Father working away from home" (in Attachment-related Problems in the form of early separations) noted as "Absent father" (in Emotional Trauma). Assistance of a translator may have been worthwhile to ensure I understood the exact issue mentioned by parent participants better. I could then include the issue in the correct category of risk factor if I reproduced Study One. Concerning the specific risk factors of neonatal complications, Study One indicated one ATT-DIFF parent participant receiving ARV treatment during her pregnancy. Although studies have been conducted extensively in other areas of the world with some studies concluded in South Africa, the incidence of ADHD in childhood and prenatal ARV treatment could be an

important focus of further research given the high levels of HIV/AIDS in South Africa (Simbayi, 2019).

Correspondingly, a further limitation which became apparent was related to the un-involvement of some parents (in particular, fathers). This was further associated with some child participants' mothers not being aware of information related to the paternal family history of mental and health conditions. However, this limitation could not be mitigated due to the possibility of inaccurate reporting or overinterpreting of undiagnosed conditions. In addition to this, it is possible that parents and their biological extended family members may suffer from other conditions, which are not recorded in Study One, due to family members and parents not having access to adequate healthcare. To this end, only diagnosed conditions were reported regarding maternal and paternal family history of mental and health conditions

Also, as noted some child participants had difficulty understanding descriptors of the PANAS-C. This could be related to most children not speaking English as their home language and may have impacted the results of Study One. If I reproduced this study face-to-face, showing child participants emoticons related to each descriptor, and assistance of a translator, may be helpful.

Relatedly, lower levels of educational attainment and employment status may have affected how parent participants completed the Brown EF/A Parent Forms at the start of Study One. Going forward, to avoid low SES bias, confirming parental understanding of the various items when engaging with them during subsequent parent interviews, should the study be replicated.

In a similar manner, although ADHD affects children and their families across all socio-economic groups, some of the findings of Study One may not be generalisable to all groups of children, irrespective of their socio-economic status. Despite this, it is worth noting that access to treatment is limited for individuals from lower socio-economic groups (Wright et al., 2015; WHO, 2021).

Likewise, only attention problems and no other neurodisabilities[34] were screened for in child participants. These may have accounted for poor academic progress, slow learner or grade repetition in three child participants in the No-ATT-DIFF group. A future study of this nature could include the full CBCL to screen for other neurodisabilities.

[34] **Neurodisabilities** is the term for impairments in the brain and neuromuscular system with accompanying difficulties and limitations with cognition, hearing, vision, emotion, communication, behaviour and movement. They include conditions such as cerebral palsy, ASD and spina bifida (Roldán-Pérez et al., 2023).

It is also noteworthy that issues related to developmental trauma and diagnoses of Covid-19 were not determined in the study. Incidence of these may have provided richer data for participants of Study One.

Furthermore, as the ATT-DIFF group of child participants have not been formally diagnosed with ADHD and the reported existing research pertains to children with ADHD, these results may have limited applicability.

Finally, due to there being no direct clinical observations of non-verbal aspects of the child participants' behaviours, verbal observations were limited only to those which could be noted telephonically/virtually, such as child participants asking for instructions to be repeated, not responding to questions, inter alia. Thus, the inclusion of observations was purely as supplemental information to limit the impact of this measure on the objectivity of the overall screening process, but I acknowledge the limitations thereof when compared to actual in-person behavioural observations in everyday settings. Face-to-face interviews and administration of the different assessment measures could be useful if the study were reproduced in future.

Significance of Study One

Despite the limitations of the current study, Study One provided insight into a number of issues. Firstly, the study described the demographic variables of parents and child participants as well as the extent of possible attention challenges in child participants at a school educating children from low SES communities in Ekurhuleni, a large city in South Africa. Moreover, Study One shared information about the extent and types of attention difficulties and co-morbid problems experienced by child participants as recorded in results of the standardised and non-standardised measures. This study also explored the known risk factors for ADHD and attention difficulties as applied to child participants from the study site.

For these reasons, and notwithstanding the noted limitations, it can be concluded that the aim of Study One was successful in identifying the extent of diagnosed attention problems in a sample of Foundation Phase learners attending a school for children from low SES communities as a preliminary study for Study Two.

Conclusion

Study One was conducted to provide insight into the extent of attention difficulties in children aged 8 to 12 years in a school for learners from low SES communities in Ekurhuleni, Gauteng. This was conducted as a needs assessment before the presentation of a BPT programme which formed part of Study Two. To this end, Study One provided information

about the demographic variables of parents and child participants as well as the predominant age ranges, extent of diagnosed attention difficulties, and co-morbid emotional problems of child participants. Additionally, it showed how ADHD-related risk factors are expressed in child participants with attention difficulties at the site of research.

Before Study Two, which focuses on the teacher-led parent training intervention I implemented, is shared, I will be discussing current treatment modes for ADHD with a special focus on psychosocial interventions, and specifically BPT programmes in Chapter Four. Thereafter, a description of Study Two will follow in Chapter Five.

Chapter Four

ADHD: Types of and Barriers to Treatment

Following the overview of ADHD discussed in Chapter One and theoretical framework discussion in Chapter Two, Chapter Three shared findings from Study One, which indicated the extent of attention problems in a school educating learners from low SES communities in Ekurhuleni, Gauteng.

With an understanding of the challenges faced, this chapter will focus on the various treatments that are available for ADHD, specifically for children and adolescents. Thereafter, factors that influence outcomes for ADHD and treatment options globally and in South Africa will be explored with particular reference to BPT programmes.

Treatments for ADHD

Treatments for ADHD can involve the use of pharmacological as well as multimodal supports, including behavioural training (Flood et al., 2016; Pan et al., 2019; Swanson et al., 2018). With this in mind, pharmacological, technology-related, and psychosocial treatments will be discussed before providing an analysis of treatment protocols followed across different regions of world.

Use of Pharmacology and Dietary Supplements

There are various pharmacological medications that have been shown to be successful in managing ADHD in children (Mechler et al., 2022). These include conventional (allopathic) medications and alternative (usually herbal or homeopathic) treatments, in addition to mineral and vitamin supplements. For ease of reference, Table 19 summarises the nature of pharmacological treatment modes, mechanisms of action, efficacy, as well as associated benefits and risks for children. As noted in Table 19, there are benefits to using the various medications, whether allopathic, herbal or supplements.

Concerning allopathic medications, high rates of efficacy, of between 70% and 80% reduction in ADHD symptomology, are noted in children using stimulant medications (Advokat & Scheithauer, 2013; Cortese, 2020). Use of stimulant medications has been associated with lowered risk for motor vehicle accidents, decreased rate of mood disorders, lowered risk for involvement in criminality-related behaviours, and better academic outcomes (Boland et al., 2020; Ghirardi et al., 2020; Jangmo et al., 2019; Yeh et al., 2020). However, non-stimulant mediations also show some effectiveness in the reduction in severity of ADHD symptoms (Cortese et al., 2018), enhanced quality of life (Childress, 2015), and improvements in symptoms of co-morbid anxiety and ODD (Childress, 2015).

Table 19

Summary of ADHD Pharmacological Treatment Modes, Efficacy, Mechanisms of Action, Potential Benefits and Risks for Children

Description/ Name of treatment	Efficacy and Indications	Mechanism	Potential benefits for children	Potential risks for children	Authors
Pharmacological: Conventional/ Allopathic: Stimulants used in South Africa					
Methylphenidate (sold in South Africa as Neucon, Ritalin, Contramyl, Concerta)	High rate; most commonly prescribed	Increase levels of norepinephrine and dopamine in the synapse by blocking the reuptake of norepinephrine and dopamine from the presynaptic neuron	Effective in reducing symptomology; extended release allows convenience of single dose; protective factor when used at a young age against substance abuse; lowered risk for motor vehicle accidents; decreased rate for mood disorders; lowered risk for involvement in criminality-related behaviours, decreased risk of suicidality, lowered involvement in activities which lead to physical injury; better academic outcomes	Inconsistent use of medication, often used only in the short-term; slow growth rate; hallucinations; decreased appetite; sleeping problems; abdominal pain; headaches; arrhythmias; cardiovascular; sudden cardiac death; slow pubertal maturation in boys; decreased bone mineral content; limited data regarding long-term use	Avigan, 2004; Boland et al., 2020; Briars & Todd, 2016; Bussing et al., 2012; Carolan, 2022; Chan et al., 2023; Childress et al., 2019; Cortese et al., 2018; Faraone, 2018; Ghirardi et al., 2020; Groenman et al., 2019; Heal et al., 2022; Jangmo et al., 2019; Mechler et al., 2022; Mosholder et al., 2009; Munasur-Naidoo & Truter, 2019; Normal et al., 2021; Poulton et al., 2012; Poulton et al., 2016; Schweren et al., 2018; Shin et al., 2016; Steinhausen & Bisgaard, 2014; Storebø et al., 2018; Swanson et al., 2018; Wilens et al., 2022; Yeh at al., 2020; Zhang et al., 2023
Pharmacological: Conventional/ Allopathic: Amphetamines					
Adderall and Vyvanse	High rate	Blocks reuptake of dopamine and norepinephrine in the synapse; stimulates an increase of dopamine and norepinephrine from presynaptic terminals	Overall symptom reduction in inattentive and impulsive/ hyperactive domains; convenience of single dose	Decreased appetite; weight reduction; insomnia, affect lability	Briars & Todd, 2016; Childress et al., 2018; Childress et al., 2019; Hodgkins et al., 2012;
Pharmacological: Conventional/ Allopathic: Non-stimulants					
Atomoxetine (Strattera)	Used when stimulants are contra-indicated or in children with tic disorders or existing cardiovascular problems; less commonly prescribed than methylphenidate	Selective norepinephrine reuptake inhibitor; inhibition of the presynaptic norepinephrine transporter averting the reuptake of dopamine in selected regions of the brain, including the prefrontal cortex, as well as norepinephrine in all regions of the brain	Effective reduction in severity of ADHD symptomology; enhanced quality of life; improvements in symptoms of co-morbid anxiety and oppositional defiant disorder; convenience that non-stimulants may be administered at any time during the day	Somnolence, nausea and vomiting; increased blood pressure and heart rate; headaches; increased suicidal ideation; signs of liver failure	Briars & Todd, 2016; Callahan et al, 2019; Childress et al., 2015; Cortese et al., 2018; Eli Lilly and Company, 2020; Fu et al., 2022; Mechler et al., 2022; Strattera, 2022; US Food and Drug Administration, 2009; Pan et al., 2021; Warikoo & Faraone, 2013; Wigal, 2009; Wolraich et al., 2019

Description/ Name of treatment	Efficacy and Indications	Mechanism	Potential benefits for children	Potential risks for children	Authors
Alternative treatments: homeopathic medications					
Bacopa Monnieri	High levels	Regulation of dopamine and acetylcholine	Overall improvements in cognitive symptoms, including verbal learning, memory and information processing	Digestive discomfort, such as cramps and bloating	Bhardwaj et al., 2023; Dave et al., 2014; Tardner, 2020; Thanh, 2023; Urooj et al., 2022;
Pycnogenal	Concern noted due to limited unbiased trials	Lowered levels of dopamine, noradrenaline and adrenaline levels	Improvements in visual-motor co-ordination and lowered hyperactivity	Gastrointestinal problems, dizziness, headache and nausea when taken without food	Chovanová et al., 2006; Hadi et al., 2019; Trebatická et al., 2006
Ningdong capsule	Has not been extensively researched, therefore its overall consistent efficacy cannot be established	Regulation of dopamine	Reported overall alleviation of ADHD symptoms	Abdominal pain; nausea; difficulty falling asleep; increased appetite; anxiety; hypersomnia	Li et al., 2011; Wang & Li, 2019
Vitamin and Mineral Supplementation					
Omega 3 oils	Results from studies are inconsistent	Alleviation of ADHD symptoms	Improving neuronal functioning and implicated in healthy brain development	Increase in side effects of methylphenidate when used in combination with methylphenidate	Bloch & Muqueen, 2014; Bos et al., 2015; Händel et al., 2021; Königs & Kiliaan, 2016; Joshi, 2022; Manor et al.,2012; Mohammadzadeh, et al., 2019
Vitamins B6, C	Inconsistent results due to limited studies	Deficiencies related to lower levels of norepinephrine and dopamine	Maintenance of central nervous system pathways and prevention of neurotoxicity	Mild reports of insomnia; irritability; mild hyperactivity; increased stereotypic behaviours	Cucinotta, et al., 2022; Joshi et al., 2006; Moghadas et al., 2019; Mousain-Bosc, et al., 2006
Zinc, Magnesium, Iron	Effective in small subgroups of children with ADHD	Supplementation assists as deficiencies in these minerals are often noted in children with ADHD	Improvements in motor activity levels; improvements in dopamine levels	Minor reports of vomiting; nausea; physical pains and constipation	Granero et al., 2021; Frank, 2017; Konofal et al., 2008; Lange et al., 2017; Mousain-Bosc, et al., 2006; Pellow et al., 2011

Note. ADHD: Attention Deficit Hyperactivity Disorder

Regarding homeopathic medications, Bacopa Monnieri, an Ayurvedic medication, has been shown to improve ADHD symptoms in a study of 31 children aged between 6 and 12 years (Dave et al., 2014; Thanh, 2023). Another herbal product which has shown promise is Pycnogenal, a French maritime bark extract, with reported improvements in visual-motor co-ordination and hyperactivity (Chovanová et al., 2006; Trebatická et al., 2006). Furthermore, a Chinese medication, Ningdong granule, has shown positive results in alleviating symptoms of ADHD (Li et al., 2011).

With supplementation options, Omega-3 oil supplements are popular choices for alleviating symptoms of ADHD (Bos et al., 2015; Königs & Kiliaan, 2016). Symptom reduction is noted after supplementation in children with, or at heightened risk for, iron, zinc or magnesium deficiencies (Granero et al., 2021; Konofal et al., 2008; Lange et al., 2017; Mousain-Bosc, et al., 2006; Pellow et al., 2011). Other supplements indicated in symptom decline include Vitamin C and flax oil as well as Vitamin B6 (Joshi et al., 2006; Mousain-Bosc, et al., 2006). Vitamin and mineral supplementation is effective due to many children being at risk for nutritional deficiencies, as they do not meet the recommended daily allowances for meat, vegetables, grain and fruits (Frank, 2017).

However, despite the various benefits of using allopathic and homeopathic medications as well as nutritional supplements, there are possible risks involved.

Potential risks of stimulant medications include slower rate of growth when compared to peers of the same age although slowed growth rate may be related to disorder-specific traits, rather than to the medication (Landgren et al., 2017; Ptacek et al., 2014; Swanson et al., 2007; Swanson et al., 2018). Furthermore, research suggests that it is not feasible to attribute slowed growth rate specifically to the use of stimulant medications as a result of limited understanding of the neurochemical alterations found in individuals with ADHD (Ptacek et al., 2014). Nonetheless, other commonly cited side effects include hallucinations (Mosholder et al., 2009), decreased appetite (Poulton et al., 2016; Storebø et al., 2018), sleep-related problems (Mechler et al., 2022), abdominal pain (Storebø et al., 2018), headaches (Mechler et al., 2022; Pan et al., 2021) as well as arrhythmias and cardiovascular problems (Shin et al., 2016; Zhang et al., 2023), with some studies showing the risk for increased blood pressure and heart rate (Cortese et al., 2013; Mechler et al., 2022). However, cardiovascular-related problems in children and adolescents are not consistently verified, as discussed in a systematic review by Storebø et al. (2018), which consisted of a comparison of results from clinical trials in over 400 studies, in addition to a meta-analysis conducted by Zhang et al. (2022) which confirmed the same. Nevertheless, sudden cardiac death in children has

previously been cited as a very uncommon occurrence (Avigan, 2004). Other reported side effects include a decrease in bone mineral content and density in children using stimulant medications to treat ADHD (Poulton et al., 2012). A later study by the same authors also showed slowed pubertal maturation in boys aged 14 to 16 years (Poulton et al., 2012).

Relatedly, some parents have concerns that their child will be at risk for substance abuse if they have been medicated with stimulant medication for ADHD, partly due to misinformation about ADHD medications (Sonuga-Barke et al., 2023). However, numerous studies have shown the converse to be true (see Boland et al., 2020; Carolan, 2022; Groenman et al., 2019; Wilens et al., 2022). Interestingly, children who received treatment from a younger age, and with higher dosages of medication, tended to be at lower risk for developing a substance abuse disorder, possibly due to untreated older children presenting with more complicated courses of the disorder (in the former studies which demonstrated such risk), thus placing them at heightened risk for the development of a substance use disorder, in comparison to no lowered risk associated with children who only received treatment at later stage (Steinhausen & Bisgaard, 2014). While this may be true, there is a heightened risk for adolescents who were treated with stimulant medications, particularly in moderate to higher dosages, to develop nicotine dependence (Groenman et al., 2019).

In addition, there are adverse effects for child and adolescent populations for the various non-stimulants that warrant consideration. Negative side effects for atomoxetine include somnolence, nausea and vomiting (Eli Lilly and Company, 2020; Strattera, 2022), heightened blood pressure and heart rate and headaches (Pan et al., 2021; US Food and Drug Administration, 2009). A further concern noted, particularly for use of atomoxetine, is the potential for increased suicidal ideation as well as signs of liver failure (Briars & Todd, 2016; Strattera, 2022). By comparison, the most common side effects in children reported for clonidine and guanfacine are hypotension, somnolence and abnormally slow heart rate (Biederman et al., 2008; Sharma & Gupta, 2019; Mylan Pharmaceuticals, Inc, 2017; Naguy, 2016). Similarly, side effects of viloxazine in children include decreased appetite, nausea, vomiting, somnolence and irritability (O'Connor et al., 2023).

Although many parents consider homeopathic medications as safer options for their children, there are still negative side effects which are worth deliberating (Mohammadzadeh et al., 2019). For instance, some individuals who use Bacopa Monnieri report digestive issues, such as stomach cramps, particularly with infrequent, long-term usage (Tardner, 2020). Similarly, Pycnogenal may also induce gastrointestinal problems, nausea, headaches and dizziness, especially when consumed before a meal. At the same time, the Ningdong

capsule has been associated with abdominal pain, nausea, difficulty falling asleep, increased appetite, anxiety or nervousness as well as hypersomnia (Wang & Li, 2019). Moreover, there are insufficient and inconsistent results noted in studies involving some natural options, particularly those regarding Pycnogenal, Ningdong and Omega 3-oils (Bos et al., 2015; Catalá-López et al., 2017; Golsorkhi, et al., 2023; Händel et al., 2021; Kemper et a., 2018; Lange et al., 2017; Lange, 2020; Li et al., 2011).

Vitamin supplementation, particularly with Vitamin C and Vitamin B6, is associated with mild symptoms related to irritability, mild hyperactivity, insomnia, and reports of increased stereotypic behaviours (Cucinotta et al., 2022). Likewise, supplementation with Zinc, Magnesium, and Iron could cause these adverse side effects: nausea, vomiting, constipation, physical pains, and reports of a metallic taste in the mouth following ingestion (Granero et al., 2021). Although no consistent reports of adverse side effects are noted for supplementation with Omega 3-oils, when combined with methylphenidate, negative reactions of the latter are enhanced (Mohammadzadeh, et al., 2019).

Apart from parental concern about negative side effects and attitudes towards medication use, there are other considerations worth exploring, such as adherence to treatment and limited support for long-term usage of medications and supplements (Brinkmann et al., 2018; Emillson et al., 2020; Kamimura-Nishimura, et al., 2019; Khan & Aslani, 2021).

Treatment Adherence and Long-Term Efficacy/Effectiveness.

Adherence to Treatment. Treatment adherence to ADHD medications, particularly for children and adolescents, has been a concern for many years (Adler & Nierenberg, 2010; Charach & Fernandez, 2013; Kamimura-Nishimura, et al., 2021; Khan & Aslani, 2020; Thiruchelvam, et al., 2001). Reasons cited for poor adherence include intolerability, difficulty in using (such as timing of medication intake), inconvenience of needing to administer multiple dosages daily, high cost of medication, and reported and experienced efficacy of the medication (Brinkmann et al., 2018; Charach & Fernandez, 2013; Ishizuya, et al., 2021; Kamimura-Nishimura, et al., 2019). Studies further show that the following factors may decrease adherence to medication use: parental beliefs that ADHD is not a neurobiological condition, stigma concerning medication use, parents lacking knowledge about ADHD and treatment options, increased conflict between parents and children, and lower SES (Baweeja et al., 2021; Ishizuya et al., 2021; Kamimura-Nishimura, et al, 2021). Child characteristics include unwillingness to take medications, co-morbidities of ODD and/ or CD, lower levels of ADHD severity, as well as personal characteristics within the child, with studies

suggesting more resistance to medication by non-white and female children, for example[35] (Emillson et al., 2020; Kamimura-Nishimura, et al., 2019).

Long-term Efficacy/ Effectiveness of ADHD Medications and Supplements.

Relatedly, there is limited support for long-term use of medication to treat ADHD, with medication use often occurring in the short-term and being used inconsistently (Bussing et al., 2012). Although research shows that acute effects of medication include improvements in working memory, reaction time, response inhibition, and flexibility in maintaining attention (Bofler et al., 2018), limited data is available regarding long-term use of ADHD medications such as methylphenidate (Schweren et al., 2018). Some studies suggest that, although medication tolerance is under-reported and under-recognised, children and adolescents could potentially build tolerance towards methylphenidate and other stimulant medications, possibly due to changes to brain regions and at the neuronal level (Handelman & Sumiya, 2022; Rosenau et al., 2021; Wang et al., 2013). One study noted that there could be a gradual loss of efficacy of stimulant medications over time (Cunill et al., 2016).

Regarding supplementation specifically, long-term use of Omega 3 oils has been related to increased risk for atrial fibrillation (Gencer et al., 2021), and of Vitamin B6, to sensory peripheral neuropathies (Muhamad et al., 2023). Further, Vitamin C supplementation over extended periods could be related to increased risk for kidney stones, long-term use of Magnesium may reduce the absorption of other minerals, and Zinc supplementation over an extended period may cause altered smell and taste (Moses, 2021). Also, as there is limited research on the long-term effects of supplementation with vitamins and minerals, the safety of this approach cannot be established (Zhang et al., 2020). For these reasons, parents of children with ADHD may seek alleviation of symptoms through using other treatments, such as those related to the use of technology and psychosocial interventions.

Technology-related Treatments

With recent technological developments, treatment modes for children and adolescents with ADHD now include Computer-Assisted Learning (CAL) and game-type interventions in which executive functions have been shown to improve (Alabdulakareem & Jamjoom, 2020). Implementing digital interventions, such as Software Treatment for

[35] Researchers determined that **personality traits**, such as antagonism, negatively affect adherence to medication schedules, and perceptions about ADHD (Emillson et al., 2020). A further study notes that adolescents prefer self-reliance over formalised treatments for ADHD, with culture-related perceptions on ADHD difficulties also impacting on the child's willingness to continue using medication in adolescence (Kamimura-Nishimura, et al., 2019; MacDonald et al., 2019).

Actively Reducing Severity of ADHD (STARS-ADHD), which utilises a video game-like interface, has shown promising results in alleviating symptoms of ADHD in children (Kollins et al., 2020). Overall, parents noted significant improvements after implementation of STARS-ADHD, although results from teachers were not significant. However, according to a meta-analysis, computer-based cognitive training programmes, such as Cogmed, may result in a reduction in ADHD symptoms only in the short-term (Kemper et al., 2018). Recent studies indicate that hemoencephalographic (HEG; a form of neurofeedback) and electrooculography (EOG) biofeedback treatments reduce symptoms of ADHD (Baumeister et al., 2018; Kemper et al., 2018; Sho'ouri, 2022; Skalski et al., 2021; Vlachou et al., 2022). HEG biofeedback, combined with virtual reality, results in increased cerebral blood oxygenation and improved ADHD symptoms (Skalski et al., 2021). However, results are inconsistent when considering findings from a previous meta-analysis, which showed no significant improvement in the use of biofeedback for the treatment of ADHD (Catalá-López et al., 2017).

With regards to efficacy, a systematic review of 19 randomised controlled studies focusing on the use of technological interventions with N=1843 children of school-going age who were diagnosed with ADHD, showed small but significant improvements in executive functioning skills, parent-rated disruptive behaviour, and visual attention (Wong et al., 2023). In contrast, no significant positive changes were indicated for working memory, initiation, planning and organisation, teacher-rated disruptive behaviour, auditory attention, parent- and self-rated quality of life, sensitivity to reward and punishment, medication adherence, as well as other impulsivity- and hyperactivity-related symptoms (Wong et al., 2023). Furthermore, a review of 409 articles from three databases focusing on changes in ADHD symptomology in children aged below 18 years, determined that use of virtual and augmented reality technologies showed significant reductions ADHD symptoms despite no improvements indicated for reading and spelling skills (Goharinejad, et al., 2022).

In sum, although there are many positive outcomes associated with technology-related interventions, there are also some drawbacks, particularly with regards to resources. For example, there are associated financial costs to purchase technological devices and programmes, the necessary physical space to implement some therapies, and the time needed to practise the treatments (Cibrian et al., 2022).

Psychosocial Interventions

Teaching mindfulness-based techniques like Mindfulness Based Stress Reduction (MSBR), Digital Cognitive Mindfulness Training, Mindfulness Based Cognitive Therapy

(MBCT), yoga and deep breathing techniques have shown mixed results as successful treatments as adjunct therapies (see Oliva et al., 2021; Ponomarev et al., 2023; Tercelli & Ferreira, 2019; Wang et al., 2020, Xue et al., 2019). In fact, a variety of systematic reviews and meta-analyses have shown that psycho-education groups incorporating elements of skills training outperformed mindfulness-based interventions (Olivia et al., 2021).

Similarly, involving children in social skills programmes, such as Stop Think Do and Stop Think Act, have yielded positive results in teaching emotional control and cognitive and behavioural skills for better social relationships (Mcclelland & Tominey, 2016; Peterson, 1995; Petersen & Adderley, 2002). Although the Stop Think Do programme was developed originally to improve children's social and behavioural skills, results suggest increased motivation for learning and decreased impulsivity and distractibility for children with ADHD (Adderley, 1995). Further, better self-regulation skills from early childhood have been associated with improved academic results, healthier friendships, and better management of stress (Mclelland & Tominey, 2016).

Interestingly, there are conflicting results regarding whether low stimulation educational environments lead to the improvement of ADHD symptomology (Bischler, 2022; Kofler et al. 2016; Krtkova, 2022; Metin et al., 2013). For example, one study found that seating children with ADHD away from distractors and the use of alternative seating apparatus (such as standing desks and disc "o" sit cushions) improved concentration on tasks (Stapp, 2018), while a meta-analysis of 63 studies showed that low stimulation educational environments may rather increase hyperactive behaviours in children with ADHD (Kofler et al., 2016).

Studies indicate that physical exercise is considered an effective treatment for cognitive symptomology of ADHD due to improvements in executive functioning, particularly with attentional flexibility, inhibition, working memory, and planning skills (Lambez et al., 2020; McKnight et al., 2019; Vysniauske et al., 2020). However, a literature review by Suarez-Manzano et al. (2018) generated mixed results, particularly regarding variations in long- and short-term results, intensity of exercise, duration, and type of exercise in addition to the time of day during which the exercises were performed.

Due to the inconsistent success rates, adverse side effects, intolerance, and other associated factors noted, such as cost, psychosocial interventions, as part of a multimodal treatment plan have become increasingly popular in treating ADHD (Drechsler et al., 2020, Duric et al., 2017).

Psychosocial Interventions and the Multimodal Approach to the Treatment of ADHD. As a complete methodology, the multimodal approach targets various areas of the individual's functioning, including psychosocial interventions, psycho-education about ADHD, parent counselling, teacher and parent training, behaviour training or therapy for the individual with ADHD, complementary or alternative techniques, including neurofeedback, and the use of pharmacology in the treatment of ADHD (American Academy of Pediatrics, 2019; Döpfner, et al., 2020; Drechsler et al., 2020; Duric et al., 2017; Geissler et al., 2018; Mechler et al., 2022; Schellack et al., 2019; van der Oord et al., 2012; Wolraich et al., 2019).

Many healthcare providers abide by the National Institute for Health and Care Excellence (NICE) guidelines which encompasses a multimodal approach through recognition and referral of individuals suspected of having ADHD, assessment protocols, sharing of information about the diagnosis with the individual and their families, management of the disorder through consideration of diet, medication options, maintenance of the disorder, and adherence to treatments before considering review of medication, and termination of treatment, when appropriate (Bowling & Nettleton, 2020; NICE, 2023). Although this approach is considered the most suitable in South Africa also, it is not always followed for reasons explained further in this chapter (Vrba et al., 2016). Particularly with regards to implementation of the NICE guidelines, limitations in terms of development of the recommendations, guidelines not taking into account negative side effects of medications, in addition to focusing on short-term, and not long-term treatments, it may not always be possible to apply the guidelines consistently (Faltinsen et al., 2019). Thus, implementing a multimodal approach is not feasible in many low SES communities despite its efficacy. With these limitations in mind, we will now consider a further option regarding the treatment of ADHD, employment of BPT programmes in isolation.

BPT Programmes. As noted previously, ADHD can have devastating impacts on many areas of a child's and their family's functioning (Hinshaw, 2018; Lee et al., 2021; Vacher et al., 2020). As such, interventions that target the entire system in which the child exists, and which involve parents directly in the treatment could be beneficial (Emerson & Bögels, 2017). For example, Ciesielski et al. (2020) showed that BPT, although usually implemented as part of the multimodal approach, leads to improved behavioural compliance related to problematic behaviours such as chore and homework completion, mealtimes, and peer relationships, and lowered parental stress levels. Also in support of this treatment approach, a study in Denmark showed positive results when community volunteers were trained to provide support to parents of children with ADHD following BPT methods, which

included well-researched behavioural modification techniques and supervision during the research process. Specifically, results indicated improvements in children's functioning, parents' sense of competence in their parenting skills, and reduced levels of parental stress (Chacko & Scavenius, 2018).

Parent counselling and psycho-education are often included in a programme of BPT, aimed at educating parents and other caregivers, as well as teachers of children and adolescents, about ADHD and management techniques for difficulties related to ADHD. Parent training could, thus, include psycho-education about ADHD, and behaviour management strategies (Marquet-Doléac et al., 2023, van der Oord, 2020; Wolraich et al., 2019). For example, a study by Bai et al. (2015) showed that after psycho-education was provided to parents, they were able to improve the management of their children's behaviour. Parents gained emotional and informational support, and their own mental health improved. Further, parent counselling regarding ineffective parenting strategies and teaching parents valuable parenting practices and supportive strategies for themselves, could assist with their child-rearing and improve the way the family functions (Emerson & Bögels, 2017; Moen et al., 2016; Wolraich et al., 2019). To this end, teaching parents about social learning theories and principles, such as positive reinforcement and behaviour management contingencies, could be worthwhile as part of a BPT (Gupta & Sahai, 2024; van der Oord & Tripp, 2020).

Involving teachers in a training programme for parents of children with ADHD may result in a reduction in children's symptoms of ADHD as the programme provides a cost- and time-effective option for treatment (Korkram et al., 2004). Additionally, participation in teacher training programmes on ADHD increases the teachers' confidence in working with children with diverse needs (Ward et al., 2022). Similarly, parents have reportedly perceived that activities that improve parent-teacher collaboration in working with children with ADHD, as well as developing secure relationships between children and teachers, are beneficial to their children, thus improving the child's motivation levels and academic performance (Ewe, 2019; Krtkova et al., 2022; Rogers et al., 2015).

In addition to parent counselling, psycho-education, and including teachers in the intervention, research also shows that training parents about nutrition management and suitable dietary options can complement behavioural training and other treatments (Lange, 2020). For example, utilisation of the few-foods (oligoantigenic) diet, with the exclusion of particular food types in sequence, assists parents in identifying foods that exacerbate ADHD symptoms in their children (Lange et al., 2023; Uldall Torp & Thomsen, 2020).

In sum, psychosocial strategies and training, including parent training and guidance, as well as teacher training in behavioural modification and classroom management, are therefore shown as effective alternative treatments for children with ADHD (Claussen et al., 2022; DuPaul et al., 2020; Hinshaw, 2014; van der Oord & Tripp, 2020). Notwithstanding these positive effects reported following the implementation of such parent training programmes, it is prudent to consider results of various systematic reviews and meta-analyses regarding the overall efficacy of BPT.

Review of Systematic Reviews and Meta-analyses of BPTs. Table 20 includes systematic reviews and meta-analyses of such parent training programs, almost all focused on working with children aged between 2 and 18 years of age, although one of the data sets focused on children and adults with ADHD (Shou et al., 2022). Most of the data showed positive results, with the majority of results recorded as moderate to superior in terms of outcomes measured (such as emotional dysregulation), and with more success noted for younger children when compared to adolescents (Aldabbagh et al., 2022; Evans et al., 2018; Fabiano et al., 2021; Kemper et al., 2018; Türk et al., 2023; Vacher et al., 2020), In addition, most of the research reported reductions in problematic externalised behavioural symptomology, including irritability, aggressiveness, and conflict with others, particularly with teachers (Aldabbagh et al., 2022; Fabiano et al., 2021; Marquet-Doléac et al., 2023; Vacher et al., 2020). Social skill improvements and increased prosocial behaviours were also described (Aldabbagh et al., 2022; Fabiano et al., 2021; Kemper et al., 2022; Marquet-Doléac et al., 2023; Shou et al., 2022; Vacher et al., 2020). Interestingly, none of the research conveyed positive academic progress (Aldabbagh et al., 2022; Catalá-López et al., 2017; Evans et al., 2018; Fabiano et al., 2021; Kemper et al., 2022; Marquet-Doléac et al., 2023; Shou et al., 2022; Türk et al., 2023; Vacher et al., 2020). Nonetheless, two series of data showed improvements in parenting skills, heightened perceptions of efficacy by parents, and lower levels of parental stress (Fabiano et al., 2021; Marquet-Doléac et al., 2023).

Three of the data sets shared findings related to using BPT in isolation (Evans et al. 2018; Fabiano et al., 2021; Vacher et al., 2020) with four of the sets of research analysing the use of BPT in combination with other psychosocial interventions, including teaching of social skills, behavioural modification strategies, and teacher training (Aldabbagh et al., 2022; Catalá-López et al., 2017; Shou et al., 2022; Türk et al., 2023). One of the reviews re-counted findings of a BPT programme which involved teachers only (Aldabbagh et al., 2022). Also, four discussed results of BPTs involving parents and two encompassed participation from the

children themselves (Evans et al., 2018; Fabiano et al., 2021; Kemper et al., 2018; Marquet-Doléac et al., 2023; Türk et al., 2023; Vacher et al., 2020).

Most of the reviews described studies that extended over multiple years (from 8 weeks to 48 years), with the majority of these focused on shorter periods, of approximately 4 to 8 years (Aldabbagh et al., 2022; Catalá-López et al., 2017; Evans et al., 2018; Fabiano et al., 2021; Kemper et al., 2022; Marquet-Doléac et al., 2023; Shou et al., 2022; Türk et al., 2023; Vacher et al., 2020).

Although, as mentioned, most reviews report positive outcomes, some of the results of the various data sets may not be generalisable due to a lack of a control group, a lack of follow-up on permanence of results, and limited diversity of participants (Aldabbagh et al., 2022; Catalá-López et al., 2017; Evans et al., 2018; Fabiano et al., 2021; Kemper et al., 2022; Marquet-Doléac et al., 2023; Shou et al., 2022; Türk et al., 2023; Vacher et al., 2020). Furthermore, only one review was focused on BPT programmes, delivered using an online mode (Shou et al., 2022). Interestingly, although not directly noted as related to SES of communities, only one review referenced developing countries with the use of telemedicine delivery of BPTs as a manner of overcoming uneven distribution of resources (Shou et al., 2022).

Despite the limitations, variations in the mode of delivery, and length of time of studies in the reviews, the most efficacious BPT programmes included the following elements: psycho-education about ADHD to parents and teachers, skills training, teaching positive parenting practices and behavioural modification strategies, and involving children in the process. Moreover, for maximum benefit, the programme would need to be implemented before adolescence.

Table 20

Summary of Systematic Reviews Regarding the Effectiveness of BPT in Alleviating Symptoms of ADHD

Authors	Methodology	Date	Number of studies	Sample characteristics	Overall results for psychosocial interventions
Catalá-López et al., 2017	Online search for RCTs	1 January 2005 – 7 April 2016	16	Under 18 years of age	Low to very low quality individual effects following BPT; BPT combined with stimulants show superior results
Kemper et al., 2018	Online search of RCTs and observational studies	1 January 2009 – 7 November 2016	3	Birth – 17 years of age	Improvements in symptoms but not academic achievement; parent and child training considered together in analysis
Evans et al., 2018	Online search of RCTs; evidence-based assessment methods	August 2012 - December 2016	10	Preschool - under 18 years	Positive results for preschool and primary school aged children; mixed results for older children and adolescents
Fabiano et al., 2021	Online search of between-group design studies with predominantly random assignment to treatment group	1968 - 2016	123	Under 18 years of age	Overall strong positive effects noted for impairments in parenting with improvements noted for child behaviours in classroom sites
Vacher et al., 2020	Online search of RCTs, open-label uncontrolled study designs and quasi-experimental studies	2000 - 2019	12	Children and adolescents under 18 years of age	Reduction in emotional dysregulation and improvements in overall functioning following participation in the psychosocial interventions. Positive results were also note after use of pharmacology and psychosocial interventions.
Aldabbagh et al., 2022	Online search of peer-reviewed RCTs	5 February 2018 – 16 July 2021	31	Children aged 2 – 13 years	Teacher-rated positive effects for teacher-child closeness and reduced teacher-child conflict; reductions in ADHD symptoms and externalised behaviours in children and improved prosocial behaviours
Shou et al., 2022	Online search for RCTs and subgroup analysis; use of validated scales	Unspecified start date – 1 December 2021	6	Children and adults	Online BPT is more efficacious than being wait-listed in social and attention deficit functioning
Türk et al., 2023	Online search literature search of meta-analyses of RCTs and pseudo-RCT designs and within- and between-groups designs	Unspecified - July 2022	16	Children and adolescents under 18 years	Small but significant improvements in ADHD symptoms as rated by parents and teachers
Marquet-Doléac et al., 2023	Online search of RCTs; qualitative analysis of findings	Unspecified - July 2023	20	Children aged 4 – 12 years	Improvements in parental assessment of externalised behaviours and social skills; lowered levels of parental stress and improved feelings of parental efficacy

Note. BPT: Behavioural Parent and Teacher Training; RCT: Randomised control trials

In spite of the wealth of information available regarding training models which are widely used to teach parents and teachers separately regarding behavioural modification techniques and psycho-education of ADHD (Rimestad et al., 2018; Rooney et al., 2018; Veenman, et al., 2019), no research could be found for a model which has been developed for teachers to use to train parents of children with ADHD, or the efficacy of such a programme in South Africa. Still, assisting children from lower SES groups, particularly, could be beneficial as studies indicate these children are most negatively affected across various domains of functioning by ADHD symptomology and have limited access to other more expensive treatment types, including medication and technology-related interventions (Arnold et al., 2003, Wampfler, 2023).

Worldwide Treatment Protocols

Worldwide, ADHD treatment varies according to different regions. In some countries, e.g., the USA, medication is considered a first-line treatment (Cortese, 2020; Wolraich et al., 2019). Other countries, such as Brazil and the Netherlands, focus on withholding pharmacological intervention and providing psycho-social skills training and family support instead, with Brazil showing resistance to the use of medication due to stigma around its use (Ortega & Müller, 2020), and practitioners in the Netherlands noting concerns with adverse side effects and long-term use of medications (Hoekstra et al., 2021). Similarly, Italy seems to favour non-pharmacological interventions too, although medication may be used if deemed necessary (Bonati et al., 2021). By comparison, other European countries, such as Spain and the UK, seem to favour a combination of pharmacological treatment (utilising stimulants methylphenidate, amphetamine/dexamphetamine) or anti-stimulants (such as atomoxetine, guanfacine and atypical antipsychotics including aripiprazole and risperidone), and educational, behavioural and psychological interventions, including BPT (Coghill et al., 2023; Flood: 2016; Hodgkins et al., 2013; Wedge 2016). Accordingly, many countries prefer multimodal treatments due to concerns about long-term efficacy of medications, safety, and reported negative side effects of medication and other treatment options (Coghill et al., 2023).

Treatment in South Africa

Treatment protocols are not standardised at present in South Africa with treatment generally including stimulant medication (such as methylphenidate) or non-stimulant medication (such as atomoxetine) as first line treatments, and psychotherapy and psychosocial skills training as adjunct treatments (Hinshaw, 2014; Schoeman & Liebenberg, 2016; Vrba et al., 2016). However, medications are costly, which impedes access to treatment for many children. Psychosocial interventions, including psycho-education about behaviour

modification strategies and appropriate dietary choices, provided by psychologists in their involvement with parents and families, are then useful (Mohangi & Archer 2015; Topkin et al., 2015). Treatment choices may differ from one individual or family to the next, depending on a range of barriers.

Barriers to ADHD Treatment

As mentioned in Chapter One, children with ADHD are often under-diagnosed and untreated due to various factors (Massuti et al., 2021). For example, socio-economic difficulties in the context of inequitable provision of healthcare and logistical barriers to treatment (Fridman et al., 2017; Massuti et al., 2021, Wright et al., 2015) presents one such factor, which will be discussed at this point, as these relate directly to reasons for implementation of the parent training intervention conducted in Study Two of this dissertation.

Worldwide Barriers to Treatment

Access to pharmacology and psychiatric care is limited in many countries (Chan et al., 2023; WHO, 2021). For instance, in a longitudinal study conducted from 2015 to 2019 the researchers monitored use of ADHD medication across 64 countries in different regions (Chan et al., 2023). They determined that upper-income countries showed increased use of ADHD medications, in contrast to lower-income countries, which did not show significant increases in ADHD medications, despite epidemiological rates being consistent across both sets of countries. Further to this, the WHO stated that access to resources for psychiatric care for adolescents and children was scarce, or hardly existent, in lower-income countries, suggesting that supply and cost of medications tend to be the greatest obstacles to treatment, as provision is reliant predominantly on funding from governments (WHO, 2021).

Many lower-income countries tend to be under-resourced to provide psychiatric treatment for adolescents and children, with healthcare professionals tending to make fewer diagnoses of ADHD (WHO, 2021). These findings support evidence from a previous study by Cuffe et al. (2009) which showed that parents without healthcare insurance in the USA were less likely to seek treatment for their children's ADHD difficulties. This was later verified by Wright et al. (2015), who found that children from higher socio-economic groups in the USA, UK, Australia, Greece, and Taiwan, tended to access services more readily than those from lower SES groups.

Although not a new problem, inequitable provision of healthcare due to geographical location and intra-regional differences are also noted as barriers to treatment (Chan et al., 2021; Cuffe et al., 2009, Mykletun, 2021; Price et al., 2020; Widding-Havneraas et al., 2022).

For example, a study by Price et al. (2020) showed differences in prescription of ADHD medications and inequitable treatment provision across several regions of the UK. Although a study by Widding-Havneraas et al. (2022) found regional differences in diagnosing and treatment of ADHD in Norway, differences were ascribed to the level of clinical treatments available and chance occurrences. In comparison, a study by Cuffe et al. (2009) found that children who lived in rural areas had more difficulty accessing treatment for ADHD than those residing in urban areas. The study, however, also highlighted inequitable provision of healthcare treatment across the country. Thus, access to equitable healthcare provision is a concern in many countries, even if more pronounced in those with poorer SES conditions.

Related to geographical location of individuals and healthcare providers, logistical issues can present as barriers to treatment. For instance, transport provision to access services could be problematic and may present a barrier to treatment, which was overcome by providing BPT through video conferencing (Xie et al., 2013). In line with these findings, a systematic review found that mobile health treatment was offered in some developing countries to compensate for the shortage of resources, including limited numbers of healthcare providers, as well as dysfunctional healthcare systems (Hoque et al., 2020). Online support further mediated any issues due to inequitable access to resources, which often occurs in developing countries, through providing support more conveniently to families and children, online in their homes. Although findings of this review were premature and based on studies that were not peer-reviewed, results suggest that remote provision of healthcare could be beneficial and may remove some of these barriers to access.

Thus, BPT programmes could be useful in overcoming these obstacles to treatment, including those related to transport provision, constraints for individuals living in rural areas in accessing medical treatment, a limited number of healthcare providers, and dysfunctional healthcare systems.

Barriers to Treatment in South Africa

Inequitable provision of healthcare is also a problem in South Africa. With its long history of inequality and poverty, an estimated half of all South Africans still live in poverty, traced back to previous governmental policies of racial discrimination and segregation which resulted in poor economic development, poverty and unequal access to resources (Francis & Webster, 2019; Hundenborn et al., 2018; Makgetla., 2020; May,1998; Woolard, 2002). Before considering some of the effects of these past inequalities and poverty on healthcare provision

and educational inclusivity, it is worth noting the current context of mental healthcare in South Africa.

The Current Situation of Mental Healthcare in South Africa. According to Statistics South Africa (STATS SA) General Household Survey (2021), approximately 62 million people reside in South Africa with about 15 million people residing in Gauteng (Statistics South Africa, 2023). With regards to the South African population, the lifetime prevalence for mental health disorders was recorded at 30.3%, with a projected risk of mental disorders of 47.5% as far back as 2002 (Seedat et al., 2008). At that time, Gauteng specifically showed a lifetime prevalence of 29.8% of mental disorders (Seedat et al, 2008).

More recent information from the Global Burden of Disease Study (2017) indicated that neurological, mental and substance abuse disorders in 2016 were experienced by 15.9% of the population in South Africa (GBD, 2017). Lifetime prevalence rates of depression in adolescents in South Africa ranged between 2.6% and 42%, depending on the province and context in which the adolescents resided, while 20% of children in South Africa aged below 18 years presented with a known or untreated mental health problem in 2018 (Jörns-Presentati et al., 2021). Further to this, an estimated 25% of adolescents present with anxiety, and 41% with depression, with mental disorders, particularly when coupled with poverty (Jörns-Presentati et al., 2021; Statistics South Africa, 2022). Despite these consistently high prevalence rates, mental healthcare provision remains a long-standing concern in South Africa (GBD, 2017; Seedat et al., 2008).

Factors Affecting Access to Mental Healthcare Treatment. Various factors have been identified that lead to the low levels of equitable access to mental health services in South Africa. These include a lack of information regarding mental health, costs of parent training and counselling by mental healthcare providers, insufficient financial resources allocated to mental healthcare budgets nationally, discrimination and stigma surrounding mental health diagnoses, insufficient human resources to deliver mental healthcare services, a limited number of mental healthcare facilities, and unreliable medication availability (Rodgers et al., 2022; South African Human Rights Commission [SAHRC], 2018; Simoni & Drentea, 2016; Simoni, 2019; Janse van Rensburg et al., 2022).

Furthermore, additional barriers to treatment include poor development and employment of policies regarding mental healthcare for children and adolescents, inadequate clarification on the responsibilities and roles of various stakeholders at district, provincial and national levels pertaining to implementation of existing policies, under-prioritisation of mental health within the healthcare system, and scarcity of monitoring and evaluation

systems in mental healthcare provision (Marais & Petersen, 2015; Mokitimi et al., 2018). Although some of these barriers occur in other regions of the world, children in South Africa with ADHD, particularly those from disadvantaged communities, are often undiagnosed or receive inadequate treatment when diagnosed (Baweja, et al., 2021; Pipe et al., 2022; Schoeman, et al., 2018).

As noted, human resource capacity with regards to the availability of mental healthcare practitioners is also a challenge in South Africa, with between 0.13 and 0.4 practitioners (including psychologists, mental health nurses, psychiatrists, social workers, and occupational therapists) being available per 100 000 patients (SAHRC, 2017). More recent research published in 2021 by the Mental Health Million Project suggests that South Africa has one of the lowest numbers of psychiatrists in English-speaking countries with 0.3 psychiatrists per 100 000 (Newson et al., 2021), while another study noted 1.53 psychiatrists per 100 000 in April 2019 (Janse van Rensburg et al., 2022). Correspondingly, a study by Docrat et al. (2019) previously determined that there were 0.97 psychologists available per 100 000 in South Africa. By comparison, in other developing nations, such as Brazil, the rate has increased from 5 - 6 psychiatrists per 100 000 (6003 psychiatrists in total) to nearly 14 psychiatrists per 100 000 (13 800 psychiatrists in 2022; Mateus et al., 2008; Statista, 2024).

Likewise, the rates of mental healthcare providers in South Africa are considerably lower when evaluated against high-income countries, such as Monaco, where the rate for psychiatrists is 41 per 100 000, and rates in the UK ranging from 6 - 10 psychiatrists per 100 000, depending on the region (Royal College of Psychiatrists, 2017; Statista, 2023). Furthermore, there is a significant shortage of child psychiatrists in South Africa, with only three of nine provinces having child psychiatrists working in the state sector, and additional shortages of allied health professionals, such as occupational therapists, psychiatric nurses and psychologists across South Africa (Docrat et al., 2019).

Specifically with regards to Gauteng, a previous report showed that there were 0.51 psychiatrists, 0.02 child psychiatrists, 1.38 psychologists, 1.62 occupational therapists and 2.44 social workers per 100 000, while a 2022 study shows the rate of psychiatrists in Gauteng at 2.6 psychiatrists per 100 000 (Docrat et al., 2019; Janse van Rensburg et al., 2022). Accordingly, there were 1.28 occupational therapists per 100 000 reportedly in Gauteng in 2018 (Ned et al., 2020).

Implications of Past Inequality and Poverty on Healthcare Provision. However, although some improvements in living standards have been noted since the dawn of democratic South Africa in 1994 and adoption of the Constitution, which enshrines equal

rights for all the country's citizens, many of South Africa's citizens continue to lack access to resources, including quality healthcare (Hundenbron et al., 2018; Whyle & Olivier, 2023).

Most of the South African population tends to rely on the overburdened and under-resourced state medical healthcare facilities with only 16.1% of the population using private medical insurance cover to access private healthcare (Docrat et al., 2019; Maphumulo & Bhengu, 2019; Sohrsdahl et al., 2023; Statistics South Africa, 2021). This is not a new issue, as noted by the SAHRC, with only 25% of South Africans experiencing mental health problems being able to utilise services prior to a 2017-report (SAHRC, 2017). Pertaining specifically to Gauteng, 71.9% of South Africans and 57.2% of people residing in Gauteng reportedly rely on government healthcare services for healthcare provision (Statistics SA, 2022).

Further to this, children and adolescents under 18 years of age benefit from only 6.8% of mental health services, while approximately 90% of children in South Africa are unable to utilise treatment for mental health disorders (Docrat et al., 2019; Ward et al., 2018). More recent data suggests that in Gauteng, only 6% of children under 18 years of age have access to treatment for mental healthcare (Statistics SA, 2022). Specifically pertaining to ADHD, only 1.2% of the population use state healthcare facilities for ADHD treatments (Docrat et al., 2019; Sorsdahl et al., 2023).

To address unequal access to quality treatment, the National Health Insurance (NHI) Bill was only recently promulgated in parliament in South Africa in May 2024 (Parliament of the Republic of South Africa, 2024; Sithole, 2015; Van Den Heever, 2010). However, the bill is found to be lacking in certain areas in its current format. With reservations regarding funding, inadequate numbers of sufficient healthcare providers, concerns regarding healthcare governance, and some considering it being unconstitutional due to prohibiting private medical insurance cover from paying for services offered through the NHI, it is estimated that a minimum period of at least 4 years is needed before the bill can be implemented in a practical and useful manner (Discovery, 2024; Murphy & Moosa, 2021; Parliament of the Republic of South Africa, 2024; National Department of Health, 2024; Whyle & Olivier, 2023).

Alternative Solutions to Overcoming Barriers to Treatment in South Africa

Thus, due to the unique history and current constraints regarding mental healthcare provision in South Africa, other services can be considered in overcoming barriers to ADHD treatment.

Importance of Community Health Services in South Africa

The Report of the National Investigative Hearing into the Status of Mental Health Care in South Africa (2017) indicates that there is a need to provide suitable community-based psychosocial services to assist children and adolescents presenting with mental health issues, in a move towards community-based care (SAHRC, 2017). To this end, one of the aims of the National Mental Health Policy Framework and Strategic Plan 2013-2020 was for the mental health of South Africans to be promoted through collaboration between various sectors and the Department of Health (SAHRC, 2017). Collaborative Care models, which include intersectoral collaboration between external sectors such as the Education Department and the Department of Health, could thus improve health management and outcomes and could decrease the treatment gap in South Africa (Sorsdahl et al., 2023; Truter, 2022).

Importance of Educational Services and Inclusivity in Education

An understanding of the previous provision of inclusive education proves useful in offering a context to the current problems, Just as segregation and discrimination were applied to South African society along racial lines, segregation was also enforced according to levels of disability and educational inclusivity (Department of Education, 2001). Prior to 2001, most children with barriers to learning and developmental disorders, including untreated ADHD, were taught in Special Schools[36]. However, some children, particularly Black and children of other racial groups, were for the most part unable to be accommodated at Special Schools and were incorporated in normal, mainstream schools and, resultantly, were not able to access quality education to suit their needs (Department of Education, 2001; Jansen Van Rensburg et al., 2024; Walton, 2011).

In 2001, Education White Paper 6 Special Needs Education, relating to the inclusion of children with special educational needs into mainstream education, was promulgated with the goal of promoting non-discrimination and equality according to the rights enshrined in the Constitution which was enforced from 1996 (Constitution of the Republic of South Africa, 1996; Department of Education, 2001; Department of Education, 2005). Additionally, the National Strategy for Learner Attainment (2015) further supports the view that recognising barriers to learning can be social, systemic and individual, with the aim of responding appropriately to learners by supporting them, their parents and communities through

[36] **Special schools**: these schools have the necessary supportive measures in place, including therapists on site, remedially trained teachers and assistive devices, to educate children with special educational needs (Department of Education, 2005).

encouraging participation in the educational sphere and the removal of barriers to learning (Department of Basic Education, 2015).

Despite adoption of these two policies, teachers are often not formally trained to identify and educate children with ADHD (de Jongh et al., 2019; Kern et al., 2015; Krtek et al., 2022; Metzger, 2021; Ward et al., 2021). In addition, children with the disorder frequently present with, and require intervention to address, learning difficulties and ADHD-related symptoms that become more noticeable in the structured environment required in formal schooling during the Foundation Phase (APA, 2022). It is only through exposure to children with ADHD and training that teachers become more knowledgeable about it. Further to this, when teachers learn more about the disorder, they are more supportive of including children with ADHD in mainstream education (Toye et al., 2018).

School-Based Support Teams, in collaboration with teachers and parents, are important role players in the early identification and support of children with special educational needs. Despite parents being viewed as important partners in the process of supporting their children, they may lack the necessary skills and information to do so.

Indeed, school counsellors, teachers, primary healthcare providers and social workers can be trained in aspects related to basic childhood and adolescent mental health (Atilola, 2017). With teachers then considered to be a common source of information for parents regarding ADHD, interventions based at schools could be a suitable treatment option as this could overcome some of the aforementioned barriers to access to treatment, including inequitable access to healthcare due to geographic location, and shortage of healthcare providers (Chan et al., 2021; Hoque et al., 2020; Rajcumarn & Paruk, 2020; Skeen et al., 2022; Wright et al., 2015).

Although teachers reportedly prefer the use of medication as a treatment option for ADHD, they can be involved in informing parents about healthy food choices (diet) and referring the child for further assessment and intervention (Kern et al., 2015). Besides, teachers employ behavioural modification strategies and educator interventions (such as physical seating and placement of the child in the classroom) to overcome ADHD as a barrier to learning in the classroom (Roman et al., 2015). Thus, psychosocial interventions (including psycho-education and supportive coaching) can be important tools in managing the symptoms of ADHD in addition to pharmacological interventions (Schoeman & De Klerk, 2017).

Summary and Conclusion

ADHD is a prevalent childhood disorder which can have debilitating effects on a child's life if left untreated. With this in mind, Chapter Four focused on the numerous treatments currently available and those that are widely used to mitigate the impact of the disorder on the child's functioning, and those around them. This was followed by an overview of some barriers to treatment reported globally and in South Africa.

Following a discussion on conventional medications and alternative treatment options, including homeopathic medications, vitamin and mineral supplementation, use of technology and other treatments, the focus was shifted to the use of psychosocial interventions, with special consideration given to the use of BPT programmes. Findings from various meta-analyses and systematic reviews were synthesised to provide an overview of the effectiveness of these programmes in alleviating ADHD symptoms and related problems.

However, despite a wide array of treatments being available, there are preferences for treatment modes worldwide and in South Africa. In South Africa, there is a shortage of healthcare practitioners and a lack of access to services for many individuals. Due to their contact with children and their parents, teachers are a convenient point of contact to address this issue as they can be trained regarding ADHD in terms of strategies to assist children with ADHD, effective parenting practices, and the management of problematic behaviours, and they could, in turn, educate parents in these aspects. Following from this, Study Two presents the implementation and evaluation of a teacher-led parenting programme aimed at alleviating attention problems in children from a school educating learners from low SES communities in Ekurhuleni, Gauteng (i.e., child participants from Study One).

Chapter Five

Study Two: The Efficacy of a Short-Term Parent-Teacher Intervention in Alleviating Symptoms of Inattention in a School Educating Leaners from a Low SES Community in Ekurhuleni

As previously discussed, ADHD can have severe consequences on an individual's functioning (Hinshaw, 2018; Lee et al., 2021). However, due to barriers to treatment for mental health conditions (SAHRC, 2017), there are many children from disadvantaged communities who present with attention problems and may meet the diagnostic criteria for ADHD, but who do not have access to adequate treatment.

Various studies show that participation in a psycho-education programme focusing on psychosocial interventions and the use of behavioural modification strategies shows positive results for the management of ADHD symptoms and problematic behaviours (Flood et al., 2016; Hinshaw 2014; Hornstra et al., 2021; Moen et al., 2016; Schoeman & De Klerk, 2017). Studies also reveal that training parents and teachers about ADHD, and how to work with children with ADHD, are important tools in managing the symptoms thereof, in addition to the use of pharmacological interventions. Results further indicate that parent training may lead to improvements in children's functioning as well as relationships within the family, parents can learn new skills, their sense of competence in their parenting skills can be enhanced, and they may experience lowered levels of parental stress (Chacko & Scavenius, 2018; Daley et al., 2017; Kern et al., 2015).

Study Two was focused on a teacher-led parent training intervention, as a form of BPT, during which parents were skilled in various techniques aimed at alleviating attention problems in their children. The rationale, then, behind Study Two was that should the programme prove efficacious, implementation of the BPT could expand access to this psychosocial mode of treatment for children identified as having possible ADHD as it could be cost-effective and relatively easy for teachers to employ in schools in disadvantaged communities. Application of the BPT could be an important step forward, given that many parents in these communities have limited access to private healthcare and suitable treatments to alleviate their children's attention problems.

Study Two was envisaged to lead to the development of a training model for teachers (preferably Life Orientation teachers or school counsellors) to be trained to screen for attention problems (and possible ADHD) as well as to provide training to parents and caregivers on behavioural modification and psychosocial skills strategies to deal with such attention and related problems. Although teachers are not qualified to diagnose ADHD, they

could provide brief training to parents and caregivers which may alleviate the child's attention problems, and this in turn, could have a positive impact on the child's current and future well-being.

Specific Aim and Hypothesis

The aim of Study Two was to implement a psychosocial training programme in which teachers train parents regarding ADHD and behavioural modification strategies to assist in alleviating possible ADHD-related problems in their children in a low SES area in Boksburg, Ekurhuleni. Thereafter, the efficacy of the psychosocial training programme would be determined in relation to the alleviation of attention symptoms in the same children.

Therefore, one hypothesis was identified for Study Two:

A psychosocial training programme, which was designed for teachers to use to train parents of children with possible ADHD, could be effective in alleviating attention problems in children from a low SES community in Boksburg, Ekurhuleni.

Method

Study Setting and Design

Study Two was set at the same school as Study One. As indicated in Study One, the SES of child and parent participants was an important consideration in determining whether children may have experienced barriers to treatment.

Study Two followed a pre- and post-test research design, with an intervention group. The format of the intervention included a training intervention for teacher participants led by myself, followed by a teacher-facilitated parent training intervention which spanned 8 weeks in total, including a final group follow-up session. Although Study Two was planned to take place face-to-face as COVID-19 restrictions had been suspended at that time, the teacher participant and the parent participants still indicated their preference for the intervention to take place virtually on Tuesday evenings on a WhatsApp group audio call. Teacher training was conducted face-to-face at my main office in Boksburg, Gauteng, which is approximately 5km from the research site.

Sample

The sample consisted of parents, teachers and children. Parents of child participants whose scores fell within the clinical ranges of assessment instruments employed in Study One, were invited to participate in Study Two. Teacher participants who completed Brown EF/A Teacher Forms for Study One child participants, were invited to participate in Study Two. Child participants were aged between 8 and 12 years of age and were in the Foundation

Phase at the research setting. Study One explains other aspects related to the participant recruitment processes in more detail.

Participants

There were three types of participants in Study Two: parent, child, and teacher participants. Inclusion criteria for parent participants were that they consented to participation (Appendix L), were fluent in English, and agreed to attend all training sessions as outlined in the parent training manual. Foundation Phase teachers at the target school were invited to participate in Study Two. Teacher participants needed to meet the following criteria to be included: provide consent to participate (Appendix M), be fluent in English, be prepared and available to be trained by myself in the training intervention programme, be willing to present the training to groups of parent participants under my supervision, and to be present for all sessions. In addition, other teacher participants completed Browns EF/A Teacher Forms rating child participants' difficulties, and other non-facilitating teachers[37] who did not agree to facilitate parent training sessions joined the teacher training. Although not directly involved in Study Two, child participants identified with attention problems in Study One, and whose parents consented to participate in Study Two, formed the child participant sample.

Measures

During Study Two, there were various measures employed.

Standardised Measures. Results of two of the standardised assessment measures as described in Study One, the Brown EF/A Teacher Forms and Brown EF/A Parent Forms, were used as baseline data for Study Two. One month after the final parent training session, parent participants completed the Brown EF/A Scales Parent Forms, and teacher participants completed the Brown EF/A Scales Teacher Forms once more, as post-intervention assessments, to determine the efficacy of the training intervention.

Non-standardised Measures. Four non-standardised measures were used during Study Two. The first was an informal parenting style questionnaire which parent participants completed at the end of Session Six (Appendix N from psychcentral.com/quizzes/parenting-style-quiz#quiz). This questionnaire was based on research regarding parenting styles as described in Chapter One. Parent participants were invited to specify whether they strongly agreed, agreed, neither agreed nor disagreed, disagreed, or strongly disagreed to a variety of

[37] **Non-facilitating teachers**: These teachers stated that they did not feel comfortable presenting the training to parents. As a show of appreciation to the school and teachers for their participation in the studies, I allowed them to join the teacher training sessions.

statements pertaining to attitudes towards parenting and beliefs about children and parents (Psychcentral.com, 2020).

After the final training session, parent participants completed an End of Intervention Parent Participation Rating Scale (Appendix O) and the teacher participant completed a Teacher Participant Rating Scale (Appendix P), both of which I developed to assess participants' experiences following their participation in Study Two. The End of Intervention Parent Participant Rating Scale provided insight into the parents' experiences of the training and offered an additional measure of the effectiveness of the programme. The teacher participant completed the Teacher Participant Rating Scale as an indication of their evaluation of the programme and own training. I also designed the fourth non-standardised measure, the Content Monitoring Form (Appendix Q), which I completed during the parent training sessions to ensure all aspects of the various topics were discussed.

Training Manual. A training manual was needed for teacher and parent participants to use during the sessions (Appendix U).

Design of Training Manual. I developed the training manual after researching various aspects related to parenting children with possible ADHD and attention problems and drawing on my own experience of being a registered Educational Psychologist in South Africa for five years, before the COVID-19 restrictions imposed on working face-to-face with teachers and learners. After the completion of Study One, topics were adjusted to include aspects that parents and caregivers had expressed as difficulties in the parent interviews from Study One, such as effective discipline, improving relationships within the family, and assisting their children with studying. The language used and content in the manual was simplified to not overwhelm parents with excessive information. Following the teacher training, minor amendments were made to the training manual, considering concerns that were raised by the teacher participant and non-facilitating teachers. Amendments included changing of pronouns to be gender-neutral, addition of further explanations for some of the terminology, and inclusion of additional examples to illustrate concepts, removal of reference information in the content of the manual, and the inclusion of free access visuals.

The various sections of the manual included theory-based discussions about each topic, in-group activities which parents could complete individually or in groups as indicated, tasks for parents to attempt at home, and discussion of case studies. The inclusion of activities allowed parent participants to share their experiences, acknowledge areas of concern with their children, identify their own strengths and weaknesses as parents, in

addition to gain support through positive interaction with other parent participants in the group.

Focus Areas in the Training Manual. The following aspects were focused on in the training manual: learning about ADHD and treatment options, the importance of a healthy diet, routine, structure, and rules in the home, effective discipline and motivation strategies, helping children with homework and studying; effective communication, improving the parent-child relationship and relationships within the family. Case studies were included in the discussion of various topics presented in the training manual to provide insight into how parents could identify problem behaviours in their children, identify coping strategies used in the case studies and not feel alone in their experiences (Appendix R). Table 21 provides an outline of the sessions, including the content, in-session activities, and preparation activities.

Before discussing the various aspects of the parent training intervention, it is important to note that the BPT and manual were originally developed to help parents and caregivers of children who were diagnosed with ADHD. Although this information was printed at the start of the manual, it was also explained to parents at the start of the first session. In addition, it was shared that, due to restrictions imposed by the GDE on doing research at the research site because of the COVID-19 pandemic, changes were made to the research methods which was not sufficient to diagnose any children participants with ADHD. Children participants were then selected as they showed symptoms of possible ADHD and attention problems. Although the manual referred to techniques that could assist children with ADHD, the research aimed to determine if these techniques could decrease some of the difficulties children with attention problems faced.

In addition, parents were informed that the programme intended to help them as caregivers to work positively with their children who showed symptoms of attention problems. Information about different psychological conditions or disorders was provided for informational purposes only and was not intended for diagnoses or treatments. Although parents were advised that I could assist should they experience discomfort as a result of participation in Study Two, they were notified to consult with a trained healthcare worker when seeking a diagnosis or subsequent treatment.

Table 21

Outline of Parent Training Intervention

Sessions	In-session group discussion	In-session activity for parents	Activity in preparation for next session
One	Learning about ADHD and treatment options	Establishing ground rules for group; each parent indicated what they wanted to gain from participation	Parents completed table regarding the children's meals, snacks and exercise in the week between sessions
Two	Completion of previous topic (learning about ADHD and treatment options); The importance of lifestyle	Consideration of how the family's eating habits, and food choices are reflected in the completed table; discussion about how deficient nutrients could be included in the children's daily diets and how recipes can be adjusted accordingly; use of household items in exercise and development of an exercise plan they would use with their children during the coming week	Parents answered questions about their children's goals and rule-setting
Three	Routine, structure and rules in the home	None	Parents answered questions about discipline
Four	Effective discipline techniques and use of positive reinforcement and motivation strategies	Diagram plan of child's homework and study area; discussion of other strategies in which parents have noted success with encouraging their children to complete homework	Parents asked their children about how their children would like to be assisted with homework, studying and learning-related tasks
Five	Helping with homework and studying and encouraging independence in learning-related tasks	None	Parents completed questions about roles in the home as well as completion of a parenting style questionnaire (psychcentral.com). They were advised to take photographs of their responses and WhatsApp these directly to me for scoring. After scoring, I sent each parent a private WhatsApp with their result and an interpretation of the result
Six and Seven	Effective communication strategies and improving the parent-child relationship and relationships within the family	Discussion about how parents could show a more balanced parenting style through inclusion of positive aspects of the different parenting styles from the parenting style questionnaire; role playing of active listening skills; selection of appropriate responses demonstrating active listening	None specified
Eight	Follow-up	Provision of further assistance to parents as well as an initial monitor of parent participants' experiences	None

Topic One: Learning about ADHD and Treatment Options. Educating the parents and caregivers about ADHD is an important part of treatment to minimise further challenges and manage the disorder successfully with positive outcomes for the child (Brown, 2013; Schoeman & Liebenberg, 2017). Thus, ADHD was defined as a disorder, and the associated symptoms were listed, a brief discussion provided information on various co-morbid conditions, an explanation was given of the course and development of ADHD, associated features and functional consequences of ADHD were discussed, and treatment options for ADHD were explored (Adler et al., 2015; de Schipper et al., 2015; Hinshaw, 2015; Schoeman & Liebenberg, 2017).

While exploring their children's diet and eating habits, parent participants were asked to complete Table 22 (Appendix S) during the following week in preparation for the second topic: The Importance of lifestyle.

Topic Two: The Importance of Lifestyle. After Topic One was concluded during Session Two, parents and caregivers consulted the table (Table 22, Appendix S) which they completed in preparation for the topic. They were asked how their family's eating habits and food choices were reflected in Table 22. Thereafter, the impact of dietary choices was discussed with parent participants and caregivers, with information shared about foods shown to increase ADHD-related behaviours, sugar consumption, healthy diet options, nutrient deficiencies, and the importance of regular exercise (Granero et al., 2021; Königs & Kiliaan, 2016; Konofal et al., 2008; Lange et al., 2017; Suarez-Manzano et al., 2018).

Two further group activities were presented in this session: parent participants were asked how they could include the nutrients mentioned in the session in their children's daily diet, and how they could consider including nutrient-rich foods in their favourite recipes. An additional task was given in which parent participants were to determine how they could encourage their children to perform physical exercises at least three times in the following week and how they could use household items in the various physical exercises.

Topic Three: Routine, Structure and Rules in the Home. As discussed previously, structure in the home, including hierarchy within the family, is associated with better functioning of the child with ADHD (Schellack et al., 2017; Wedge, 2016). However, as many children with ADHD tend to be strong-willed and may defy rigid rules and limits, parents and caregivers need to be flexible within the limits and boundaries (Wedge, 2016). In addition, the consistency with which rules are applied is important (van der Oord & Tripp, 2020). This third topic explored the value of rules in society and in the home, how routine

maintains a sense of safety and predictability for families and children, and ideas were then shared about implementing routine in the home.

At the end of this session, parents were tasked with contemplating the following questions: What are my goals for my child? What kind of life do I want my child to lead? Where will my child be in 5 years? 10 years? 15 years? Why do we have rules in society? What would society look like without rules? Did I notice any changes in my child's behaviour this week after implementing the exercise programme?

To conclude this session and prepare for the fourth topic, parent participants were asked to consider different aspects related to disciplining their children, including reasons for disciplining children, methods used by their parents when they were children, and whether these were effective. They were also asked to identify disciplinary methods they have used with their children and which of these have been successful.

Topic Four: Effective Discipline Techniques and Using Positive Reinforcement and Motivation Strategies. As noted, psychosocial educational approaches could be successful if presented as part of a thorough BPT, which includes operant conditioning[38] (Pelham et al.,2014), reward sensitivity[39] (Tenenbaum et al., 2018; Tripp & Alsop, 2001), and positive reinforcement[40] (Coelho, et al., 2015; Hinshaw, et al., 2015; van der Oord, 2020). Parents working collaboratively with regard to discipline can enhance the effectiveness of discipline strategies employed, with how parents issue the commands making a further impact (Gordon, 2019; Mol, 1984; Wedge, 2016).

With this in mind, the theme of effective discipline techniques was examined in the fourth session, with parent participants being requested to share their challenges regarding disciplining their children at the start. The following aspects were then explored in more detail: an overview of discipline and important characteristics of effective discipline, working with a child's strong will, and the benefits, limits, and principles of using natural and logical consequences as a discipline technique. As a preparation activity for the next session, parent

[38]**Operant conditioning** is the process in which learning occurs as a result of the behavioural consequences; for example: an individual may learn to perform a certain action as they were rewarded previously for performing the same behaviour (APA, 2024).

[39] **Reward sensitivity**: the extent to which behaviour of an individual is encouraged by stimuli which are relevant to a particular stimulus (Kim et al., 2015).

[40] **Positive reinforcement**: the increased likelihood of an activity happening as a result of a reward being offered when a particular stimulus is presented (APA, 2024).

participants were tasked with asking their children how they would like to be assisted with homework, studying, and completing learning-related tasks.

Topic Five: Helping with Homework and Studying and Encouraging Independence in Learning-Related Tasks. Because ADHD is often co-morbid with SLDs (APA, 2022; Koerner et al., 2021), this session provided an overview of more common learning difficulties, such as reading and mathematics-related difficulties. A detailed discussion ensued about how parents could determine a suitable homework routine for their children. Parent participants and caregivers were asked to draw their children's study and homework areas following guidelines provided on establishing a suitable study and homework area within their homes.

The session also included practical tips for encouraging children to complete homework, useful tips when building the foundation for studying, and encouraging independence in learning-related tasks. As children need to learn to perform age-appropriate tasks independently, this was also expanded upon in this section (Gordon, 2019). A group activity concluded this session in which parent participants and caregivers were urged to discuss strategies that have assisted them when encouraging their children to do homework. Also, parent participants answered questions about improving the parent-child relationship through completion of the parenting style questionnaire in preparation for the final topic.

Topic Six: Effective Communication Strategies and Improving the Parent-Child Relationship and Relationships Within the Family. As individual results of the parenting style questionnaire had been sent to parent participants before the start of this session, a brief explanation of different parenting styles was discussed (Carter, 2019). Parent participants and caregivers were then invited to discuss the advantages of different parenting styles and how they could incorporate positive aspects of the different parenting styles into their interactions with their children. Furthermore, effective communication strategies and ways to improve the parent-child relationship were considered.

As a consolidation activity for Sessions Six and Seven, parent participants were invited to participate in a role play in which different responses were shared to situations to demonstrate the outcome of effective listening strategies for parents. They were also asked to identify the most suitable response which indicated active listening in a variety of given scenarios.

With research indicating that families of children with ADHD tend to experience greater amounts of stress, a discussion commenced about the importance of healthy relationships in the family, which included parent-child relations, the value of parents having

a working and supportive parenting relationship, dealing with differences in parenting styles, active listening skills, and You-I Messages[41] (also called: The three-part I-Message, see Flood et al., 2016; Gordon, 2019; King et al., 2016). This discussion took place before the seventh session was concluded with further deliberation on the advantages of a child with ADHD, such as emotional sensitivity, being sincere friends, and displaying a charismatic demeanour (Mahdi, et al., 2017). This was expanded to include positive aspects that parent participants could acknowledge of the own children's presentations.

Procedure

To determine the efficacy of the training intervention programme, numerous procedures were employed pre- and post-intervention.

Pre-intervention Procedure. When feedback was provided to parent participants at the conclusion of Study One, parents of child participants who displayed attention problems were informed that they would be formally invited to participate in Study Two. Following this, I delivered invitation letters to the school for these parent participants for Study Two. The principal was asked to circulate similar invitations to the teachers of the selected child participants. As child participants were not formally included in Study Two, they did not receive invitation letters.

After the delivery of the invitations for parent and teacher participants, I was contacted telephonically by a representative from the GDE indicating that research could be conducted face-to-face according to changes to COVID-19 lockdown regulations at the time of the study, and I informed the school principal of this. Once approval was received by email from the school principal for me to facilitate the face-to-face sessions with parent and teacher participants, I contacted the teacher participant who was willing to facilitate the training, and non-facilitating teachers interested in learning about, but not administering the intervention, with suitable times and dates for training for Study Two. This was done over a teacher WhatsApp group, created after their verbal consent to be added to the group was received. The teacher participants and non-facilitating teachers confirmed their preferred dates, with the majority wanting to attend during the winter school holidays[42].

Thereafter, I contacted parent participants telephonically regarding possible days and times for the parent training intervention sessions, and I also shared the approval for face-to-

[41] **You-I-Messages** (three-part I message) are statements a person makes to share their feelings towards another when the first believes a boundary has been crossed by the second; for example: When you interrupt me when I talk, it makes me feel undervalued (Gordon, 2019).

[41] **Winter school holidays** for South African state schools usually span from the final week of June to the first two weeks of July.

face sessions from the GDE and school. The teacher participant who agreed to facilitate the sessions informed me of her availability to facilitate the parent training sessions only online as originally communicated before the change of COVID-19 lockdown restrictions. Therefore, I then made final arrangements for the allocation of data to participants as well as finalisation of the training manual (see Appendix U). I subsequently phoned parent participants to inform them of the preferred online of mode of the parent training sessions and all parents confirmed their willingness to proceed with the training conducted over WhatsApp. I further requested the parent participants' preferred days and times for the online training sessions, their needs for data, confirmation of their contact numbers to which data would be allocated, and their verbal consent to be added to a WhatsApp group for the parent participants attending the training intervention.

Following that, I delivered letters, which included dates and arrangements related to the parent training sessions, to the teachers of the child participants from Study One to be disseminated to their parents. An additional letter was also delivered to the school for the teacher participant who agreed to lead the training which indicated the dates and arrangements for the teacher-led parent training sessions.

Intervention Procedure

Teacher Training. Two dates were selected by the teacher participant and non-facilitating teachers for the teacher training to commence, and the teacher training was completed during the winter school holidays of the relevant year. The training was held over two mornings and completed in a total of 6 hours. The same training manual, which would be utilised for parent participants, was used during the training to allow the teacher participant to become familiar with the topics and to make notes in during the presentation. The training followed the same sequence as outlined in the training manual and included the same activities as indicated for parent participants. The non-facilitating teachers and teacher participant engaged positively with the material and showed insight by relating aspects to their own experience in and outside of the classroom. The teacher participant made detailed notes during these sessions, and I clarified any aspects that were not clearly explained.

Parent Training. 1GB of data was allocated monthly to each parent participant for the training sessions, and parent participants were notified by SMS when the data was allocated. Parent participants were also requested to use the data exclusively for the training sessions. A record was kept of data purchased and allocation to parent participants for reference. In order to ensure that data was allocated correctly, I sent an SMS to each parent participant who needed data requesting the name of their network providers. However, some parent

participants' original mobile phone numbers could not be used for WhatsApp so I contacted each of these parents telephonically to request an alternate number for data allocation. Once the first round of data was allocated, I created a parent participant WhatsApp group and posted the rules of the group (see Appendix T).

Following finalisation of data and data allocation, I delivered hard copy training manuals to the school to be distributed to parent participants[43]. I purchased and allocated data to parent participants on the same day to ensure there would be sufficient data for the training which would start that evening. Training sessions were set to commence in July to conclude by September, with data expiring after each 30 days, as per mobile network provider data validity periods. For this reason, more data was purchased and allocated monthly for parent participants, and parent participants were advised when this was performed. The training sessions needed to start by July to be completed before the end of the school term at the end of September in accordance with restrictions imposed by the GDE on time frames for engaging with research participants. As noted previously, the GDE states that research is not allowed to take place during the final term of the school year (October to December). Starting research at this time also allowed for an additional session, should this be needed by parent participants.

Teacher-led parent training sessions were conducted over WhatsApp group audio calls which I initiated, over a total of seven sessions on consecutive Tuesday evenings, with each session lasting approximately an hour. Topics were discussed according to the schedule and format of the Parent Training Manual (See Table 21). I recorded attendance at each of the sessions, and I monitored the attendance throughout each session. The teacher participant and I were able to mute parent participants if/when necessary, when they had forgotten to mute themselves or had difficulty doing so. With regards to the parenting style questionnaire (Appendix N), parent participants took photographs of their answers and sent these to me directly by WhatsApp for scoring, following which I shared results and interpretation of results privately over WhatsApp with each of the parents.

Post-intervention Procedure. Brown EF/A Teacher Forms were delivered to the school and circulated to teachers of child participants for completion. Once I had collected and scored each of these, information from the Brown EF/A Parent Forms and Teacher

[43] Child participants were returning to school for the start of the third school term the following day. The third term commenced mid-July and concluded at the end of September.

Forms were collated and child participants whose scores were within the clinical range (T-score of above 50) were referred to state clinics in Ekurhuleni.

After that, the training manual was revised considering areas of difficulty experienced during the training sessions, and more information about parenting challenges such as effective discipline and aspects related to assisting with homework and studying, was incorporated into the manual (see additional information which was added to final training manual: Appendix V). Child participants whose scores did not fall below clinically significant levels were referred for further interventions as described in the Ethical Considerations section below.

An additional follow-up session was facilitated 1 month after the final training session to allow for further assistance to parent participants and to act as an initial opportunity for feedback on parent participants' experiences. In addition, an informal follow-up phone call was made to each parent participant approximately 6 months after the last WhatsApp session to ascertain if referred child participants had been assisted by medical practitioners, and to gain feedback on how their children were, at that stage, coping with their previous difficulties. During these calls, many of the parent participants reported positive progress although some stated that they had not yet followed up with referrals.

Scoring Procedures and Statistical Analysis

Scoring of Assessment Instruments. The Brown EF/A Parent Forms and Teacher Forms were hand-scored using the hand-scoring worksheets according to manual guidelines (Brown, 2019). Norms were used for the various age groups (8 – 9 years or 10 – 12 years) and, for the relevant sex.

The End of Intervention Parent Participant Rating Scale was scored after the full BPT was completed (Appendix O). Parent participants rated the effectiveness of the BPT by noting one descriptor for each statement made about the programme: To avoid influencing parent participant rating of the BPT, points were allocated for each descriptor only at scoring as follows: Strongly agree (4 points), Agree (3 points), Disagree (2 points), Strongly disagree (1 point).

Statistical Analysis. SPSS version 25 was utilised to carry out statistical analyses. As noted previously, results from Study One were considered as baseline data and compared to the results of post-intervention rating scales following the conclusion of the teacher-led parent training intervention. Descriptive statistics were reported as means and standard deviations. For non-normal data, medians and interquartile ranges were included. Categorical

data were presented as counts and percentages. Inferential statistics were conducted pre- and post-intervention to evaluate the effects of the intervention.

According to the power analysis calculation, the sample size of parent participants was considered as being sufficient for a paired samples t-test with a power of 0.80 as determined with the G*Power statistical software programme (see: download.cnet.com/g-power/3000-2054_4-10647044.html), to establish the effectiveness of the teacher-led BPT. Alternatively, a Wilcoxon signed-rank test was employed when data did not meet the normality assumption or if significant outliers were present. Statistical significance was set at .05, and effect sizes were reported (Cohen's *d* for the t-test, and *r* for the Wilcoxon signed-rank test, as recommended by Rosenthal, 1991). Furthermore, Spearman's coefficient was calculated using the Crosstabs function due to the small sample size.

Individual differences in scores were assessed using the Reliable Change Index (RCI). The Reliable Change Generator was designed to assist students, clinicians and researchers in determining whether any reported individual changes between pre- and post-assessments are related to error of measurement or due to actual changes, if any, and whether these are positive or negative (Jacobson & Traux, 1991). A change of at least one standard deviation indicated a confidence interval of 68.26%, and a change of at least 1.96 standard deviations indicated a confidence interval of 95%. As the confidence interval of 95% was considered sufficient due to the small sample size, a confidence interval of 99% was not calculated.

Hence, to provide insight regarding the effectiveness of the training intervention, on an individual level, the RCI outcomes comparing pre- and post-intervention scores for each subtest and composite scores of the Brown EF/A Teacher and Parent Forms, are presented. Scores for the test-retest reliability from the manual of the Brown EF/A Scales were determined as follows: regarding within-group analysis of scores pre- and post-intervention, effect size differences (Cohen's *d* and *r*) were considered by calculating the differences between mean scores pre- and post-intervention as the Brown EF/A Teacher and Parent Forms are standardised measures (Fritz, Morris & Richler; 2012).

Finally, correlation analyses (with significance indicated at $p < .05$) were conducted to determine the relationship between the number of sessions attended and the various scales, as well as to examine the relationship between Parent and Teacher Forms of the Brown EF/A Scales.

Ethical Considerations

Informed Consent

Informed consent was obtained from parent and teacher participants for their own participation in the research. Consent forms included information about how the research would be used, who would have access to the information, as well as a detailed description of the research process. In addition, the risks and benefits of participation, confidentiality and privacy, and voluntary participation in the research were explained (Appendices 12 and 13). Permission was obtained for Studies One and Two in the same application with the GDE and research site (Appendix K).

Ethical Clearance from the University

Institutional ethical clearance from the Department of Psychology at UCT, as discussed in Study One, applied to Study Two, as the doctoral study was approved in its entirety. The UCT Research Ethics Committee (UCT REC) therefore also approved Study Two with reference number: PSY2020-004 (Appendix D).

Risks and Benefits to Participants

The risks, potential for harm, inconveniences, and benefits of participating in Study Two were explained to parent and teacher participants in their letters of consent (Appendices 12 and 13).

Risks, Harms and Inconveniences for Parent Participants. By participating in Study Two, the following risks were considered: as the parent training interventions were conducted online, parent participants were asked to find a suitable private venue for the sessions as far as possible. In addition, they were encouraged to attend all sessions and to therefore avail their time for attendance. They were informed that data would be made available for use during the training sessions if they did not have data and they were further notified that, should they experience emotional distress or any discomfort during or after the training sessions, I would assist with parental guidance or counselling at no cost. In addition, while I aimed to keep the information provided private through data security measures and anonymisation of identifying details, I could not guarantee total confidentiality should there be a data breach.

Risks, Harms and Inconveniences for Teacher Participants. Teacher participants were asked to avail themselves to attend the training sessions as well as to present the training to the parent participants. In addition, they were informed that, although all efforts would be made to keep provided information private, this could not be guaranteed due to the possibility of data breaches, although anonymisation of identifying details was enacted. It was also

explained that, if teacher participants felt emotional discomfort as a result of their participation, I would provide counselling if needed at no costs to themselves.

Benefits for Parent Participants. Parent participants were notified that they may learn to assist their children with their difficulties, and their relationships with their children could possibly improve. Furthermore, they were informed that they may learn to support their children and understand their children's difficulties better. Parent participants were also advised that those who attended all sessions would be entered into a lucky draw to win a gift voucher to the value of R1000.00.

Benefits for Teacher Participants. Teachers were notified that they may learn additional classroom management strategies, they could learn new skills to assist with learners' behavioural problems which they may experience, and participation in the training intervention could potentially enhance future career prospects given additional experience gained. The teacher participant who presented the training was also informed that she would be thanked for participation with a R1000.00 gift voucher and she would also be invited for a meal at a local restaurant as compensation for her participation.

Child Participants. As child participants were not directly involved in Study Two, no benefits, possible harms, inconveniences, or risks were explained to them.

Data Management

All data management practices discussed in Study One applied to data from Study Two. WhatsApp was utilised for the teacher-led parent training sessions as it allows for encrypted data transmission.

Feedback

Feedback was provided to parent participants through phone calls during which I shared and explained the results of the post-intervention Brown EF/A Parent and Teacher Forms. I also described the post-intervention 6-month follow-up calls, as part of the procedure.

Referrals

Children whose scores did not improve to below the clinical significance levels post-intervention were referred to local state facilities for further intervention and possible pharmacological assistance. Difficulties were mentioned in the referral letters in terms of emotional difficulties, as identified in the PANAS-C NA, as well as descriptors of the Brown EF/A Teacher Forms and Parent Forms. These referral letters were delivered to the school in sealed envelopes for distribution by teachers to parent participants. In addition, contact details of the various state facilities were included in the envelopes. However, if parent participants

requested for the referral letters to be transmitted by WhatsApp or email for their convenience, I did so.

Results

Results from Study Two will now be explored through presenting participant demographic data and thereafter, through an analysis of pre- and post-intervention data. The sample size for the Study Two analyses based on the results of Study One, is *N*=17, as four parents of child participants from Study One (specifically 1 male and 3 female child participants, aged between 8 years 4 months and 9 years 6 months at the time of Study One) did not consent to participate in Study Two.

Participant Demographic Data

Demographic variables of the child participants are tabulated in Table 23 for reference.

Table 23

Demographic Variables of Child Participants: Study Two (N=17)

Variables	***M*** **(*m*)**	***SD*** **(IQR)**	**Range**	**Count (%)**
Age of child participants [a]				
Pre-assessment	108.12 (106.00)	9.87 (17.00)	96-128	
Post-assessment	115.00	11.83		
Sex of child participants				
Male				12 (70.59%)
Female				5 (29.41%)
Home language of child participants				
English				5 (29.41%)
Sepedi				4 (23.52%)
Sesotho				2 (11.76%)
isiZulu				1 (5.88%)
isiXhosa				2 (11.76%)
Xitsonga				3 (17.65%)

Note. For continuous data that are not normally distributed, descriptive statistics include *m*=median and IQR = interquartile range for continuous data. Categorical data presented as count (%). [a]Age presented in months.

Information was also gathered regarding demographic details of parent participants (see Table 24). Considering the educational level of parent participants, most parents (across mothers and fathers) attained a grade 12 certificate[44] or higher, with more mothers than fathers attaining tertiary level qualifications (Table 24). The most common occupation of parent participants was that of a business owner and general worker (including sales and administration-related occupations) for father participants, and housekeeping and cleaning followed by a professional occupation for mother participants. Also, some parents were unemployed at the time of Study Two. Mothers and fathers participated, in some instances both parents from one family, or from single parent households. Thus, parent participants were suitable for the target demographic group of Study Two as those from a low SES income area. For most child participants, only one parent participated, although data is recorded regarding demographic variables for both parents. As parent participants indicated their ability to converse fluently in English during parent interviews as well as through inclusion rules for Study Two, no data was reported regarding other languages spoken by parent participants in the home.

[44] **Grade 12** is the exit point for high school in South Africa indicating completion of secondary education.

Table 24

Demographic Variables of Parents of Child Participants: Study Two (N = 17)

Variables	**Count (%)**	
Parental highest levels of education		
	Father	Mother
0 – 11 years	2 (11.76%)	1 (5.88%)
12 years	7 (41.18%)	7 (41.18%)
13 years +	7 (41.18%)	9 (52.94%)
Unknown	1 (5.88%)	0 (0.00%)
Parental employment		
	Father	Mother
Business Owner	2 (11.76%)	0 (0.00%)
General worker; administration; sales	4 (23.53%)	6 (35.29%)
Skilled and semi-skilled	3 (17.65%)	0 (0.00%)
Technical or IT	4 (23.53%)	2 (11.76%)
Professional	1 (5.88%)	0 (0.00%)
Manager	1 (5.88%)	1 (5.88%)
Housekeeper/ cleaner	0 (0.00%)	2 (11.76%)
Home-maker	0 (0.00%)	1 (5.88%)
Student	1 (5.88%)	1 (5.88%)
Unemployed	0 (0.00%)	4 (23.53%)
Unknown	1 (5.88%)	0 (0.00%)

Note. Categorical data presented as count (%).

With regards to the teacher participants, as non-facilitating teacher participants and teacher participants who completed Brown EF/A Teacher Forms were not directly involved in presenting the BPT, no demographic details were requested from them. The teacher participant who facilitated the training, on the other hand, had 5 years of teaching experience at the time of Study Two (employed as a professional), after graduating with a tertiary-level qualification (13 years +; Bachelor of Education in Foundation Phase Teaching).

Pre- and Post-Intervention Analyses

For reference, it is worth calling to mind some of the scores from Study One, used as baseline data for Study Two, for the 17 of the 22 ATT-DIFF child participants who continued with Study Two. Composite T-scores ranged from 48 – 80 for the Brown EF/A Teacher

Form, and 48 – 86 for the Brown EF/A Parent Form. Furthermore, the mean score pre-intervention for the Brown EF/A Teacher Form was 65, while the mean for the Brown EF/A Parent Form was lower at 64.65, Both mean scores fall within the moderately atypical range and suggest attention problems are considered clinically significant (Brown, 2019).

Analyses were conducted on the results of the individual subscale and the overall composite scores of the Brown EF/A Parent and Teacher Forms Pre- and Post-intervention to assess any possible significant changes in the reported scores.

Brown EF/A Teacher Forms: Within-group Changes

Table 25 shows the results of the within-group analysis from pre- to post-intervention for the Brown EF/A Teacher Forms. Results from the Brown EF/A Teacher Forms Composite Score suggests that there was an overall improvement in the full cluster of attention problems, at least descriptively, although this change was not significant. In addition, when considering *r*-scores, small effect sizes are reported for the following domains which can be affected by attention problems: Activation, and Effort. Medium effect sizes are noted for overall Composite, Focus, Emotion, and Action, and large effect sizes are stated for Memory, suggesting some improvements in these domains. However, although lower mean scores (descriptively) were calculated post-intervention, overall teachers continued to perceive attention problems and related difficulties as within the clinically significant range (T-scores of 55 and above).

Table 25

Within-group Analysis: Brown EF/A Teacher Forms Pre- and Post-intervention (N = 17)

Variable	*Pre-Intervention*		*Post-Intervention*				
	***M* (*m*)**	***SD* (IQR)**	***M* (*m*)**	***SD* (IQR)**	***t* / *Z*[b]**	***p***	***d* / *r*[c]**
Composite	65.24	10.69	61.29	10.95	-1.51[b]	.132	.365[c]
Activation[d]	62.06	11.64	60.82	13.39	.432	.672	.105
Focus[e]	64.41	11.14	60.00 (64.00[a])	10.85 (21.00[a])	-1.22[b]	.224	.295[c]
Effort[f]	62.53	10.47	61.82	13.83	-.40[b]	.687	.098[c]
Emotion[g]	59.00	10.59	56.06 (53.00[a])	10.49 (15.00[a])	1.11	.282	.270
Memory[h]	67.47	12.93	61.65	10.20	.01	.025*	.598
Action[i]	62.53 (58.00[a])	13.69 (19.00[a])	59.82 (55.00[a])	13.52 (23.00[a])	.16	.317	.250

[a]As data are not normally distributed, descriptive statistics presented as *m*=median and IQR = interquartile range. [b]Wilcoxon signed rank test utilised as score differences between pre-post intervention did not meet normality assumption or there were significant outliers present. [c]For effect size calculation, *r* correlation was computed for Wilcoxon signed rank test as per recommendations by Rosenthal (1991). "[d]Activation: organising, prioritising and activating to work; [e]Focus: focusing, sustaining and shifting attention to tasks; [f]Effort: regulating alertness, sustained effort and adjusting processing speed; [g]Emotion: managing frustration and modulating emotions; [h]Memory: utilising working memory and accessing recall; [i]Action: monitoring and self-regulating action" (Pearson, 2019)

Brown EF/A Parent Forms: Within-group Changes

When considering the means reported for Parent Forms of the Brown EF/A Scales (see Table 26), it is apparent that, for all subscales, overall lower scores were recorded post-intervention. Furthermore, moderate effect sizes are calculated for the Composite, and Memory scales, suggesting some improvements in these domains. However, despite the positive changes noted descriptively, all means remain within the clinically significant range (T = 55 and above), thus indicating that the child participants still experienced clinically significant attention-related difficulties (albeit of a possibly less severe nature) in the different areas assessed by the Brown EF/A Parent Form subscales.

Table 26

Within-group analysis: Brown EF/A Parent Forms Pre- and Post-Intervention (N = 17)

Variable	*Pre-Intervention*		*Post-Intervention*				
	***M* (*m*)**	***SD* (IQR)**	***M* (*m*)**	***SD* (IQR)**	***t* / *Z*[b]**	***p***	***d* / *r*[c]**
Composite	64.65	14.10	61.88	12.39	-.95[b]	.342	.230[c]
Activation[d]	62.59	13.09	60.88	13.82	1.04	.312	.253
Focus[e]	66.00	13.22	64.12	13.34	1.09	.293	.264
Effort[f]	63.29	10.28	58.59 (55.00[a])	10.88 (8.00[a])	-1.63[b]	.104	.395[c]
Emotion[g]	60.12	16.52	55.53	10.57	1.74	.101	.422
Memory[h]	63.71	14.23	60.35	11.54	-1.58[b]	.114	.383[c]
Action[i]	62.71	12.37	59.94	11.00	1.07	.303	.258

[a]As data are not normally distributed, descriptive statistics presented as *m*=median and IQR = interquartile range. [b]Wilcoxon signed rank test utilised as score differences between pre-post intervention did not meet normality assumption or there were significant outliers present. [c]For effect size calculation, *r* correlation was computed for Wilcoxon signed rank test as per recommendations by Rosenthal (1991). "[d]Activation: organising, prioritising and activating to work; [e]Focus: focusing, sustaining and shifting attention to tasks; [f]Effort: regulating alertness, sustained effort and adjusting processing speed; [g]Emotion: managing frustration and modulating emotions; [h]Memory: utilising working memory and accessing recall; [i]Action: monitoring and self-regulating action" (Pearson, 2019)

Pre-post Intervention: Individual Changes

Results from the RCI analyses are captured in Table 27 and Figures 7 and 8. These results indicate that parent participants reported positive changes for some difficulties associated with attention (as measured in the Brown EF/A Scales), with positive change indicated for at least four child participants per area of functioning. There were fewer positive changes of this nature reported by the teacher participants. In addition, no negative change was recorded for the Memory subscale as well as the overall Composite scale as indicated by parent and teacher participants. However, as shown in Table 27, and in Figures 7 and 8, a large number of child participants did not show any significant clinical change from pre- to post-intervention, whether positive or negative.

Table 27

Summary of Results from RCI: Comparison of Pre- and Post-test Scores for Brown EF/A Forms (N=17)

Variables	Count (%)				
	Significant Positive Change**	**Slight Positive Change***	**No Change**	**Slight Negative Change***	**Significant Negative Change ****
Composite					
Teacher	1 (5.88%)	1 (5.88%)	15 (88.24%)	0 (0.00%)	0 (0.00%)
Parent	1 (5.88%)	3 (17.65%)	13 (76.47%)	0 (0.00%)	0 (0.00%)
Activation					
Teacher	1 (5.88%)	3 (17.65%)	11 (64.71%)	2 (11.76%)	0 (0.00%)
Parent	0 (0.00%)	4 (23.53%)	10 (58.82%)	3 (17.65%)	0 (0.00%)
Focus					
Teacher	2 (11.76%)	1 (5.88%)	13 (76.47%)	1 (5.88%)	0 (0.00%)
Parent	1 (5.88%)	4 (23.53%)	10 (58.82%)	2 (11.76%)	0 (0.00%)
Effort					
Teacher	1 (5.88%)	1 (5.88%)	14 (82.35%)	0 (0.00%)	1 (5.88%)
Parent	3 (17.65%)	4 (23.53%)	8 (47.06%)	2 (11.76%)	0 (0.00%)
Emotion					
Teacher	1 (5.88%)	3 (17.65%)	12 (70.59%)	1 (5.88%)	0 (0.00%)
Parent	4 (23.53%)	2 (11.76%)	10 (58.82%)	1 (5.88%)	0 (0.00%)
Memory					
Teacher	1 (5.88%)	3 (17.65%)	13 (76.47%)	0 (0.00%)	0 (0.00%)
Parent	1 (5.88%)	3 (17.65%)	13 (76.47%)	0 (0.00%)	0 (0.00%)
Action					
Teacher	0 (0.00%)	5 (29.41%)	10 (58.82%)	2 (11.76%)	0 (0.00%)
Parent	4 (23.53%)	2 (11.76%)	6 (35.29%)	5 (29.41%)	0 (0.00%)

Note. Positive change = a reduction in total scores on Brown EF/A scales indicating a decrease in symptoms. Negative change = an increase in total scores on Brown EF/A scales indicating an increase in symptoms. *a change of at least 1 standard deviation with a confidence interval of 68.26%. **a change of at least 1.96 standard deviations with a confidence interval of at least 95%.

When comparing the two figures (7 and 8), it can also be seen that more teacher participants recorded no significant clinical change in symptoms across the various subscales when compared to parents, with no change reported for at least 10 of all 17 child participants in all the subscales by teacher participants. As noted from Table 27, more parent participants reported positive changes when compared to teacher participants, which further aligns with parent participants reporting positive changes informally at the end of the sessions and during the follow-up interviews.

Figure 7

Summary of Results from RCI: Comparison of Pre- and Post-test Scores for Brown EF/A Teacher Forms (N=17)

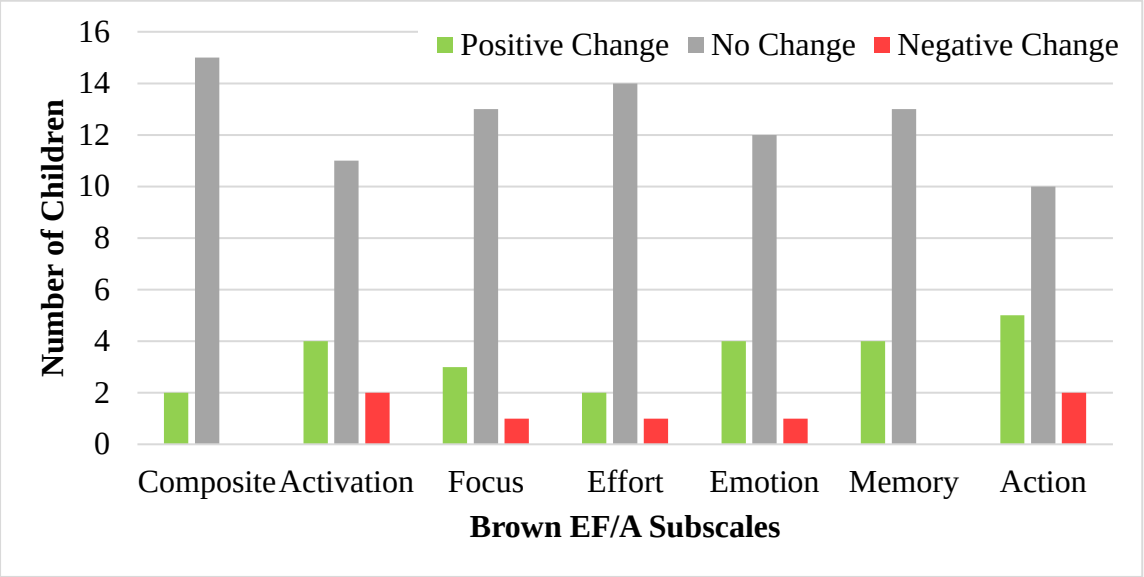
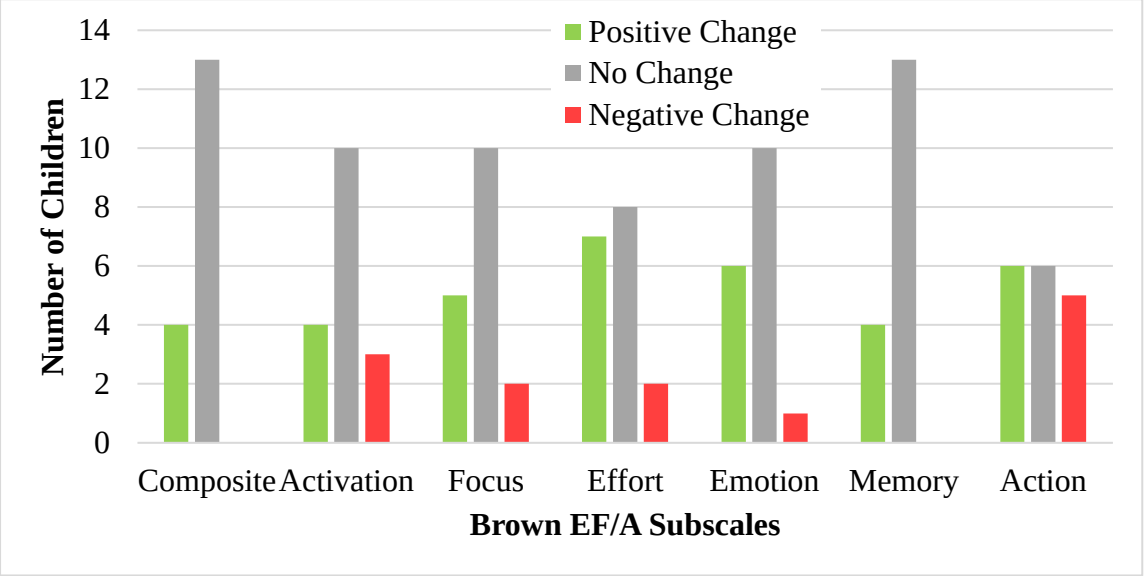


Figure 8

Summary of Results from RCI: Comparison of Pre- and Post-test Scores for Brown EF/A Parent Forms (N=17)



With regards to the End of Intervention Parent Participant Rating Scale, 16 of the 17 parent participants completed and returned the form as one parent participant was hospitalised at the time of completion of the form. Final scores ranged from 13 to 40, with higher scores indicating more positive outcomes with a mean score of 34.954. However,

when the low score of 13 was removed as a possible outlier (N = 15) and the coefficient was recalculated (see Table 30 in Appendix W), all scores were now between 32 and 40.

I evaluated parental attendance within the intervention against the parental rating of the efficacy of the BPT in the End of Intervention Parent Participant Rating Scale using SPSS (see Table 29 in Appendix W). On average, parent participants attended approximately seven sessions (M = 6.82). Despite high levels of attendance, Spearman's coefficient was calculated with r = -.388, suggesting that the higher the attendance at sessions, the lower parents rated the intervention.

However, it is possible that one parent participant did not understand the items or instructions when completing the rating form, applying the rating in the opposite direction with a total score of 13 out of 40. Despite their rating, they showed positive appreciation for the BPT when I engaged with them for the follow-up telephonically, although I acknowledge that participants may be pressured by socially desirable responses when talking directly to me. As the number of sessions attended by parent participants vary considerably, from three to eight sessions, the results, at least descriptively, are positive in terms of appraisal of the programme. With results not being statistically significant, at r = .598, a moderate relationship between rating of the intervention and attendance at sessions is suggested when the outlier score of 13 was removed (see Table 30: Appendix W).

To provide comprehensive analysis of the relationship between the number of sessions attended by parent participants, post-intervention results as reported by parents and teachers in the Brown EF/A Scales, and parental rating of the effectiveness of the intervention (recorded in the End of Intervention Parent Participant Rating Scale), these three measures were compared through calculation of Spearman's rank order correlation as reflected in see Table 28. With p =.529 for the Brown EF/A Teacher Form and p =.362 for the Brown EF/S Parent Form, no significant relationship was determined between parent participant attendance at sessions, changes in child participants' difficulties as assessed by the Brown EF/A Scales, and parent participant appraisal of the intervention.

Table 28

Correlation Between the Number of Sessions Attended and Brown EF/A Scales and the End of Intervention Parent Participant Rating Scale (N=17)

Variable	Number of sessions attended r_s [a]	*p*
Brown EF/A Teacher Form Difference in Composite Scores from Pre-Post Intervention	.16	.529
Brown EF/A Parent Form Difference in Composite Scores from Pre-Post Intervention	.24	.362

Note. [a]Spearman's rank-order correlation was conducted due to the violation of normality assumptions

Data shown in Table 31 verifies weak and non-significant relationships across all subscales as well as the composite scores when comparing the Parent and Teacher Brown EF/A Form outcomes. However, parent and teacher participants tended to agree more consistently with positive changes as recorded in the Effort subscale (p = .137). Despite this, the relationship is not significant, suggesting possible agreement in small improvements related to the motivation-associated tasks of maintaining sufficient effort and completing them, as well as processing speed, but not significantly so.

Table 31

Correlation Between Parent Forms and Teacher Forms From the Brown EF/A across Subscales (N=17)

Variable	Brown EF/A Parent Form Differences Pre-Post Intervention r_s [a]	*p*
Brown EF/A Teacher Form Differences Pre-Post Intervention		
Composite	.08	.770
Activation	-.21	.936
Focus	.19	.460
Effort	.17	.137
Emotion	-.22	.402
Memory	.19	.471
Action	.10	.699

Note. [a]Spearman's rank-order correlation was conducted due to the violation of normality assumptions

Discussion

Following the presentation of the results of Study Two, a summary and discussion of results are now presented.

Summary of Results and Hypothesis Testing

Participant Demographic Data Analysis. Demographic results from Study Two indicate that there were more male child participants than female child participants which supports data from other research regarding more males being identified with attention problems (and ADHD) than females (see APA,2022; Hinshaw et al., 2023). Also related to child participants, a difference in ages was noted due to child participants maturing from their initial participation in Study One at which time baseline data was accrued, to their post-intervention assessments by parent and teacher participants. As reflected in other research, because of relative age effects, younger children tend to be diagnosed more often with ADHD than older children (see Furzer et al., 2022; Sayal et al., 2018). When considering relative age effects, then, for child participants from Study Two, one cannot be certain that positive changes reflected in Table 24 are purely attributable to parental participation in the BPT and not due to child participant maturation during the study.

When considering parent participants, a majority of the father parent participants were noted as completing their final year of schooling (grade 12) and above as their highest qualification, with a majority of mother participants specifying they had completed tertiary study (13 years +), with more mother participants having pursued tertiary education (13 years + of education). Furthermore, some unknown occupations and levels of education were indicated for fathers which corroborate with the information provided by some mother parent participants in Study One as having no recent contact with some of the child participants' fathers. In addition, there was a higher level of unemployment indicated for mother participants as well as some specifying their occupations as cleaners or housekeepers, which is in line with the target demographic group of Study Two, being those from a low SES income area.

Pre- and Post-Intervention Data Analysis. The hypothesis for Study Two was that a psychosocial programme, which was implemented and facilitated by a teacher to a group of parents whose children presented with attention difficulties, could be effective in alleviating attention problems. Thus, a comparison of pre- and post-intervention scores, both within-group and individually, based on responses received from parent and teacher participants in the Parent and Teacher Forms of the Brown EF/A Scales, were considered in determining whether the hypothesis would be accepted.

Overall, the pre- and post-intervention within-group analyses showed largely no significant changes, although descriptively these were in the expected direction, except for the outcome of the Memory subscale for the teacher participant ratings. However, there were moderate effect sizes noted for the Brown EF/A Teacher Form (r = .598), and for the Brown EF/A Parent Form *(*r = .383), where teacher and parent participants indicated positive changes related to attention problems based on the Memory subscale, respectively, which assesses working memory and the ability to recall efficiently (Pearson, 2019). This result, overall, is supported by findings from studies in which BPT and other techniques were employed, including cognitive executive functioning training and structured games, with BPT as a whole showing poorer outcomes overall, but with reasonable (albeit smaller) effect sizes noted specifically for working memory improvements (Akiko, 2022; Beauregard & Lévesque, 2006; Lambez et al., 2020; Prins et al., 2011; Raghuveer, 2020). Relatedly, various studies show improvements in working memory functioning due to participation in physical exercises and CBT-based interventions, with aspects of both approaches utilised in the BPT employed in Study Two, through encouraging participation in cardiovascular exercise, and teaching effective communication and listening strategies, for example (Choi et al., 2015; Gapin et al., 2015, Miranda et al., 2002; Miranda et al., 2013; Virta et al., 2010). The possible mechanism associated with the changes is improved blood circulation to the prefrontal cortex, as a result of exercise, being responsible in part for the positive changes reported in working memory (Hillman et al., 2003; Lambez et al., 2020). Although most of the cited studies employed BPT in isolation, the Choi et al. (2015) study employed the use of medication in conjunction with the psychosocial interventions used.

Interestingly, results suggest only parent participants reported possible improvements in the following other areas assessed by the Brown EF/A Scales: Emotion and Effort, at least in terms of effect sizes for these results (given non-significant within-group outcomes). As reflected in Tables 25 and 26, the Emotion subscale measured behaviours related specifically to frustration management and modulation of emotions, aspects which perhaps are more noticed in the home when children are not confined to the classroom environment, but when engaging with other family members. This finding is supported by research by Parent et al. (2023), where researchers noted positive improvements in irritability after participation in a BPT, which is postulated to be related to improved parent-child relationships, as was focused on in the BPT in Study Two (see Sessions Six and Seven, Table 21). As discussed in Chapter Two, motivation is defined as sustained effort (Dörnyei & Ushioda, 2021), which is one of the aspects measured by the Effort subscale. To this end, the finding regarding a moderate

effect size for Effort (r = .395), is consistent with those reported by other researchers (see Steeger et al., 2015; Zheng, 2022).

In sum, as noted, although some positive changes are reported by teacher and parent participants across most subscales, overall, teacher and parent participants did not report significant improvements across the different subscales, and this was regardless of how well parents rated the efficacy of the programme or the number of sessions they attended. Findings are consistent with results from meta-analyses and systematic reviews, which show no reductions in main ADHD symptomology following implementation of BPT, although improvements are reported for positive parenting methods and reductions in oppositional behaviours, both aspects of which are not directly assessed in the Brown EF/A Scales (Chan et al., 2022; Coghill et al., 2023). There were also other study limitations which could have impacted on the results.

Limitations and Directions for Further Study

First, as reported for Study One, a small sample size may have impacted on the generalisability of the results, despite effect sizes suggesting some possible positive outcomes. Resultantly, the study would need to be replicated to determine the validity of the findings.

Second, it was envisioned at the time of planning that the training intervention would be delivered face-to-face with parent and teacher participants. The fact that options were made available for the mode of delivery following the COVID-19 pandemic and restrictions on face-to-face contact between people, the subsequent selection of online attendance, and the delivery of the training intervention programme in this mode, may have impacted the overall efficacy of Study Two. Also, as noted in previous research (DuPaul et al., 2018), there are differences reported for efficacy of BPTs delivered online and face-to-face due to higher acceptability ratings by parents in a face-to-face group when compared to the online group.

Third was the issue of the study design and the absence of a no-intervention control group. This prevented a comparison in attention-related symptoms for children whose parents attended the training with those of parents who did not attend the training, as well as controlling for test-practice and maturation effects, which are necessary in intervention studies (e.g., Lanesman, & Schrieff, 2021). Thus, any relief of attention-related symptoms could not be directly attributed to participation in the intervention. The recruitment of participants at the start of the study was hampered by COVID-19 restrictions, and although some of these restrictions were lifted during the study, given the continuity between Studies One and Two, the initial limitations to the recruitment affected the study as a whole.

Fourth, although parental attendance was noted at intervals during each training session, continued parental involvement in sessions was difficult to monitor online. It is possible that some parent participants may have logged on to meetings and not focused fully on the information shared due to the sessions being online, and there may potentially have been some parent participants only attending sessions to ensure their names were added for the incentive draw to win the gift voucher. Despite this, parent participants attended, on average, seven of the eight sessions, and most appraised the sessions favourably as reflected in the End of Intervention Parent Participant Rating Scale. Thus, it seems parent participants deemed the sessions worthy of attendance. Interestingly, the parent participant who rated the End of Intervention Parent Participant Rating Scale with the lowest score expressed appreciation following their participation in the intervention, and it is possible that they completed the form incorrectly. It is also plausible that the parent participant may not have understood the language or instructions for the scale fully.

Fifth, and regarding the intervention itself, although aspects covered in the training manual were tailored to include difficulties mentioned by parent participants during their interviews with me, all the topics may not have been entirely applicable to all parent participants and may not have benefitted all child participants equally, despite some improvements noted. Furthermore, as evidenced from conversations overheard before parent participants were muted during some of the training sessions, there may have been distractions by siblings and other people in the vicinity of parents during the training sessions, suggesting a lack of a private venue from which to attend the sessions. Also, access to data and reduced connectivity due to loadshedding for participants may have limited the success of the programme to an extent, as delivery of the material may not have been as effective as planned. Relatedly, it may be possible that the BPT was not presented for a long enough period or that sessions were not presented frequently enough. It is also not known whether, in cases of two-parent homes, both parents attended the training and implemented the strategies discussed collaboratively or consistently across the homes.

Similarly, use of WhatsApp as an online communication platform may have affected the outcome of Study Two. Despite WhatsApp being utilised for a variety of reasons (such as most parent participants and the teacher participant being familiar with the application's functionality, most participants already having the application installed their mobile phones or electronic devices used during the training sessions, and WhatsApp facilitating the use of a group call for sessions), there are some limitations specific to the use of WhatsApp worth noting. For example, participants preferred audio calls over video calls for the sessions which

precluded non-verbal cues to aid communication (such as hand gestures instead of emoticons for the same). Also, not all parent participants may have been familiar with some texting abbreviations used (for instance: lol for laugh out loud) and may have felt excluded from these communications as a result. However, these limitations are not unique to Study Two (see Mavhandu-Mudzusi et al., 2022 and Oksman et al., 2024).

Seventh, although the language used in the training manual was simplified and examples added after the teacher training intervention, it is noted that English was not the home language for many of the child participants and, consequently parent participants may also have experienced some difficulty with understanding of some of the information presented in the training sessions and training manual. Also, as noted previously, this may also have affected how the parent participant (who appraised the training intervention with the least favourable overall score of 13 out of 40), completed the End of Intervention Parent Participant Rating Scale as they may not have understood the instructions fully.

Also, it is noted that there may have been an impact on the symptoms reported by different teacher participants as, for some of the child participants, two different teacher participants completed the Brown EF/A Teacher Forms as children had progressed to a higher grade level since the start of Study One (from which the scores were used as pre-intervention data). Although inter-rater reliability scores are sufficient (Brown, 2019), some variations in behaviour appraisals may have occurred which could have affected the overall results of Study Two. However, the teacher participant completed the Teacher Participant Rating Scale (Appendix P) on completion of the study. Results from the teacher rating scale showed that they rated the intervention and their own training very favourably with “strongly agree” being indicated as the response for all the descriptors. This suggests they were very satisfied with the training and support received during their own training as well as the training intervention with parent participants.

Relatedly, use of additional standardised measures assessing aspects not noted in the Brown EF/A Parent Form, such as improved parent-child relationships and parenting-related stress reduction, as well as use of measures with child participants at conclusion of the study focusing on aspects like improvements in self-concept, may have yielded richer information regarding the extent of changes not noted in the measures used.

The use of non-standardised measures may have affected the outcome of Study Two, in addition. To this end, regarding the End of Intervention Parent Rating Scale, when comparing the parent appraisal to the standardised measures of the Brown EFA Scales and number of sessions, such results regarding efficacy of the BPT should be interpreted

cautiously. Furthermore, the use of an informal parenting style questionnaire, as used in Study Two (see Appendix N), may have impacted the accuracy of parenting styles identified during the intervention.

Also, as the confidence interval of 95% was considered sufficient due to the small sample size, a confidence interval of 99% was not calculated. However, this may have affected the generalisability of results.

Finally, it is noteworthy that only utilising eight sessions for the intervention may have affected the outcomes of results. Replication of the programme over a longer period of time may produce significant changes and more enduring results. This could be achieved through integrating principles of the intervention programme in Life Orientation classes, or in adjusting approaches used by teachers in classroom management and engagement strategies with learners. Thus, an area of further study could be determining the efficacy of the programme if it were implemented over a longer period of time.

Nonetheless, there are other aspects highlighted for further investigation. For example, the possibility of implementing a teacher-led training intervention in one of the more predominant South African languages, using the current study as a framework and translating it, could be possible. Further, the efficacy of a teacher-led training intervention presented in-person could be investigated in terms of its efficacy in alleviating attention problems, or ADHD following an assessment of child participants for ADHD. The inclusion of a no-intervention group in these two proposed studies may also be valuable in determining, with greater accuracy, whether the suggested positive outcomes, however limited, may be attributed to participation in the BPT and may preclude relative age or test practice effects.

In light of the summary of results and the noted limitations above, overall, the programme as it was delivered and in its form at the time of its implementation, can perhaps not be reported as efficacious in alleviating possible ADHD and attention problems as measured by the Brown EF/A Scales in child participants. Although lower mean scores were calculated post-intervention, at least descriptively, and which appear encouraging, overall teachers and parents continued to perceive some attention problems and related difficulties as within the clinically significant range (T-scores of 55 and above) for the Brown EF/A Parent and Teacher Forms. Although the limitations outlined above impact on the efficacy of the intervention, such efficacy could be considered more broadly.

Other Considerations Regarding the Efficacy of Intervention

After presentation of the results of Study Two, it is worth considering a variety of outcomes which were not assessed by the Brown EF/A Scales. For example, some of the

parent participants reported, anecdotally, relief in their own stress levels related to managing their children's behaviours and difficulties, and many of the parents reported improved relationships with their children as they learned to work in a more positive manner with their children.

Further to this, the following comments were added to End of Intervention Parent Participation Rating Scales in the allocated space for additional remarks:

"the programme really helped me understand my child better …new skills that I've learned …helping me and my son"; "Thank you so much for being upskilled"; "it has allowed for a better relationship between myself and [my child], there is no more screaming and shouting"; "I never thought my children would be working together for homework"; "it has helped me and my family a lot"; "it has been of great help, truly an eye opener"; "the programme helped me to work on myself, try my best not to shout"; "[participation in the programme] has improved my child's relationship with us. He doesn't worry as much" and, one parent participant noted: *"as parents we always think we are doing the right thing and we learned new ways of doing things".*

Subsequently, when parent participants were contacted telephonically approximately 6 months after the training intervention concluded, most reported continued relief and improved relationships. Some parent participants wanted to attend further sessions as they felt the process was supportive and they stated enjoyment of the sense of camaraderie and feeling of belonging, which is often inherent in support group sessions (Guttmacher & Birk, 1971).

Comments mentioned by parent participants at that time included:

"at home my child is not bad although one teacher complains of him not doing his work"; "things are going well at home and he is not playing as much as he used to, also school is fine"; "she is flourishing as we have changed schools and she is in a smaller class now"; "my two boys are doing well – I just needed to learn about and know more about kids like them – they are progressing well at school"; "he is doing better at school but is still battling with concentration"; "I am seeing [positive] changes one at a time"; "our relationship has improved partly due to the changes I made because of the programme" and "the school is no longer complaining".

However, despite some of the reported improvements being supported by findings from other research (see Dale et al., 2021; Martinez, 2023; Schechter & Kollins, 2019; Vardanian et al., 2020), it is noteworthy that some of the parent participants had not yet taken

their children for the referral consultations at the state clinics and hospitals, and that some requested me to send them the referral letters once again.

Regarding the teacher participant's experience of the training interventions, they stated: *"I feel all teachers should go through the training"* indicating their experience of the training as being beneficial, and sharing a sentiment noted in previous literature regarding the usefulness of teacher participation in ADHD-specific teacher training (Ward et al., 2020).

Applicability of Intervention to Specific Context

Bearing in mind the overall efficacy of the BPT, the original mode of delivery of the training intervention, face-to-face delivery may have been more appropriate for the demographic group of the parent participants.

Furthermore, although the information provided during the training sessions and in the training manual was tailored to include aspects that parent participants in Study One conveyed as difficulties for their children, many of the problem areas mentioned in previous BPT studies, which were consulted in preparation of the BPT of Study Two, were appropriate to international children (children raised predominantly following Western ideals) and may not be in line with more traditional systems of thought locally.

Summary and Conclusion

Study Two presented findings from the implementation of an online BPT programme which was delivered by a teacher participant and which parent participants of some of the child participants in Study One, attended. Various topics were presented, as related to working with a child with attention problems and ADHD, and parent participants engaged in various discussions and activities during and after the sessions. Furthermore, parent and teacher participants rated Study One child participants on a range of areas of functioning as outlined by the Brown EF/A Scales before and after implementation of the programme. These results were then analysed in this chapter to determine the efficacy of the BPT.

Although many of the parent participants reported feeling relief during and after the training sessions and showed appreciation for the information which was shared with them, overall the short-term parent-teacher training intervention was not successful in alleviating attention problems as measured by the Brown EF/A Scales in a low SES community in Boksburg, Gauteng. Of course, intervention outcomes should not be reliant only on test outcomes, but on real-life changes, which are often harder to measure systematically.

However, despite these results, Studies One and Two made further contributions to the understanding of attention problems and ADHD and also highlighted different areas of interest which will be explored in final chapter of this dissertation.

Chapter Six

General Discussion and Conclusion

ADHD is considered one of the most common neurodevelopmental disorders in children worldwide (Ayano, et al., 2020; Hoseini et al., 2014; Smith, 2017). However, there is limited information regarding the epidemiology of the disorder in South Africa and, specifically, in Gauteng. Due to barriers related to access to treatment in South Africa, ADHD remains a burden for many children from disadvantaged communities and their families.

To address these issues, the aim of the dissertation was twofold. First, in Study One, as an exploratory study, the aim was to identify the extent of possible ADHD in a sample of children from a school educating learners aged between 8 and 12 years from surrounding low SES areas. Second, in Study Two, the aim was to determine the efficacy of a short-term teacher-led BPT intervention focusing on psychosocial strategies in alleviating attention-related difficulties in child participants identified with possible ADHD in the same school. As described earlier, the move from investigating the frequency of diagnosed ADHD among the child participants in the Study One sample to investigating attention problems more generally (possible ADHD), was a function of the study being conducted during and just following the COVID-19 pandemic, which restricted the degree and the nature of contact with the participants, at least initially.

Results from Study One indicated that ±73% of child participants in the sample (*N*=30) were assessed to have possible ADHD. Further, demographically, child participants with attention-related problems tended to be older (in terms of the age of the sample), at least descriptively, than child participants without attention-related problems, and male. Overall, child participants with possible ADHD tended to report experiencing more negative emotions. The developmental histories of child participants with possible ADHD tended to include more pregnancy and neonatal complications, attachment-, health- and education-related issues, developmental problems, emotional trauma, family histories of mental and health problems, as well as other issues mentioned by parents (such as over-dependence on a parent, and sibling rivalry), as compared to those without attention-related problems. Although none of the results regarding known risk factors for ADHD were statistically significant, they were in the expected direction.

Furthermore, the results provide insight into difficulties related to rearing child participants with attention problems which may be exacerbated by limited access to treatment as previously discussed and the results share information about the children's lived

experiences and challenges. Despite inconsistent sampling methods employed, consideration of the number of child participants who presented with attention problems from the total sample showed the need for implementation of a BPT.

Study Two followed by examining the efficacy of the teacher-led BPT programme. Results from pre- and post- test standardised measure outcomes indicated that teacher and parent participants noted improvements in some areas of functioning, but inconsistently so. For example, moderate effect sizes were reported for child participants' memory-related skills as assessed by teacher and parent participants in the Brown EF/A Scales. However, parent participants did not report significant improvements in other outcomes as measured on the Effort and Emotions subscales of the Brown EF/A Parent Form. Application of the Reliable Change Index (RCI) verified that parent and teacher participants noted mostly non-significant improvements across most areas (reflected as no significant change), with parent participants reporting more positive changes, descriptively, than teacher participants. Despite this, analysis of information provided in the informal End of Intervention Parent and Teacher Participant Rating Scales, and qualitative data from comments from the participants allude to parent participants experiencing improvements in their relationships with their children and improved sibling co-operation; parent participants stating that they understand their children better, that they experience improved communication, and they think that they have enhanced their overall parenting skills. The teacher participant stated that they believed all teachers should attend the training. Furthermore, an informal follow-up conducted approximately 6 months after the intervention affirms that some of these reported qualitative improvements have been maintained.

Together, Studies One and Two provide a unique contribution to our understanding of contextual determinants and factors related to investigating attention challenges (and likely ADHD) and the implementation of a related psychosocial intervention in a South African context, particularly in an under-resourced community. There is a dearth of such studies in this context. The implementation of assessments and interventions for disorders such as ADHD here, and likely in other developing world contexts, requires special consideration of contextual vulnerabilities.

For example, the findings from Study One demonstrated that many parents experience barriers to accessing quality treatment for mental and other health conditions for themselves and their children. To this end, some parents reportedly were not informed of the nature of their children's birth or neonatal problems. Although this lack of knowledge could be related to limited information shared by healthcare providers, a language barrier, or medical

professionals explaining such outcomes in a manner that parents did perhaps not adequately understand, confirm previously reported outcomes that language-related problems can impact the quality of healthcare provided, even indirectly (Shamsi et al., 2020). Study One also contributes to the growing literature on pervasive attention problems among primary/elementary school-age children, and especially those from socially disadvantaged backgrounds, but importantly the degree to which such problems remain undiagnosed, and consequently, untreated (ADHASA, 2020; Baweja, et al., 2021; Pipe et al., 2022; Smith, 2017). Despite the limitations of the study, the results can be used to promote advocacy for formal screening of attentional problems in such school-going populations.

Similar to Study One, Study Two provides contextual-relevant insights into difficulties experienced by parents, children and teachers in their lived experiences of attention problems and possible ADHD.

As noted in Tables 3 and 4 relating to demographic data of parent and child participants in both studies, English was not spoken as the home language for most participants and yet the current study was administered in English. Possible difficulties related to understanding English, such as child participants needing additional explanations when referring to emotions in the PANAS-C scales, parent participants not being able to name health- and birth- related issues experienced by their children, and parent participants possibly not understanding items in the End of Intervention Parent Rating Scale, may have impacted on the overall results of Study Two. Thus, the two studies demonstrated possible problems related to multilingualism for children and their parents, a concern for many years especially as related to education in South Africa (see Brezinger, 2017; Desai, 2001; Desai, 2018; Webb et al., 2010). For example, present in both studies but introduced in Chapter Three, despite South Africa's polyglot nature, English is noted as the medium of instruction at the school site. However, as a reflection of the use of English as the predominant language of learning and teaching in South Africa, this further entrenches inequality, disadvantages speakers of other languages and, thus, negatively affects their educational outcomes (Govender, 2010; Mbude, 2020). While wanting to contribute to limited studies on assessment and intervention for attentional issues (and by implication, ADHD) in a South African setting, I acknowledge the limitation of not being able to address these important considerations regarding language and linguistic fairness and accessibility in the current research. Furthermore, although multilingualism was discussed at length in Chapter Three, it is noted at this point due to its influence on the results of both studies. Although the current research was unable to adopt a more inclusive linguistic approach, given that I am only fluent

in English and Afrikaans and that I conducted the study on my own, the focus of both Studies One and Two were on learners from under-resourced schools.

In South Africa, many schools remain under-resourced, which further impedes the ability of teachers to accommodate learners with special educational needs, with teachers further reporting limited support from parents, social issues of children, and large classes as additional factors which make educating children with special needs challenging (Jansen Van Rensburg et al., 2024; Mahlo, 2017; Sonkgavi, 2021). Additionally, many teachers believe they have not received the necessary training to support learners with diverse needs using evidence-based methods (Adewumi et al., 2019; Guerra et al., 2017; Schatz et al., 2021; van der Oord & Tripp, 2020; Ward et al., 2021). The issue of teacher training was highlighted in Study Two, notably as related to understanding teachers' training needs regarding neurodiversity[45], and ADHD in particular. Findings from Study Two, as evidenced in the teacher participant's responses in the End of Intervention Teacher Participant Rating Scale as well as in information noted in the informal follow-up conversations with parents, reflect the utility of the intervention, even if standardised outcomes did not demonstrate efficacy consistently. In line with the findings from Study Two as well as the literature cited in this discussion, there is a further distinct need for additional research into specific strategies which foster effective teaching for students with neurodiversity (Jansen Van Rensburg et al., 2024; Sewell, 2020). Likewise, organisational changes which reduce the gap between teaching neurotypical and neurodiverse learners are needed, such as pursuing new teaching practices and focusing on fair outcomes, regardless of whether the child presents with a neurodevelopmental disorder or not (Baker, 2023). These findings reiterate the fact that, as evidenced in Study Two, teachers (at least those who participated in the current research studies) do not believe their teacher training on the management of learners with ADHD is adequate.

Furthermore, Study Two provided awareness regarding the value of support groups for parents of children with special educational needs, reflected in the eight group sessions attended by parent participants in the parent training intervention. The following criteria, which were present in Study Two, were considered valuable by parents when engaging in parent support groups: access to information, types of activities, the interaction between

[45] **Neurodiversity** is the umbrella term for conditions such as Specific Learning Disorders, ADHD, autism and other neurodevelopmental disorders, which have a neurological basis and present as strengths and difficulties (Kapp et al., 2013). The focus on neurodiversity for teachers and others involved in the treatment and support of individuals with neurodiverse-related conditions, then, is acknowledging the difficulties as differences instead of as deficits (Rappolt-Schlichtmann et al., 2018).

group members, parents' abilities to deliberate matters, and adequate supervision of the group (Häggman-Laitila & Pietilä, 2009). As discussed at length in Chapter Five, the parent training sessions comprised the sharing of information about ADHD, in-group and after-group activities, in-group discussions, and the opportunity for parents to share their views and challenges around parenting their children. At the end of the training sessions, as indicated in parental responses to the End of Intervention Parent Participant Rating Scale, parents referred to the benefits of attending the sessions and working in the group. This is in line with findings from other research, noting that parents valued the shared connection between group members; they shared how the dissemination of information promoted social and health support, as well as how their parenting skills improved following conversations with other group members (Ronaasen et al., 2020). These results are consistent with those reported by parents in other research studies in terms of valued group participation due to the group being considered a space where they experienced empathy from others and where they were afforded the opportunity to receive and share information (Jackson et al., 2018). Similarly, other studies have determined that the way in which parents are supported, such as feeling respected as a person and parent, is more important than the source of the support, with support groups possibly reducing the reliance on an over-burdened healthcare system making them a cost-effective and wide-reaching addition to the treatment on offer for ADHD in South Africa (see Shalaby & Agyapong, 2019; Strnadová et al., 2019).

Although Studies One and Two focused on implementation of a BPT on a small sample of child participants in a specific low SES community, the sample represents a microcosm of a larger society still experiencing barriers of access to quality healthcare and education as a result of inequality, a long-term consequence of the discriminatory policies and practices of the previous South African apartheid government. As a means of alleviating some of the burden of these challenges, a teacher-led BPT implemented with a group of parents of children with attention problems may be a cost-effective measure utilising existing structures, making access to treatment a reality.

Overarching Limitations

As with all studies, there are various general limitations which apply to Studies One and Two, over and above those I have discussed in relation to each study. First, the impact of the COVID-19 pandemic and subsequent lockdown measures enforced by the government of South Africa at the time of data collection for this dissertation, resulted in research restrictions related to face-to-face contact, which prevented face-to-face assessments and consequently a formal diagnoses of ADHD from being made. The studies were amended to

rather reflect the extent of possible ADHD problems, and efficacy of the training programme of children with possible ADHD instead of diagnosed ADHD. Of course a lack of formal diagnoses may result in limitations to the generalisability of the results. However, alleviation of some attention-related problems of child participants and perceived psychosocial support by parents endorse the implementation of the BPT as a means to promote access to a form of treatment, irrespective of the formal diagnosis of ADHD in child participants.

As discussed previously, the employment of mixed sampling methods, namely snowball and purposive sampling, may have affected the determination of the prevalence of attention problems in the sample of child participants, thus affecting the outcomes of both studies. Furthermore, the lack of a control group, to which to compare results, and small sample size, prevent any improvements noted to be directly attributed to participation in the parent training programme.

Future Directions

Despite these limitations, both studies have brought further areas of research to the fore. As a start, although the teacher participant noted their belief that all teachers should attend the training, it would be worth determining if teachers experience improvements in their own attitudes towards children with ADHD following training. Thereafter, it would be interesting to establish if teachers' relationships with children were enhanced due to participation in an ADHD teacher training intervention. It could be useful, then, to ascertain if there is any effect on children's academic performance following teacher attendance at an ADHD training programme.

Regarding parents, a further area of study would relate to whether any parent participants presented with ADHD and how this may have affected their involvement in the training, particularly as it was delivered online. In addition, it could be interesting to find out whether their implementation of the strategies shared in Study Two was any different to those of parents without ADHD. It could also be useful to determine whether they then experienced any improvements in their personal lives following the use of strategies outlined in Study Two.

Related specifically to the South African context, further study is needed on the impact of cultural-related parenting beliefs and practices and how this affects parenting decisions for children with ADHD. This could assist with guiding interventions in a culturally-sensitive manner and possibly improving the efficacy of training programmes.

Ultimately, a face-to-face replication of the current studies, with a larger sample-sized, randomised controlled trial using the materials already developed, but translated into other South African languages, should be implemented.

Conclusion

ADHD, as a prevalent neurodevelopmental disorder, is not being diagnosed and effectively treated in large portions of the South African population. Although parental involvement in a teacher-led training intervention shows promising results in some areas, more research is needed which takes into account contextually-relevant issues unique to South Africa, such as our cultural and language diversity. More resources, then, need to be made available to improve access to treatment and employment of a collaborative care model which utilises skills of those interacting with children, including teachers and healthcare professionals. Moreover, the prevalence of the disorder can be accurately determined at that time as more parents and children can access care, and only after implementation of holistic care, which includes the use of parent and teacher training, can the burden of the disorder be reduced for children, their parents and their communities.

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Appendices

Appendix A. The Positive and Negative Affect Scale for Children (PANAS-C)

Appendix B. Developmental Questionnaire

Appendix C. Observation Checklist

Appendix D. Approval from UCT Research Ethics Committee (REC)

Appendix E. GDE Research Approval Letter: 2020

Appendix F. Letter Requesting Approval for School Participation: Studies One and Two

Appendix G. GDE Research Approval Letter: 2021

Appendix H. Request for Participation of Parents/ Caregivers in Study One: Screening Stage

Appendix I. Request for Participation of Teachers in Study One: Screening Stage

Appendix J. Assent Form for Child Participants

Appendix K. GDE Research Approval Letter: 2022

Appendix L. Request for Participation of Parents/ Caregivers in Study Two

Appendix M. Request for Participation of Teachers in Study Two

Appendix N. Parenting Style Questionnaire

Appendix O. End of Intervention Parent Participant Rating Scale

Appendix P. End of Intervention Teacher Participant Rating Scale

Appendix Q. Content Monitoring Form

Appendix R. Case Studies for Training Manual

Appendix S. My Child's Eating Habits and Daily Exercise

Appendix T. Study Two Parent WhatsApp Group Golden Rules

Appendix U. Training Manual

Appendix V. Additional Information for Training Sessions

Appendix W. Supplementary Tables

Appendix A: The Positive and Negative Affect Scale for Children (PANAS-C)

Description:

The Positive Affect and Negative Affect Schedule-Child Form (PANAS-C) is a 30-item, self-report questionnaire used to measure the respondent's emotions during the past few weeks. The items are grouped into the subscales indicated in the title of the protocol: positive affect and negative affect. The respondent is asked to read several words that describe feelings and emotions and enter a number that corresponds to the value on a scale. The 5-item scale ranges from "not much or not at all," with a value of 1, to "a lot," with a value of 5.

Specific Instructions:

The PANAS-C is copyrighted by Dr. David Watson and Dr. Lee Anna Clark of the University of Notre Dame. All printed versions of the instrument (including online protocols) must contain the following copyright information:

Adapted from Watson, D. & Clark, L.A. (1999). The PANAS-X: Manual for the Positive and Negative Affect Schedule-Expanded Form-Revised. Copyright 1994 by D. Watson and L. A. Clark; all rights reserved. PANAS-X adapted with permission.

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Protocol:

Feelings and Emotions (PANAS-C)

This scale consists of a number of words that describe different feelings and emotions.

Read each item and then circle the appropriate answer next to that word.

Indicate how much you have felt this way during the past few weeks.

	Not much or not at all	A little	Some	Quite a bit	A lot
Interested	1	2	3	4	5
Sad	1	2	3	4	5
Frightened	1	2	3	4	5
Alert	1	2	3	4	5
Excited	1	2	3	4	5
Ashamed	1	2	3	4	5
Upset	1	2	3	4	5
Happy	1	2	3	4	5
Strong	1	2	3	4	5
Nervous	1	2	3	4	5
Guilty	1	2	3	4	5
Energetic	1	2	3	4	5
Scared	1	2	3	4	5
Calm	1	2	3	4	5
Miserable	1	2	3	4	5
Jittery	1	2	3	4	5
Cheerful	1	2	3	4	5
Active	1	2	3	4	5
Proud	1	2	3	4	5
Afraid	1	2	3	4	5
Joyful	1	2	3	4	5
Lonely	1	2	3	4	5
Mad	1	2	3	4	5
Fearless	1	2	3	4	5
Disgusted	1	2	3	4	5
Delighted	1	2	3	4	5

Blue	1	2	3	4	5
Daring	1	2	3	4	5
Gloomy	1	2	3	4	5
Lively	1	2	3	4	5

PANAS-C SCORING SHEET

Instructions: Record the child or adolescents rating for each item in the appropriate blank.

Ratings are from 1 to 5. To obtain the score for the positive affect (PA) scale, add the raw scores for the 12 items that compose the PA scale. Similarly, adding the raw scores for the 15 items that compose the negative affect (NA) scale results in the score for the NA scale.

Positive Affect (rated 1-5) _____	Negative Affect (rated 1-5) _____
Interested _____	Sad _____
Excited _____	Frightened _____
Happy _____	Ashamed _____
Strong _____	Upset _____
Energetic _____	Nervous _____
Calm _____	Guilty _____
Cheerful _____	Scared _____
Active _____	Miserable _____
Proud _____	Jittery _____
Joyful _____	Afraid _____
Delighted _____	Lonely _____
Lively _____	Mad _____
Alert	Disgusted _____
Daring	Blue _____
	Gloomy _____
PA Total _____	NA Total _____

Adapted from Watson, D. & Clark, L.A. (1999). The PANAS-X: Manual for the Positive and Negative Affect Schedule-Expanded Form-Revised. Copyright 1994 by D. Watson and L. A. Clark; all rights reserved. PANAS-X adapted with permission.

Protocol Name from Source:

Positive Affect and Negative Affect Schedule-Child Form (PANAS-C)

Availability:

Publicly available

Appendix B: Developmental Questionnaire

(amended from the UCT Neuropsychology Clinic History Sheet)

Information supplied remains confidential and will not be shared with the school or its teachers.

Child's Name: _____Date of Birth: _____ Age: _____

PREGNANCY AND BIRTH

Were there any complications during the pregnancy?

Did you take any medicine during pregnancy? Prescribed or over the counter?

Did you smoke cigarettes while you were pregnant? How many?

How much did you drink when you were pregnant?

Anything else, like dagga? Any drugs?

Was the birth on time?

If early or late, find out why:

Was it a natural birth or via C-section/Caesarian? Was labour induced?

Were there any complications during the birth?

What was your baby's birthweight? _____

Were there any complications in the newborn period?

Did the baby feed easily?

Was your baby breastfed, and if so for how long?

And at present, how does s/he eat??

Did the baby sleep well? What about currently?

Was the baby easy to soothe?

Did you feel close to the baby?

DEVELOPMENT

If the parent is really struggling to remember times, give the guidelines in brackets; if that doesn't help ask if it was early or late compared to their other children or children in the family.

Pay attention to whether the parent really seems to know the milestone timing or if they are just agreeing with your suggestions. Ways to deal with the latter include giving a few options to pick from – ie was it 6 mths, 1 yr, 18 mths – rather than a single option. Using events can sometimes help organize memories too – was it before his first birthday? 'So he was born in June, was he sitting by Christmas?' 'Could he dress himself when he was in Creche? Grade R? or maybe by Grade 1?'

At what age did your child:

sit unaided?_____ (if unsure, check whether it was before 1 year)

crawl or 'scoot' on his bottom?_____ (if unsure, check whether it was before 1 year)

walk without help?_____(if unsure, check whether it was before 18 months)

dress and undress without help?_____

button own clothes? _____

tie shoe laces? _____

start babbling/baby talk?_____(if unsure, check whether it was around 6 – 8mths)

say their first word?_____ (if unsure, check whether it was around 1 yr)

use 2 words together?_____ (if unsure, check whether it around 1 – 2 yrs)

talk in sentences?_____ (if unsure, check whether between 2 and 3.5 yrs)

write own name?_____

Was your child slow to walk, or run? Did s/he have any problems with co-ordination or fine motor control?

At what age was your child dry by day? _____

At what age was your child dry by night? _____

Did you have any problems with toilet training?

Were there any early separations from you? (when and for how long)

Please list any illnesses and problems with hearing or vision that your child has/had.

Has your child ever been referred to a Psychologist/Psychiatry service?

Have there been any emotionally difficult experiences for your child?

Did your child attend crèche? (what ages)

How old was your child in grade R? What year was that?

If there is uncertainty about grade repeats, or chronology of schooling, work forward or back with Mom for the period between starting school and current grade until you have the school chronology absolutely clear

FAMILY COMPOSITION

Including names and ages of your other children (and state if any are half- or step-brothers or sisters).

Level of attainment at school of siblings:

PARENTS' DETAILS

	Mother	Father
Name		
Age		
Occupation		

Highest educational level		

Please give any details of any medical or mental health problems you or your family of origin may have had.

MEDICATIONS

What medication is your child currently receiving?

Please feel free to mention anything else you would like to bring to our attention.

Signature of History-Taker: _____ Date: _____ Signed:_____

Appendix C: Observation Checklist

Child's name:_____ Chronological Age:_____

Male/ Female Grade: _____ Date of assessment: _____

Indicate the frequency with which the child presents any of the following behaviours:

Behaviour	**Frequency**	**Behaviour**	**Frequency**
Has difficulty with speech		Not seeming to hear or understand items or instructions	
Has difficulty with hearing		Easily distracted	
Has difficulty with vision		Difficulty waiting his or her turn	
Excessive talkativeness		Blurting out answers	
Blank spells		Clumsiness	
Not seeming to listen when spoken to directly		Fidgets or twitches	
Asks for items or instructions to be repeated		Difficulty sitting still	
Interrupting when items are read or instructions are explained			
Impulsive behaviours and answers			
Other			

Appendix D: Approval from UCT Research Ethics Committee (REC)

UNIVERSITY OF CAPE TOWN

Department of Psychology

University of Cape Town Rondebosch 7701 South Africa
Telephone (021) 650 3417
Fax No. (021) 650 4104

23 March 2021

Vicky Downing
Department of Psychology
University of Cape Town
Rondebosch 7701

Dear Vicky Downing

I am pleased to inform you that ethical clearance has been given by an Ethics Review Committee of the Faculty of Humanities for your study, *Prevalence of ADHD and efficacy of a short-term parent-teacher intervention in a disadvantaged community in Boksburg*. The reference number is PSY2020-004.

I wish you all the best for your study.

Yours sincerely

Lauren Wild (PhD)
Associate Professor
Chair: Ethics Review Committee

Appendix E: GDE Research Approval Letter: 2020

GAUTENG PROVINCE
Department: Education
REPUBLIC OF SOUTH AFRICA

8/4/4/1/2

GDE RESEARCH APPROVAL LETTER

Date:	11 February 2021
Validity of Research Approval:	08 February 2021– 30 September 2021 2019-419A
Name of Researcher:	Downing VB
Address of Researcher:	
Telephone Number:	
Email address:	
Research Topic:	Prevalence of attention Deficit hyperactivity Disorder (ADHD) and the efficacy of short –term Parent – teacher intervention in a Disadvantaged community in Boksburg
Type of qualification	PhD (Psychology)
Number and type of schools:	5 Primary schools
District/s/HO	Ekurhuleni North and Ekurhuleni South

Re: Approval in Respect of Request to Conduct Research

This letter serves to indicate that approval is hereby granted to the above-mentioned researcher to proceed with research in respect of the study indicated above. The onus rests with the researcher to negotiate appropriate and relevant time schedules with the school/s and/or offices involved to conduct the research. A separate copy of this letter must be presented to both the School (both Principal and SGB) and the District/Head Office Senior Manager confirming that permission has been granted for the research to be conducted.

16/02/2021

The following conditions apply to GDE research. The researcher may proceed with the above study subject to the conditions listed below being met. Approval may be withdrawn should any of the conditions listed below be flouted:

Office of the Director: Education Research and Knowledge Management
7th Floor, 17 Simmonds Street, Johannesburg, 2001
Tel: (011) 355 0488
Email: Faith.Tshabalala@gauteng.gov.za
Website: www.education.gpg.gov.za

Appendix F: Letter Requesting Approval for School Participation: Studies One and Two

Vicky Downing
Educational Psychologist
M.Ed, B.A. Hons, HDE
[redacted]

Dear Sir/Madam

About this research

Research is done to answer questions, learn new information and change or improve how we do things in future. Please read this information carefully and ask any questions you may have before agreeing to allow your teachers, learners and their parents/ caregivers to participate in this research study.

The study is being conducted by Mrs Vicky Downing, a PhD student at the University of Cape Town (UCT).

Your school has been identified as a possible research site as it was previously disadvantaged and learners at your school may have limited access to private healthcare.

This study has been approved by the Gauteng Department of Education (GDE) and a Research Ethics Committee (REC) of the University of Cape Town (UCT).

Why this research is being done

The aim of this study is to determine whether there is a need for a parent intervention to assist learners with attentional problems and, if there is a need, to evaluate the effectiveness of a teacher-led parent training intervention in alleviating some of the symptoms of inattentiveness n children.

Participation is voluntary

You may decide to not allow your learners, their parents/ caregivers and teacher to participate in this study, or you may allow them to be invited to participate: they may choose to participate or not to participate, and if they do participate, they may leave this study at any stage. Should this happen, there will be no negative consequences.

What will happen in this research

If you give permission for your teachers and learners to participate, the following will happen:

1. Mrs Downing will contact you directly to arrange a meeting to discuss the proposed research.

2. Mrs Downing will send letters to parents/ caregivers of learners aged 8 to 12 years inviting them to participate in the study. These letters will be circulated by the school.
3. Parents will be requested to provide consent for their own and their child's participation, and then to complete a questionnaire about their child's behaviour. Mrs Downing will arrange to collect the completed forms from the school reception office when parents/ caregivers have handed them in.
4. She will then contact selected parents/ caregivers telephonically or virtually to discuss their children's development, difficulties and other concerns which parents/ caregivers may have about their children.
5. Teachers' consent will be requested for their participation in the study.
6. Teachers of the selected children will be asked to complete a questionnaire regarding their behaviour and progress at school.
7. Parents/ caregivers and teachers will be invited to participate in a focus group discussion where they can share their concerns and difficulties. This information will be used for a parent intervention which forms part of Study 2, the follow-on study of Study 1.
8. After obtaining their assent and explaining the research process, selected children will undergo a telephonic or virtual interview with Mrs Downing at a time convenient and as least disruptive as possible. This will be done at no cost to the school or parents/ caregivers.
9. Mrs Downing will contact parents directly for feedback.
10. Parents and teachers of selected children will be invited to participate in Study 2, the teacher-led parent training intervention. Their consent for participation will be requested in writing.
11. Mrs Downing will train interested teachers in behavioural modification strategies and psycho-education about ADHD and inattentiveness using an encrypted virtual platform. This will take place over 8 – 10 sessions at a convenient time for the teachers. There is no cost to the teachers or school for the training. Teachers will be provided with a manual. Topics are based on research regarding difficulties of assisting children with ADHD as well as areas of difficulty as identified during the focus group discussion. This could be conducted in-person depending on COVID-19 restrictions.
12. The teachers will conduct 8 – 10 parent intervention training sessions under the supervision of Mrs Downing using an encrypted virtual platform or in-person, depending on COVID-19 restrictions. During these sessions, parents/ caregivers will be given the opportunity to practise behavioural modification strategies and they will be given tasks to practise or prepare forthe following training session. Attendance records will be taken.
13. At the final parent training session, parents/ caregivers and teachers will be asked to rate the effectiveness of the training intervention and to complete a questionnaire to determine whether any improvements have been noted in their children's difficulties. Parents/ caregivers who have attended all sessions will be entered into a lucky draw to win a gift voucher to the value of R1000.00.

14. Three months after the final training programme, teachers of child participants will be asked to complete a questionnaire to determine whether the parent training intervention has assisted in improving the learners' symptoms.
15. Teachers will be thanked by Mrs Downing by a gift voucher to the value of R1000.00 and inviting them to a meal at a restaurant.
16. Children participants whose symptoms have not improved adequately will be referred for further assistance, such as to a Psychologist or Registered Counsellor and/ or other therapies as indicated.

Potential risks and inconveniences

If you choose to allow your learners, their parents/ caregivers and teachers to participate, please be aware of the following possible risks, inconveniences and discomforts:

- There is a risk of possible loss of confidentiality when teachers and parents/ caregivers and their children participate. To minimise this risk, Mrs Downing will collect all completed documentation personally and ensure teachers and parents/ caregivers have been given envelopes to put forms into and seal before sending back to the school for collection.
- Teachers will be expected to give of their time to attend the virtual training and conduct teacher-lead virtual training sessions with parents/ caregivers. These could be conducted in-person if COVID-19 restrictions allow.

Potential benefits

If you choose to allow your learners, their parents/ caregivers and teachers to participate, the following benefits could occur:

- Selected children will attend an interview with Mrs Downing at no cost to their parents/ caregivers or the school. This will assist in early detection of possible problems and referral for assistance where indicated.
- Behavioural modification training can be beneficial for teachers as they can utilise the strategies within their classrooms. This could empower them, improve their classroom management skills and improve their morale and confidence.
- Parents/ caregivers of selected learners could be empowered to work positively with their children's difficulties.
- Relationships between parents/ caregivers and teachers could be enhanced during the process.

How information will be protected

Mrs Downing will do all she can to keep all information confidential. Any notes taken during telephonic and virtual discussions, completed forms, notes made during the assessment, focus group discussion and training intervention sessions will be stored in a locked cupboard at her office. She alone has access to this office. Mrs Downing also uses an encrypted cloud-based storage service to which she alone has the password. Her computer is also password-

protected. All names of participants will be disguised in the final research to further protect confidentiality. Information will be kept for five years and will be erased or destroyed after that time period.

However, Mrs Downing cannot guarantee total confidentiality. Her research supervisor at the University of Cape Town may request or inspect the information for data analysis and quality assurance. In addition, as Mrs Downing is registered with the HPCSA as an Educational Psychologist, the Health Professions Council of South Africa (HPCSA), may request information should a case related to the research be opened with the HPCSA.

Use of information in future research

Findings of the research could be used for future research studies. However, as previously noted, all participants' names will be disguised in the final research through allocation of false names.

Payment for participation

No payment will be made to either the school or parent/ caregiver and children participants for participating in this research study.

Financial interests related to the study

There are no financial interests connected with this study.

Contact details for queries and concerns

If you have any questions or concerns about the study, contact Mrs Downing on [redacted] or [redacted]. You are welcome to email her at: [redacted]. Her supervisor, [redacted], can be contacted at: [redacted].

If you have any questions about participants' rights as a research participants or wish to discuss complaints, concerns or problems about this study, please contact [redacted] at UCT on [redacted] or by email: [redacted].

SCHOOL CONSENT

After reading and understanding the above,

☐ I give my consent for my learners, their parents/ caregivers and teachers to be invited to participate in this research study. I agree to allow my learners, their parents/ caregivers and teachers to participate in this study. (Mrs Downing will provide you with a copy of this informed consent document for your records).

☐ I give permission for Mrs Downing to contact me telephonically on _____ (cell phone number) or _____ (work or home telephone number) or by email _____ to arrange a meeting to discuss the research further.

OR

☐ I **do not** give consent for my learners, their parents/ caregivers and teachers to be invited to participate in this research study. **I do not agree** to allow my learners, their parents/ caregivers and teachers to participate in this study.

Printed Name of School Principal:_____

Signature of School Principal:_____Date: _____

Printed Name of School Governing Body Representative:_____

Signature of School Governing Body Representative:_____ Date: _____

Printed Name of Person Obtaining Consent:_____

Signature of Person Obtaining Consent:_____Date: _____

Appendix G: GDE Research Approval Letter: 2021

GAUTENG PROVINCE
Department: Education
REPUBLIC OF SOUTH AFRICA

8/4/4/1/2

GDE RESEARCH APPROVAL LETTER

Date:	11 February 2021
Validity of Research Approval:	08 February 2021– 30 September 2021 2019-419A
Name of Researcher:	Downing VB
Address of Researcher:	
Telephone Number:	
Email address:	
Research Topic:	Prevalence of attention Deficit hyperactivity Disorder (ADHD) and the efficacy of short –term Parent – teacher intervention in a Disadvantaged community in Boksburg
Type of qualification	PhD (Psychology)
Number and type of schools:	5 Primary schools
District/s/HO	Ekurhuleni North and Ekurhuleni South

Re: Approval in Respect of Request to Conduct Research

This letter serves to indicate that approval is hereby granted to the above-mentioned researcher to proceed with research in respect of the study indicated above. The onus rests with the researcher to negotiate appropriate and relevant time schedules with the school/s and/or offices involved to conduct the research. A separate copy of this letter must be presented to both the School (both Principal and SGB) and the District/Head Office Senior Manager confirming that permission has been granted for the research to be conducted.

16/02/2021

The following conditions apply to GDE research. The researcher may proceed with the above study subject to the conditions listed below being met. Approval may be withdrawn should any of the conditions listed below be flouted:

Office of the Director: Education Research and Knowledge Management
7th Floor, 17 Simmonds Street, Johannesburg, 2001
Tel: (011) 355 0488
Email: Faith.Tshabalala@gauteng.gov.za
Website: www.education.gpg.gov.za

Appendix H: Request for Participation of Parents/ Caregivers in Study One: Screening Stage

Vicky Downing
Educational Psychologist
M.Ed, B.A. Hons, HDE
[redacted]

Dear Sir/Madam

About this research

Research is done to answer questions, learn new information and change or improve how we do things in future. As your child goes to XXXX School and is aged between 8 and 12 years , I would like to invite you to take part in a research study. This letter has been sent to all parents and caregivers of children aged 8 to 12 years. Please read this information carefully and ask any questions you may have before deciding whether you would like to take part in this research study.

The study is being done by Mrs Vicky Downing, a PhD student at the University of Cape Town (UCT). This study has been approved by the Gauteng Department of Education (GDE) and a Research Ethics Committee (REC) of the University of Cape Town (UCT).

You are being asked to take part in the first (screening) stage of this research, which will be referred to as Study 1. If you take part in this screening stage, you and your child may also be invited to take part in later stages of the research.

Why this research is being done

The aim of this study is to see how many children, aged 8 to 12 years, present with attentional problems and possibly may be diagnosed with Attention Deficit Hyperactivity Disorder (ADHD).. This will let the researcher know if a training intervention could be needed to assist parents and caregivers with related problems.

Participation is voluntary

You may decide that you do not wish to take part in this study, or you may choose to take part but leave this study at any stage. If this happens, there will be no negative consequences. Choosing to not take part in the study will not affect your or your child's relationship with the school or with anyone else related to the study.

What will happen in this research

If you agree to take part in the first stage of this research, the following will happen:

1. Mrs Downing will send a questionnaire about your child's behaviour for you to complete.
2. If your child is chosen, Mrs Downing may also phone you or connect with you using an encrypted virtual platform, such as Zoom or WhatsApp video or phone call, at a time which suits you, to ask you questions about your child's development, and any problems or concerns you may have.
3. Your child's teacher may then be asked to complete a questionnaire on your child's behaviour and progress.
4. Mrs Downing may contact you to ask you and your child to take part in later stages of the research.

Potential risks and inconveniences

If you choose for your child and yourself to take part, please be aware of the following possible discomforts, inconveniences and risks:

- You would need time to complete the questionnaire and answer Mrs Downing's questions about your child's development and background.
- Your child's teacher will know that your child is taking part in this study.
- Mrs Downing will do all she can to keep your child's information confidential. However, she cannot guarantee that the information from the completed forms will be kept totally private.
- Should you not have access to data for the virtual contact with Mrs Downing, data will be made available for the duration of Study 1.

Potential benefits

If you choose to allow your child to take part, the following benefits could occur:

- If your child has any significant difficulties, you will be told about these at this time.

How information will be protected

To keep your information safe, you will need to put the completed forms in the envelope attached, seal the envelope, and return it to the school's reception. Mrs Downing will collect the sealed envelopes from the school personally.

Completed forms and any notes taken during telephonic discussions will be stored in a locked cupboard at Mrs Downing's office. She alone has access to this office. Her computer is also password-protected. Your name and your child's name will be disguised in the final research through giving false names to further protect your privacy. Information will be kept for five years and will be erased or destroyed after that time period.

Mrs Downing's research supervisor at the University of Cape Town may ask for or inspect the information for data analysis and quality assurance. In addition, as Mrs Downing is registered with the HPCSA as an Educational Psychologist, the Health Professions Council of

South Africa (HPCSA), may ask for information should a case related to the research be opened with the HPCSA.

Use of information in future research

Findings of the research could be used for future research studies.

Payment for participation

Neither you nor your child will be paid for taking part in Study 1.

Contact details for queries and concerns

If you have any questions or concerns about the study, contact Mrs Downing on 084 474 7744 or 011 894-5655. You are welcome to email her at: edpsych@guidinghands.co.za. Her supervisor, Dr Schrieff, can be contacted at: leigh.schrieff@gmail.com.

If you have any questions about your rights as a research participant or want to discuss complaints, concerns or problems about this study, please contact Rosalind Adams at UCT on 021 650-3417 or by email: rosalind.adams@uct.ac.za.

PARENTAL CONSENT

After reading and understanding the above,

☐ I consent to take part in this research study. I agree to allow my child to take part in Study 1. (Mrs Downing will forward a copy of this informed consent document for your records).

☐ I give permission for Mrs Downing to contact me telephonically on _____ (cell phone number) or _____ (work or home telephone number) or by email _____ to discuss the research further. OR

☐ I **do not** consent to take part in this research study. **I do not agree** to allow my child to take part in Study 1.

Child's Printed Name:_____

Printed Name of Parent:_____

Signature of Parent: _____Date:_____

Printed Name of Person Obtaining Consent:_____

Signature of Person Obtaining Consent: _____Date:__

Appendix I: Request for Participation of Teachers in Study One: Screening Stage

Vicky Downing
Educational Psychologist
M.Ed, B.A. Hons, HDE
Reg No. PS 0124109 Pr No. 0537063
[redacted]

Dear Sir/Madam

About this research

Research is done to answer questions, learn new information and change or improve how we do things in future. Please read this information carefully and ask any questions you may have before agreeing to participate in this research study.

The study is being conducted by Mrs Vicky Downing, a PhD student at the University of Cape Town (UCT).

This study has been approved by the Gauteng Department of Education (GDE) and the Research Ethics Committee (REC) of the University of Cape Town.

You have been invited as a possible participant as you are a teacher at Wit Deep Primary School.

Why this research is being done

The aim of this study is to determine whether a parent intervention led by a trained teacher can improve children's symptoms of attentional problems and possibly Attention Deficit Hyperactivity Disorder (ADHD).

Participation is voluntary

You may decide not to participate in this research study. If you do decide to participate, you may choose to leave the study at any stage. In either instance, there will not be any negative consequences. Choosing not to participate, or withdrawing from the study, will not affect your relationship with the school or with anyone else associated with the study.

What will happen in this research

You are being asked to participate in the first stage of this research, which will be referred to as Study 1. If you agree to participate in Study 1, you will be asked by Mrs Downing to complete a questionnaire on selected learners' behavioural and academic progress at school. Mrs Downing will give you an envelope in which to place the completed questionnaire and seal it, and hand it in at the school reception from where she will collect it. After you have completed the questionnaires, Mrs Downing will contact you again to invite you to take part in later stages of the research.

Potential risks and inconveniences

If you choose to participate, please be aware that it may take time to complete the questionnaires. In addition, while Mrs Downing will do all she can to keep the information you provide private, she cannot guarantee total confidentiality.

Potential benefits

However, you may gain insight into your learners' difficulties which could assist you in helping them overcoming these in the classroom.

How information will be protected

To keep your information secure, completed forms will be stored in a locked cupboard at Mrs Downing's office. She alone has access to this office. Mrs Downing's computer is also password-protected. Your name will be disguised in the final research through allocation of a false name to further protect confidentiality. Information will be kept for five years and will be erased or destroyed after that time period.

Mrs Downing's research supervisor at the University of Cape Town may request or inspect the information for data analysis and quality assurance. In addition, as Mrs Downing is registered with the HPCSA as an Educational Psychologist, the Health Professions Council of South Africa (HPCSA), may request information should a case related to the research be opened with the HPCSA.

Use of information in future research

Findings of the research could be used for future research studies. However, as previously noted, your name will be disguised in the final research.

Payment for participation

You will not be paid for participating in this research study.

Contact details for queries and concerns

If you have any questions or concerns about the study, contact Mrs Downing on [redacted] or [redacted]. You are welcome to email her at: [redacted]. Her supervisor, Dr Schrieff, can be contacted at: [redacted].

If you have any questions about your rights as a research participant or to discuss complaints, concerns or problems about this study, please contact Rosalind Adams at UCT on [redacted] or by email: [redacted].

TEACHER CONSENT

Please tick the relevant box(es):

After reading and understanding the above,

1. Consent to complete questionnaires

☐ I give my consent to complete the questionnaires for selected children. (Mrs Downing will forward a copy of this informed consent document for your records).

OR

☐ I do not give consent to complete the questionnaires for selected children.

Printed Name of Teacher: _____

Signature of Teacher: _____ Date: _____

Printed Name of Person Obtaining Consent: _____

Signature of Person Obtaining Consent:_____

Date: _____

Appendix J: Assent Form for Child Participants

Hi there

Sometimes people have problems and want to look for answers to these problems. Sometimes when they have an idea of how the problem can be solved, they want to check if this idea is the best way to solve the problem. This is called research.

You have been asked to take part in a research study because you go to Wit Deep Primary School, are between 8 and 12 years old. The goal of this research is to see if teachers can help parents.

This study is being done by me, Mrs Vicky Downing. I am a student at the University of Cape Town (UCT).

If you agree to take part, the following will happen:

1. I will meet with you on Zoom or WhatApp video call or I will phone you to answer some questions and tell me about yourself.
2. This will take about an hour
3. These will be done in quiet place at your home after school. Your parents/ caregivers will help me choose a time which is best.

If you decide to take part, you need to know:

- As you will be at your house when I contact you, , if someone interrupts us or you feel uncomfortable, your parents/ caregivers will find a better place for you to be in when we meet online.
- Some of the questions I ask may be a bit tricky.

If you decide to take part, you could also find out more about yourself, what you are good at and if you need help from your teachers or other people.

I will do my best to keep everything you tell me private. I will tell your parents/ caregivers what I find out, though, so they can help you and also know what you are good at. I will keep the information in a locked cupboard at my office. I am the only one with the key to this cupboard. I also save information on my computer but I am the only one who knows the password to my computer to keep the information safe. I will not use your real name when I share whether the idea helped or not. Instead, I will use a made-up name for you so that people won't recognise you or your real name. I also have to throw away and delete all information after five years. Even though I will try my best, I can't promise that no-one else will see the information.

For example, my boss at the university can ask for some of the information to check that I have done my work properly.

You don’t have to take part in this research. No one will be angry with you if you don’t want to take part. If you want to take part but later change your mind, you can do that without getting into any trouble with your teachers, parents or caregivers or school. It is up to you.

Do you have any questions you would like to ask?

CHILD’S ASSENT

My name is _____ (child’s handwritten name) and I agree to take part in this research.

OR

My name is _____ (child’s handwritten name) and I don’t want to take part in this research.

Printed Name of Person Obtaining Consent:_____

Signature of Person Obtaining Consent: _____ Date: _____

Appendix K: GDE Research Approval Letter: 2022

GAUTENG PROVINCE
Department: Education
REPUBLIC OF SOUTH AFRICA

8/4/4/1/2

GDE RESEARCH APPROVAL LETTER

Date:	**09 February 2022**
Validity of Research Approval:	**08 February 2022– 30 September 2022** **2019-419AA**
Name of Researcher:	**Downing VB**
Address of Researcher:	
Telephone Number:	
Email address:	
Research Topic:	**Prevalence of attention Deficit hyperactivity Disorder (ADHD) and the efficacy of short –term Parent – teacher intervention in a Disadvantaged community in Boksburg**
Type of qualification	**PhD (Psychology)**
Number and type of schools:	**5 Primary schools**
District/s/HO	**Ekurhuleni North and Ekurhuleni South**

Re: Approval in Respect of Request to Conduct Research

This letter serves to indicate that approval is hereby granted to the above-mentioned researcher to proceed with research in respect of the study indicated above. The onus rests with the researcher to negotiate appropriate and relevant time schedules with the school/s and/or offices involved to conduct the research. A separate copy of this letter must be presented to both the School (both Principal and SGB) and the District/Head Office Senior Manager confirming that permission has been granted for the research to be conducted.

09/02/2022

The following conditions apply to GDE research. The researcher may proceed with the above study subject to the conditions listed below being met. Approval may be withdrawn should any of the conditions listed below be flouted:

Office of the Director: Education Research and Knowledge Management
7th Floor, 17 Simmonds Street, Johannesburg, 2001
Tel: (011) 355 0488
Email: Faith.Tshabalala@gauteng.gov.za
Website: www.education.gpg.gov.za

Appendix L: Request for Participation of Parents/ Caregivers in Study Two

Vicky Downing
Educational Psychologist
M.Ed, B.A. Hons, HDE
Reg No. PS 0124109 Pr No. 0537063
[redacted]

Dear Sir/Madam

About this research

Thank you for taking part in Study 1 of the research done by Mrs Downing at your school.

Following your and your child's participation in Study 1 and the results of the evaluation with your child, you are being invited to take part in Study 2.

The study is being done by Mrs Vicky Downing, a PhD student at the University of Cape Town (UCT).

This study has been approved by the Gauteng Department of Education (GDE) and a Research Ethics Committee (REC) of the University of Cape Town (UCT).

Why this research is being done

The aim of this study is to determine whether a parent intervention, consisting of 8 to 10 training sessions led by a teacher and supervised by Mrs Downing, could help improve difficult behaviours of children with attentional problems and possibly those diagnosed with Attention Deficit Hyperactivity Disorder (ADHD). The teacher will be trained by Mrs Downing before the parent training sessions.

Participation is voluntary

You may decide not to take part in this study, or you may decide to take part but choose to leave this study at any stage. If this happens, there will be no negative consequences. Choosing to not take part or leaving the study at a later stage will not affect your relationship with the school or with anyone else related to this study.

What will happen in this research

If you agree to take part, the following will happen:

1. Mrs Downing will phone you to arrange for a suitable time for the training sessions to be held according to GDE approval (virtually if COVID-19 restrictions remain in place or in-person). The time chosen will be as convenient to you as possible.
2. You will be asked to attend 8 to 10 sessions in which different topics will be discussed (these topics will be about the problems children with ADHD and their parents have). You will also be trained on how to deal with these

difficulties. The topics chosen will be from the results of the focus group discussion as well as topics from previous research. Role plays will be done so you can practise your skills under the supervision of Mrs Downing and the teacher who has been previously trained. Training can be conducted in-person if allowed according to COVID-19 restrictions.

3. You will be asked to try the new skills you will learn, at home, and discuss any difficulties at the next session.
4. At the last session, you will be asked to say how effective the intervention has been as well as whether there have been any improvements in your child's problems. You will be asked to complete forms to show these. At this final session, if you have come to all sessions, your name will go into a lucky draw in which you could win a R1000.00 gift voucher.

Possible risks and inconveniences

If you choose to take part, please be aware of the following possible risks, discomforts and inconveniences:

- You will be asked to give your time to attend the sessions. If sessions are in-person, you would need to pay for your transport to the sessions.
- There is a risk of feeling uncomfortable during the sessions if they are done virtually in a venue at your house if someone interrupts the sessions. If you feel uncomfortable or are interrupted, please find a more private venue. If sessions are in-person, they will be presented at the school.
- Should you not have data available should sessions be virtual, data will be sent to you for use during the training programme.
- You may feel some emotional distress during or after the parent training sessions. Mrs Downing will assist with parental guidance or counselling at no cost to yourself.

Possible benefits

If you choose to take part, the following benefits could occur:

- You may learn how to deal with your child's difficulties and how to assist them.
- Your relationship with your child may improve.

How information will be protected

To keep your information secure, completed forms will be stored in a locked cupboard at Mrs Downing's office. She alone has access to this office. Mrs Downing's computer is also password-protected. Your name will be changed in the final research through allocation of a false name to further protect your identity. Information will be kept for five years and will be erased or destroyed after that time period.

Mrs Downing's research supervisor at the University of Cape Town may ask for or inspect the information for data analysis and quality assurance. In addition, as Mrs Downing is registered with the HPCSA as an Educational Psychologist, the Health Professions Council of South Africa (HPCSA), may ask for information if a case related to the research is opened with the HPCSA.

Use of information in future research

Findings of the research could be used for future research studies.

Payment for participation

You will not be paid for taking part in this research study. However, if you come to all parent training sessions, your name will go into a lucky draw to win a gift voucher valued at R1000.00.

Contact details for queries and concerns

If you have any questions or concerns about the study, contact Mrs Downing on [redacted] or [redacted]. You are welcome to email her at: edpsych@guidinghands.co.za. Her supervisor, Dr Schrieff, can be contacted at: [redacted].

If you have any questions about your child's rights as a research participant or wish to discuss complaints, concerns or problems about this study, please contact Rosalind Adams at UCT on [redacted] or by email: [redacted].

PARENTAL CONSENT

After reading and understanding the above,

☐ I give my consent to take part in Study 2. I agree to take part in study 2. (Mrs Downing will forward a copy of this informed consent document for your records).

OR

☐ I **do not** give consent to take part in Study 2. **I do not agree** to take part in Study 2.

Printed Name of Parent:_____

Signature of Parent : _____Date:_____

Printed Name of Person Obtaining Consent:_____

Signature of Person Obtaining Consent: _____Date:_____

Appendix M: Request for Participation of Teachers in Study Two

Vicky Downing
Educational Psychologist
M.Ed, B.A. Hons, HDE
Reg No. PS 0124109 Pr No. 0537063
[redacted]

Dear Sir/Madam

About this research

Research is done to answer questions, learn new information and change or improve how we do things in future. Please read this information carefully and ask any questions you may have before agreeing to participate in this research study.

This study has been approved by the Gauteng Department of Education (GDE) and the Research Ethics Committee (REC) of the University of Cape Town.

You have been invited as a possible participant as you are a teacher at Wit Deep Primary School.

Why this research is being done

The aim of this study is to determine whether a parent intervention led by a trained teacher can improve children's inattention problems and possibly symptoms of Attention Deficit Hyperactivity Disorder (ADHD). The study is being conducted by Mrs Vicky Downing, a PhD student at the University of Cape Town (UCT).

Participation is voluntary

You may decide not to participate in this research study. If you do decide to participate, you may choose to leave the study at any stage. In either instance, there will not be any negative consequences. Choosing not to participate, or withdrawing from the study, will not affect your relationship with the school or with anyone else associated with the study.

What will happen in this research

- Mrs Downing will train teacher participants during 8 to 10 virtual one-hour sessions at a time convenient for the majority of the teachers. This could be conducted in-person if allowed according to COVID-19 restrictions.
- You will be provided with a training manual during these sessions.

- After this, under Mrs Downing's supervision, you will be asked to conduct 8 to 10 virtual or in-person one-hour training sessions with parents/ caregivers at a time convenient to the parent/ caregiver participants.

Potential risks and inconveniences

If you choose to participate, please be aware that it may take time to attend the sessions. In addition, while Mrs Downing will do all she can to keep the information you provide private, she cannot guarantee total confidentiality. You may experience some discomfort facilitating the parent/ caregiver training sessions. Should this occur, Mrs Downing will assist during the sessions and provide counselling if needed at no cost.

Potential benefits

You could learn additional skills which can be utilised in the classroom. In addition, attendance of the training and presentation of the parent/ caregiver training may be valuable skills to list on your curriculum vitae. Your relationship with parents/ caregivers may improve following the sessions.

How information will be protected

To keep your information secure, completed forms will be stored in a locked cupboard at Mrs Downing's office. She alone has access to this office. Mrs Downing's computer is also password-protected. Your name will be disguised in the final research through allocation of a false name to further protect confidentiality. Information will be kept for five years and will be erased or destroyed after that time period.

Mrs Downing's research supervisor at the University of Cape Town may request or inspect the information for data analysis and quality assurance. In addition, as Mrs Downing is registered with the HPCSA as an Educational Psychologist, the Health Professions Council of South Africa (HPCSA), may request information should a case related to the research be opened with the HPCSA.

Use of information in future research

Findings of the research could be used for future research studies. However, as previously noted, your name will be disguised in the final research.

Payment for participation

You will not be paid for participating in this research study. You will, however, be thanked by Mrs Downing with a R1000.00 gift voucher as well as being invited for a meal.

Contact details for queries and concerns

If you have any questions or concerns about the study, contact Mrs Downing on 084 474 7744 or 011 894-5655. You are welcome to email her at: edpsych@guidinghands.co.za. Her supervisor, Dr Schrieff, can be contacted at: leigh.schrieff@gmail.com.

If you have any questions about your rights as a research participant or to discuss complaints, concerns or problems about this study, please contact Rosalind Adams at UCT on 021 650-3417 or by email: rosalind.adams@uct.ac.za.

TEACHER CONSENT

Please tick the relevant box(es):

After reading and understanding the above,

1. **Consent to complete questionnaires**

☐ I give my consent to participate in the training sessions involving myself and the researcher. I also consent to facilitate the training sessions with parents/ caregivers. (Mrs Downing will forward a copy of this informed consent document for your records).

OR

☐ I **do not** give consent to participate in any of the training sessions with the researcher or to facilitate the parent/ caregiver training sessions.

Printed Name of Teacher: _____

Signature of Teacher: _____Date:_____

Printed Name of Person Obtaining Consent:_____

Signature of Person Obtaining Consent:_____Date:_____

Appendix N: Parenting Style Questionnaire

Name of parent/ caregiver participant: _____

Name of child participant: _____Today's date: _____

Instructions:

For each item, indicate how much you agree or disagree with the statement by placing a **X** over your choice. Take your time and answer truthfully for the most accurate results.

Q1: Parents should provide direction but also listen and discuss their kids' concerns.				
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Q2: Society would be better if parents were stricter with their kids.				
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Q3: Kids should make most of their own decisions without parental direction.				
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Q4: There shouldn't be rigid rules for kids' behaviour.				
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Q5: Parents should provide direction and guidance in rational and objective ways.				
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Q6: Children should be told exactly what to do and how to do it.				
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Q7: Kids can make up their own minds and do what they want to do.				
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Q8: Kids need to learn early who the boss is in the family.				
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Q9: Children should get their way as often as their parents do.				
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Q10: Parents should discuss the reasons behind their policies with their kids.				
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree

Q11: Children should follow their parents' orders without asking questions.				
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Q12: Parents should make their expectations of their children very clear and open to discussion.				
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Q13: Parents shouldn't restrict children's activities or decisions.				
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Q14: Children should conform to what parents know is right.				
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Q15: Kids should be encouraged to discuss family rules and restrictions.				
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Source: https://psychcentral.com/quizzes/parenting-style-quiz#quiz				

Appendix O: End of Intervention Parent Participant Rating Scale

Dear Parents and Caregivers

Thank you for taking part in the ADHD training intervention. Please help me determine how effective the programme has been by completing the following table. Circle your responses.

Aspects	**1 Strongly agree**	**2 Agree**	**3 Disagree**	**4 Strongly disagree**
1. I learned about ADHD	1	2	3	4
2. I understand my child's difficulties better	1	2	3	4
3. I learned useful strategies to help my child	1	2	3	4
4. 1 learned useful discipline strategies	1	2	3	4
5. The programme was presented in a way I could understand easily	1	2	3	4
6. The role plays helped me practise my new skills	1	2	3	4
7. My questions were answered in a way I could understand	1	2	3	4
8. The presenter was knowledgeable	1	2	3	4
9. I felt supported during the programme	1	2	3	4
10. The programme helped me build a better relationship with my child	1	2	3	4
Any other comments?				

Appendix P: End of Intervention Teacher Participant Rating Scale

Dear Teacher

Thank you for your participation during the ADHD training intervention. Please help me determine the effectiveness of the programme by completing the following table. Circle your responses.

Aspects	**1 Strongly agree**	**2 Agree**	**3 Disagree**	**4 Strongly disagree**
1. I learned about ADHD	1	2	3	4
2. I understand my learners' difficulties better	1	2	3	4
3. I felt supported during the training	1	2	3	4
4. My questions were answered in a way I could understand	1	2	3	41
5. The programme was presented in a way I could understand easily	1	2	3	4
6. The information provided was useful	1	2	3	4
Any other comments?				

Appendix Q: Content Monitoring Form

Session and Topic Description	**Content**	**Addressed**
Sessions 1 and 2: Psycho-education about ADHD about the nature and treatment of ADHD.	Symptoms of ADHD, behavioural manifestations, co-morbid conditions as well as treatment options Role play	
Session 3: Importance of diet	Dietary inclusions: e.g. fatty acids, iron supplements; dietary deficiencies and unhealthy diets Role play	
Session 4: Routine, structure and rules in the home	Importance of structure and routine, establishing rules that work Role play	
Sessions 5 and 6: Effective discipline techniques	Positive reinforcement, motivation strategies, reward-based strategies Role plays	
Session 7: Homework, studying and encouraging independent behaviour	Time management strategies, positive reinforcement, teacher-parent communication, chores and responsibility in the home Role plays	
Session 8: Communication strategies and improving the parent-child relationship	Effective communication strategies, avoidance of labelling the child, realistic expectations of parents and children, importance of positive time together, positive aspects of ADHD Role plays	
Session 9: Focus group discussion	Completion of Teacher and ParentRating Scales Completion of Browns EF/A Lucky draw	
Other topics from first focus group discussion		

Appendix R: Case Studies for Training Manual

Topic One:

Jeanie: referred for psycho-educational assessment at seven years of age, presenting with signs of inattention. Diagnosed with ADHD: father and grandmother, a retired teacher, supportive although mother not supportive. Grandmother noted inattentive symptoms as helps with homework. Teacher did not notice inattentive symptoms. If not for grandmother's training, Jeanie may not have been diagnosed and receive the assistance which she needed, including play therapy, Occupational Therapy and remedial therapy so she would have been at risk for co-morbid emotional and learning difficulties

Topic Three:

Johnny referred for play therapy due to behavioural outbursts at home at nine years of age. Parent intake consultation revealed parents did not have routine or rules in place in the home. Parental guidance provided before consultations with Johnny. Parents reported improvements in behavioural outbursts after implementing routine and rules in the home.

Topic Five:

Jimmy, displaying signs of anxiety at eleven years of age, was referred for play therapy after his parents separated. The separation was acrimonious and parents were unable to be in the same room together for consultations. Their parenting styles were identified and they were assisted, with the help of a Parenting Co-ordinator, to build a working parenting relationship. Jimmy's anxiety abated after approximately six months and therapy was discontinued.

As a case study, names of various celebrities and business leaders was shared with parents, including Trevor Noah, Adam Levine, Justin Timberlake, Will Smith and Michael Phelps, who all have been diagnosed with ADHD. Their positive qualities and strengths were discussed.

Michael Phelps: Gold medal Olympic swimmer

Diagnosed with ADHD at 9 years of age. Although medication assisted, Phelps recalls how swimming has helped him with the routine of practices and calming effects of the water.

“I think the biggest thing for me, once I found that it was okay to talk to someone and seek help, I think that’s something that has changed my life forever,” he says. “Now I’m able to live life to its fullest.”

He won 28 Olympic medals of which 23 are gold.

Adam Levine: Maroon 5 Frontman and reality show “The Voice” co-host

Adam stated that he had difficulty with aspects which were considered as “normal” with other children, such as finishing his work and sitting still. Although his parents provide treatment for him, his attention-related problems remained into adulthood.

Levine is quoted as saying: “I had trouble sometimes writing songs and recording in the studio. I couldn’t always focus and complete everything I had to. I remember being in the studio once and having 30 ideas in my head, but I couldn’t document any of them.”

He advised others with ADHD to not feel any different from others without the disorder and encouraged them to try not to feel alone.

Justin Timberlake: singer and actor

Justin shared that he has been diagnosed with ADHD (Inattentive Type) and OCD. His success with his career demonstrates that he has some coping strategies to help him live in daily life.

https://www.healthline.com/health/adhd/celebrities

Trevor Noah: Host of “The Daily Show”, comedian and host of the 2022 Grammy Awards Ceremony

One of our famous South African celebrities and comedians, Noah shared that he was diagnosed with ADHD and depression.

He is quoted as saying to Leslie Stahl in a CBS interview:

“What I've come to learn, thanks to some great therapists, is my depression is created by a severe level of ADHD,” Noah said. “If I'm not careful in how I sleep, how I eat, how I

manage my routine, I can become overwhelmed and it can feel like the whole world is just too heavy to bear."

https://www.additudemag.com/slideshows/famous-people-with-adhd/

Appendix S: Table 22: My Child's Eating Habits and Daily Exercise

My child's meals	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Breakfast							
Snack							
Lunch							
Snack							
Supper/ Dinner							
Snack							
Additional drinks							
Other							
Exercise							

Appendix T: Study Two Parent WhatsApp Group Golden Rules

The Golden Rules for our group

Always keep to the purpose of the group! Don't share irrelevant messages about other topics.

Do not spam the group

Post your message in one single chunk of text, don't post every word or sentence in a new message.

Do not have one-on-one conversations in the group. Switch to private messages.

Do not post in any group between 21:00 and 07:00 unless it is an all-out emergency.

If a message asks for a positive response like an RSVP, don't reply in the negative. Only say if you are able to attend. Don't double RSVP if a second call to action is sent out for the same event.

If someone asks a question and you don't know the answer don't respond with "I don't know". Just wait for someone who knows the answer to reply.

Please don't send in a hundred "thank you" messages. If you feel gratitude towards someone – tell them in a private message.

If someone asks a question of a personal nature (like asking for advice) don't respond if someone else has already answered, or else respond to the person directly in a private message.

The group is not a political platform. No arguing, no heated opinions, no fear mongering, no hyped up drama, no fake news.

Never EVER use a group to berate someone else or air grievances. If you have an issue address it one on one with the relevant person.

Don't send data-insensitive messages. No-one wants their last 3GB used up on uninvited memes.

When the group has served its purpose, delete it.

Hit "Mute" on your Whatsapp group. This is a sanity saver. You will still receive all the messages, but your phone won't buzz or make a noise for every one of them.

If you are not sure, ask yourself these three questions before you post:

Is this relevant?

Is this necessary?

Is this a good time to post?

Adapted from: https://www.webafrica.co.za/blog/general-knowledge/golden-rules-whatsapp-groups/

Appendix U: Training Manual

Training Manual: Assisting Children with Attentional Problems

Study 2 of Research Regarding

Prevalence of Attentional Problems and the Efficacy of a Short-Term Parent-Teacher Intervention in A Disadvantaged Community in Boksburg, Gauteng to Alleviate Symptoms of Inattention

Study conducted by Mrs Vicky Downing in fulfilment of requirements for PhD at the University of Cape Town ©

Dear Parents and Caregivers

This programme was originally developed to help parents and caregivers of children who were diagnosed with Attention Deficit Hyperactivity Disorder (ADHD).

However, because of restrictions imposed by the Gauteng Department of Education (GDE) on doing research at the research site, your child's school, due to the COVID-19 pandemic, changes were made to the research methods which would not be sufficient to diagnose any children participants with ADHD. Children participants have then been selected as they show symptoms of attentional problems.

Although the manual refers to techniques which could assist children with ADHD, the research aims to determine if these techniques could decrease some of the difficulties children with attentional problems face.

This programme aims to help you as a parent or caregiver to work positively with your child who shows symptoms of attentional problems. Information about different psychological conditions or disorders is provided for informational purposes only and is not intended for diagnoses or treatments. When seeking a diagnosis or treatment, it is best to consult with a trained healthcare worker.

Your participation shows how much you love your child as you are willing to learn more about your child’s problems and you are willing to try new ways of doing things with your child.

The programme will take place over 8 to 10 sessions in which we explore various topics. As with most things in life, what you put into your participation in the programme and trying new things at home will determine the success you may experience in parenting your child.

There will be opportunities for you to share your experiences as they relate to the topics and you have time to interact with other parents as you try new skills or work as a group to solve a problem. You will then be given tasks to try out or things to think about at home. As each child is unique and each parent or caregiver is unique, your involvement in the programme and in our discussions become very important.

So, what will we be looking at during our sessions? Here is a brief outline of the topics:

1. Learning about ADHD and treatment options
2. Importance of a healthy diet
3. Routine, structure and rules in the home
4. Effective discipline and motivation strategies
5. Helping your child with homework and studying
6. Effective communication and improving the parent-child relationship and relationships within the family
7. The final session will take the form of an evaluation of the programme as well as a lucky draw to win a gift voucher. In order to be entered in the lucky draw, you need to attend all sessions.

Ground Rules for Our Sessions

1. Join the call on time and let us know if you are unable to attend or will be late. What's app messages and missed calls to Mrs Downing can be used. Let Mrs Downing know if you have any problems with data or connection so she can try to assist.
2. Find a quiet, private space to be in for the duration of each of the calls.
3. Try the strategies at home and spend time thinking about what we have discussed.
4. We respect each other's viewpoints and ideas even if we don't agree with what another person may be saying.
5. Whatever we say in our group - stays in our group.
6. We also show respect for each other by listening to each other and paying attention to what another person may be saying.
7. We only share information that we feel comfortable sharing.
8. You are free to ask questions about what we are discussing. Questions can be asked through the chat function during the WhatsApp call: this will be explained before we start. You are also welcome to ask questions directly.
9. Please make sure your phone is charged before we start due to possible power interruptions.
10. Any other rules we could add?

Before we begin, just one more thing to think about: What would you like to get out of our sessions and our group?

Definitions for some of the terminology used

- Behaviour modification strategies: strategies which can change a person's behaviour in a positive manner
- Behavioural Therapy: therapy aimed at changing a child's behaviour to be more acceptable
- Co-morbid conditions/ disorder: a condition/ disorder which can occur alongside another disorder/ condition
- Information processing: how the child's brain works with and makes sense of information
- Psycho-social skills: skills which relate to a person's psychological and social wellbeing, such as skills to overcome relationship problems within a family
- Neurodevelopmental condition/ disorder: condition which is neurological in nature (i.e. concerning the brain, its structures, functions, etc) and is usually diagnosed during childhood
- Pharmacological: use of medication as treatment
- Specific Learning Disorders: difficulties in learning which prevent the learner from achieving according to their potential

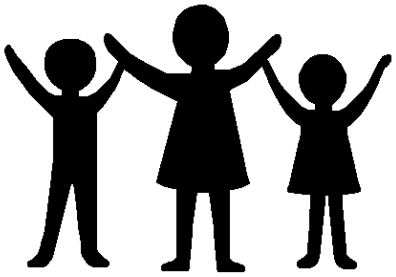


Image: http://www.clipartbest.com/clipart-9ipxe7oGT

Topic One: The Nature of ADHD and Treatment Options

What is ADHD?

Attention Deficit Hyperactivity Disorder (ADHD) is a neurodevelopmental condition which is often first noticed during childhood. ADHD affects the way the child's brain processes information and the way they respond to their environment. For a child to be diagnosed with ADHD, symptoms must noticed before the child turns twelve years old.

Symptoms of ADHD

The most common symptoms of ADHD are inattention and disorganisation and/ or impulsivity-hyperactivity.

Inattention and disorganisation are often seen as difficulty staying on task (the child is easily distracted), not seeming to listen when spoken to directly (the child does not seem to hear instructions when he or she is spoken to directly) and losing things, wandering attention (the child jumps from topic to topic in conversation or seems to be thinking about something other than what is being said at the moment), lack of focus (the child has difficulty focusing

on something, especially with tasks the child finds boring or difficult), difficulty concentrating for an age-appropriate amount of time, difficulties with organisation (often seen as untidy books, desks, bedrooms and even untidy handwriting), difficulties with working memory (such as often forgetting instructions and losing things), planning issues (such as seen with motor co-ordination and clumsiness) and/ or difficulty with self-regulation (managing themselves) resulting in impulsive or hyperactive behaviours and difficulty controlling emotions.

Symptoms related to hyperactivity and impulsivity include difficulty in sitting still, being overactive when compared to other children of the same age or level of development, fidgeting, difficulty waiting their turn and intruding into others' activities (which includes taking part in activities to which they have not been invited, sometimes seen during play).

These behaviours must be more noticeable than what is expected of a child of the same age and same developmental level and must be seen in at least two different settings or places, such as at home and at school.

Co-morbid conditions. Co-morbid conditions are other disorders or conditions which can be diagnosed in combination with a particular disorder.

There are several co-morbid conditions which can be experienced with ADHD. As with all psychological disorders, there are certain criteria which must be met including the symptoms being noticed for a minimum amount of time and in a certain number of settings or places. These conditions can only be diagnosed by specific professionals such as psychologists and psychiatrists.

Conduct Disorder

This disorder also starts in childhood and is one of the most difficult disorders to manage as the child shows signs of defiance of authority, aggression towards animals or people, destruction of property, theft or deceitfulness and serious violation (breaking) of rules. The child with Conduct Disorder may show cruel behaviours towards other people and animals and this can include bullying or threatening behaviours, physical fights and using a weapon to hurt others. Destruction of property includes fire-setting with the purpose of causing serious damage and destroying other's property. Theft and deceit includes lying to others to avoid meeting their own responsibilities and to gain material and other goods ("conning" others), breaking into someone else's home, car or property, and stealing items without the use of violence. Serious violation of rules includes several instances of running away from home, staying out past curfews before the age of thirteen years and being truant from school (bunking school) before the age of thirteen years.

Oppositional Defiant Disorder

This disorder is characterised by an angry or irritable mood (often shown through the child losing their temper, becoming easily annoyed or often seeming angry or resentful), argumentative or defiant behaviours (such as the child often arguing with authority figures, actively defying or refusing to follow instructions and requests, deliberately annoying others and blaming others for their own mistakes) and vindictiveness in which the child shows spiteful or vindictive behaviour at least twice within the past six month-period. As a result of frequent conflict with others, children with Oppositional Defiant Disorder tend to have social, academic, and emotional problems.

Specific Learning Disorders

Due to the limited attention spans which children with ADHD show, some may also develop Specific Learning Disorders. These are difficulties in learning which can include difficulty reading words, reading comprehension, spelling, expressing themselves in writing, understanding numbers and numerical (mathematical) reasoning. The child's performance in these areas is significantly lower than what is expected according to the their age and learning disorders can cause problems for the child in terms of their performance at school or with normal daily activities. Specific Learning Disorders are usually diagnosed during formal schooling years (i.e. from grades R to 12). These difficulties are not related directly to any intellectual difficulties, uncorrected visual or auditory problems (such as needing eyeglasses or a hearing aid), other mental disorders, poor academic instruction or teaching, and problems in the language of teaching and learning (such as learning in a third language), among others. In the past, learning disorders were referred to as Dyslexia, Dysgraphia and Dyscalculia.

Disruptive Mood Dysregulation Disorder

This mood disorder is seen by recurring temper outbursts due to the child having difficulty tolerating or managing their frustrations which are expressed verbally (such as through shouting and screaming) and/or behaviourally (such as through physical aggression towards others and property). The outbursts are extreme in length and severity when considering the cause of the outburst or situation. The outbursts are not developmentally- or age-appropriate and they occur on average three or more times per week. Between temper outbursts, the child seems to others to be moody or angry for most of the day and for most days. Children with Disruptive Mood Dysregulation Disorder often have problems with relationships and often have difficulty succeeding at school. Family life can also be difficult.

Other Mood Disorders

There are different mood disorders which can be co-morbid with ADHD. Major Depressive Disorder has the following main symptoms: depressed mood for most of the day for more days than not, less interest in things which the child experienced as enjoyable in the past, sleeping difficulties (either too much sleep or not enough sleep), visible restlessness, fatigue or lack of energy most days, feelings of worthlessness or excessive guilt, indecisiveness or lack of ability to make decisions and suicidal thoughts.

Anxiety Disorders

Anxiety Disorders often occur with ADHD. These disorders are shown by extreme anxiety and fear with the related behaviours which could include panic attacks. The types of anxiety disorders differ from each other in terms of the cause of anxiety. The cause is not developmentally appropriate for the child (i.e not what is considered normal according to the stage of the child's development) and the fear and anxiety lasts longer and is more severe than what can be expected when considering the situation. Anxiety Disorders include Separation Disorder, Selective Mutism, Specific Phobia (such as fear of heights or certain animals), Social Anxiety Disorder and Generalised Anxiety Disorder.

Other Neurodevelopmental Disorders

These are disorders which are often first noticed before the child enters formal schooling (Grade School) and they cause difficulties in the child's social, academic, personal and occupational lives. Two well-known neurodevelopmental disorders which co-occur with ADHD include Autism Spectrum Disorder and Tic Disorder. Autism Spectrum Disorder has the following main symptoms: difficulties in social communication and interactions in various settings and repetitive and restricted interests, behaviours or activities all of which interfere with the child's functioning across different contexts or settings. Children showing recurring, rapid and repetitive vocalisations (sounds, for example: clearing of the throat and grunts) or motor movements, such as eye blinking, could be diagnosed with Tic Disorders.

Somatic Disorders

These are physical or bodily issues which the child may experience in addition to ADHD. These include obesity and sleep difficulties. Parents of children with ADHD often state that their children have difficulty falling asleep, they often try to delay their bedtimes and they wake often at night. Studies show that some children may binge-eat junk food as a form of self-medication to lower levels of frustration and increase feelings of stress tolerance.

The course and development of ADHD. Before the age of four years, many parents of children with ADHD notice that their children are very active, and often describe their children as “very busy”.

However, the child’s attention-related difficulties become more noticeable as they enters formal schooling in grade R or grade one. During the early teenage years, some adolescents with ADHD show antisocial behaviours. Physical symptoms of hyperactivity, like difficulty sitting still and climbing about, become less noticeable and the teenagers may show more fidgeting behaviours, become more impatient and they may report feeling restless. Teenagers with untreated ADHD have increased risks of taking part in dangerous behaviours, including substance abuse, they tend to be more emotionally immature than their peers and they often underperform academically due to difficulties in completing academic assignments and work.

Although symptoms related to impulsivity and hyperactivity tend to lessen as the teenager enters adulthood, the difficulties with attention continue into adulthood. The adults may, however, have continued difficulties with planning, initiation and completion of tasks (for example: not meeting deadlines at work), impulsivity and impatience which could lead to difficulties in interpersonal relationships and occupational problems.

Research shows that there are increased risks for substance abuse, delinquency (minor crimes), relationship difficulties, occupational-related difficulties and increased risk for self-injuring behaviours across the lifespan.

Associated features of ADHD. In addition to the mental and/or behavioural problems of inattention, impulsivity and hyperactivity, physical difficulties associated with ADHD include sensory processing and motor-related problems. Daily functioning, like managing demands of relationships and managing themselves, their school-related demands and after school or recreational activities are all affected negatively by ADHD. However, there are some positive attributes to having ADHD which can include creativity, increased optimism and resilience. These will be discussed in a later session.

Functional consequences of ADHD. Children with ADHD tend to show differences in their areas of difficulty. Although they are usually intellectually capable and have useful ideas, they may still be unable to complete tasks and they may lack intrinsic (internal) motivation to use these ideas. This affects their lives as well as the lives of those with whom they interact.

ADHD is recognised as a chronic, costly disorder which affects the quality of life of the child as well as their family. Researchers have identified the following areas of

functional issues in children with ADHD: academic performance, social relationships, stress within the family system, an increased risk for accidental injury and stress within family-child interactions.

Having a child in the family with ADHD can negatively affect the everyday experiences of caregivers and family members due to the strain on relationships and the influence of impulsivity and hyperactivity on the child's social and academic functioning. Families in which a child has been diagnosed with ADHD often experience high conflict and lack of closeness or warmth, especially between siblings with some non-ADHD siblings feeling that their sibling with ADHD receives more attention and special treatment and they may report feeling rejected as a result.

How is ADHD Treated?

ADHD is treated in different ways across the world. In some countries in Europe, for example, Behavioural Therapy and medication are often used together. In Brazil, the focus is placed on psycho-social skills training and supporting the family instead of relying on medication as a first-line treatment. Italy favours non-pharmacological (non-medication) assistance first although medication may be prescribed if necessary. Other European countries prefer a combination of pharmacological treatment (use of medication), educational, behavioural and psychological interventions, such as play therapy.

As family functioning can be a central problem in families when a child is diagnosed with ADHD due to problems related to family conflict and organisation difficulties, treatment should include parent counselling to assist with effective parenting strategies. Treatment options that include educating parents about ADHD and supportive coaching gives parents and caregivers the opportunity to improve the management of their children's behaviour. Parents also gain emotional and informational support and their own mental health may improve as a result. Parent training which is focused on teaching parents valuable parenting practices and supportive strategies for themselves can assist with their child-rearing and improve the way the family functions. Parenting styles and the quality of interactions between children and their parents can either improve or worsen the condition.

In South Africa, there are no standard treatment protocols for ADHD. Treatment generally includes stimulant medication (like Concerta or Ritalin) or non-stimulant medication (like Strattera) as preferred treatments, with psychotherapy or play therapy and psycho-social skills training as additional treatments. However, medications are expensive, which limits access to treatment for many children. Psychologists often work with families

and parents through psycho-social interventions, including teaching parents about behaviour modification strategies and suitable dietary choices.

Various studies show that training parents and teachers about ADHD and how to work with children with ADHD are important tools in managing the symptoms of ADHD in addition to pharmacological interventions (use of medication). This approach may lead to improvements in children's functioning, parents learning new skills, parents' sense of competence in their parenting skills and lowered levels of parental stress.

To prepare for our next meeting, please complete the following table concerning your child's eating habits and daily exercise. Include foods and drinks taken in by your child at each meal:

My child's meals	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Breakfast							
Snack							
Lunch							
Snack							
Supper/ Dinner							
Snack							
Additional drinks							
Other							
Exercise							

Topic Two: The Importance of lifestyle.

Dietary intervention is one of the known psycho-social interventions to treat a child with ADHD as some foods are associated with ADHD symptoms. Studies show that diets which are high in refined sugars and saturated fats (including fatty cuts of meat, cheese and other fatty dairy products and chicken skin) and low in vegetables and fruit are linked to ADHD symptoms.

Why diet is important in ADHD treatment

ADHD is a complex disorder with different causes, including genetic and environmental risk factors. We have recently learned that ADHD is a neurodevelopmental condition which affects the way the child's brain processes information. An important part of the processing of information involves chemical messengers known as neurotransmitters. Neurotransmitters assist with sending and receiving messages in the brain. There are different neurotransmitters which are linked to an increase in ADHD symptoms.

Foods with low nutrient values (such as junk foods) are low in certain micronutrients which are important for healthy functioning of our body and the biochemical reactions within our bodies.

Foods to avoid include: fast food, carbonated (fizzy) soft drinks, sugar, sweets and caffeine. Children who skip breakfast or drink sugary drinks instead of eating breakfast show poorer attention levels and memories, and are more at risk for developing ADHD symptoms.

Some studies suggest higher levels of sugar consumption are linked to impulsive-related behaviours, including risk-taking, aggression, impulsivity and hyperactivity. Other research studies show a link between increased amounts of sugar in the diet (in the form of cooldrinks and sweets). These same studies also show that children who eat irregular meals, binge eat, over-eat or drink sugary drinks often show more ADHD-like symptoms.

But why sugar? Sugar triggers the reward systems in the brain. Brain imaging shows that children with ADHD have problems with the functioning of the reward systems in the brain. When a child eats snacks containing sugar, insulin is secreted by the pancreas which increases a neurotransmitter called epinephrine. This activates (switches on) the child's nervous reactions and hyperactive behaviours. Increased sugar intake is also associated with increased risk for childhood obesity, tooth decay and diabetes. Don't forget that sugar is often hidden in some foods and can be found in savoury food products like sauces and crisps. The overall daily amount of sugar consumed can be limited by avoiding sweet drinks (such as most fizzy drinks), biscuits and other similar snacks.

It is important to keep in mind that children with ADHD may choose to eat unhealthy foods (such as sweets and fatty snacks) as a way of balancing their emotions due to their emotional distress and impulsivity. Family characteristics and habits could also influence the child's choice of foods. Parents' choice of foods and dietary habits shape how children view food and influences the child's attitude towards food. Other factors, like availability of healthy foods, the cost of eating healthy foods and parents' time available to cook home meals are part of this. If the child views take-away food as the only available food (whether take-away foods are eaten because of limited time, ease of preparation or parents' work commitments), the child may avoid eating healthier food options.

However, studies warn that eating certain foods tends to worsen ADHD symptoms and are not the only cause of the symptoms. The foods can worsen the symptoms, making the behaviours more noticeable and unmanageable. Treatment should include other interventions, and not exclusively focus on improving the child's diet.

So, what are the options for a healthy diet?

Studies show that following a Few Foods Diet or Elimination Diet could assist. The Few Foods Diet involves restricting or avoiding the types of foods a child can eat for a short period of time, like dairy products, soy, corn, chocolate, meat and certain fruits. The goal of the Few Foods Diet is to identify if the child responds positively to a restricted diet. If they respond well, an individual diet plan is set out which includes more variety of foods. These foods are introduced slowly to identify which foods trigger ADHD symptoms and these trigger foods are avoided.

The following foods are associated with lowering the risk for ADHD symptoms:

- Two or more servings of fruit daily: citrus fruits are especially healthy
- Two or more servings of vegetables: these can be fresh or cooked
- Rice
- Pasta
- Fatty fish
- Protein

Image: http://www.clipartbest.com/clipart-9TR4XbqTe

Group activity: Look back at the table you complete in preparation for today's meeting: how are your family's eating habits and food choices reflected in the table?

Deficiencies

Studies show that children with ADHD may have difficulties in keeping iron levels in their blood constant. Lower levels of magnesium, Vitamin D, copper and zinc have also been identified in children with ADHD. On the other hand, higher levels of micronutrients like lead and copper have been identified as causing ADHD-like behaviours. Omega-3 oils are also shown to be in lower levels in children with ADHD. Increased amounts of Omega-3 fatty acids (with increased amounts of EPA and DHA) improves the child's working memory.

Sources of Minerals and Micronutrients:

Mineral/ micronutrient	**Sources**
Omega 3-oils	Seafood (salmon), leafy vegetables, nuts (walnuts), seeds (flax seeds, , pumpkin seeds, black and red currant seeds), butternuts, wheat germ, canola oil and soy
Magnesium	Almonds, cashew nuts, black beans, legumes, seeds, whole grains, fruits, avocado
Vitamin D	Sunlight, tinned fish, milk, butter, cream, eggs, mushrooms
Zinc	Chickpeas, eggs, fish, poultry, peanuts, wholegrain cereals
Iron	White beans, spinach, oysters, poultry, meat, wholemeal bread, wholegrain cereals, eggs, apricots, raisins, brown rice, green leafy vegetables, broccoli, pumpkin seeds, chicken meat, pork

ADHD and Exercise

Studies show that, when a person exercises, the levels of various neurotransmitters in the brain can change. After exercise, neurotransmitters, like serotonin and dopamine, can improve a child's attention levels, lower aggressive behaviours and improve the child's executive (higher-order brain) functioning. Regular exercise shows improvements with the person's social functioning, motor skills, behaviour and emotional functioning. Studies even suggest that regular exercise has such positive benefits for brain development that it could possibly prevent or alter the course of development of ADHD.

The best types of exercises include cardiovascular exercise. These are exercises in which the person's heart rate is increased for a period of time. How long should the child exercise for? One study used 60 minute exercise sessions which included a10-minute warm-up, 40-minute exercise session and a 10-minute cool down period. These 60-minute sessions were done three times a week for a total period of 12 weeks.

Another study shows that involvement is sports extra-mural activities also lowers ADHD symptoms. Ball and skipping (jump) rope exercises have been shown to improve the

child's overall endurance as well as improving co-ordination, balance and agility, which are related difficulties many children with ADHD experience.

As with all the interventions we have discussed so far, whichever type of aerobic exercise is used, it must form part of the treatment plan. The most effective treatment plans include exercise as part of the changes that are made in the child's life.

Group Activity:

1. Diet: how can you include the mentioned nutrients in your child's daily diet?

   Can you think of any favourite recipes which include the nutrients or which can be adapted to include these nutrient-rich foods?
2. Exercise: Discuss what types of exercise your child can do at home using household items. Design an exercise plan which your child can follow this coming week. Encourage your child to do the exercises at least three times. You may want to participate with your child.

To prepare for our next session, think about your answers to the following:

1. What are my goals for my child?
2. What kind of life do I want my child to lead?
3. Where will my child be in five years' time? Ten years' time? Fifteen years' time?
4. Why do we have rules in society?
5. What would society look like without rules?
6. Did I notice any changes in my child's behaviour this week after implementing the exercise programme?

Topic Three: Routine, structure and rules in the home

In order to improve overall family functioning, there are some basics which need to be looked at: structure, routine and rules in the home.

Structure in the home is linked to better functioning with the child with ADHD. This impacts how family members interact with each other.

Structure and rules go hand-in-hand. Structure is important for children as it allows the child to feel secure and to function in a predictable environment as the child knows what to expect. To improve structure and predictability, children need limits or rules. Children need to know what is expected of them and a set time by which this expected.

Rules and structure are expressions of boundaries. Boundaries are invisible lines we draw around ourselves which show where we end and where others start. This helps us to know what we are responsible for and this allows us to know what our options are. Becoming aware of boundaries allows us to take responsibility for our actions and allow others to do the same.

Rules

How do rules help children ?

1. Rules are there to make sure things run smoothly in the home as well as to allow children to feel safe:

- Rules in society keep us safe and set boundaries for our behaviour.
- In order to become productive members of society, our children need to learn to work within the limits for behaviour – these limits are set by rules.
- Rules give children a sense of security by helping them predict what would happen in different situations and they provide stability.

2. Setting rules in the home:

- When there is order, structure and routine in the home, things tend to run smoothly and this makes the home a happier place to be. So how do families go about setting rules?
- At a time when the family is not hurried or stressed, the family can meet together to decide on rules to make the home a pleasant place to be. A good place and time to do this is around a casual meal, like a pizza, and on a day when the family is more relaxed, such as a weekend morning or afternoon. Parents then explain how society functions best when there are rules and that, as a family, everyone is going to suggest some rules which can make the family work together better. Parents can also give examples of rules in society, such as driving on the left hand side of the road and not running across a busy street.
- Parents can then explain that some of the rules in the home can be adjusted; however, the one non-negotiable rule for most parents is: PARENTS ARE IN CHARGE! This enforces the family's hierarchy and structure.
- Respect is also important: children and parents should always speak to each other with respect.
- Allow the children to give their suggestions with the parent taking notes: even if the child makes the strangest suggestion, write it down.

- When you have more than enough rules, go through each one and only accept rules which make the life of the family together happier and more functional. If the child makes a strange suggestion, like eating ice-cream for supper, discuss how this is logically and practically not reasonable because of the effect on health, finances, and so on. Parents need to be able to convince the child why some rules are not reasonable, so time to think on your feet, parents.
- Some rules of happy families include:

i. Parents are in charge
ii. Speak to each other with respect
iii. There is a time to get out of bed in the morning and a time to go to bed at night
iv. There are certain times to eat
v. When we make a mess in a room, whether we are working or playing, we must clean up our mess afterwards
vi. There is a time to do homework
vii. There is a time to bath or shower and brush teeth

- By looking at these rules you may notice how many are linked to time: that is why setting a routine is so important in the home.

3. Applying the rules: the important thing about applying the rules is that they are applied CONSISTENTLY (the same rules apply) but not RIGIDLY (without flexibility).

- Make allowances for different bedtimes on weekends and during school holidays.
- Children must still know there is a time for going to bed and a time for getting out of bed in the morning.
- In this way, this rule is applied consistently but not rigidly.
- Apply this principle to the other rules you have decided on.

4. Giving effective commands: the way you say a command as well as your body language will tell the child whether or not you are serious about what you want your child to do.

- Avoid nagging: it teaches your child that they don’t have to listen to you the first time and they are unsure of the cut-off point of your nagging (when you are going to take action) and they will be forced to listen to you.

- Also avoid preaching and giving long stories about how listening to this command is going to affect their future; parents should also not tell the children their "war stories" about how difficult life was when the parents were children. Most children aren't interested any way.
- Rather give an assertive command that shows you are serious about what your child needs to do.
- If your child does not listen after this assertive command is given, go straight into action and use an appropriate discipline method.

However, as many children with ADHD can be strong-willed and may go against rigid rules and limits, parents and caregivers need to be flexible within the limits and boundaries. For example, if Johnny must clean his hamster cage every Saturday morning, allowing him to clean it any time before lunch would be one way of setting a limit or boundary (clean before lunch time) but allowing him some freedom of choice in terms of deciding the exact time he needs to clean the hamster cage.

Routine

Now we will turn to routine. Children learn consequences from routine. Routine helps establish boundaries and limits. It allows children to feel safe and aware of what will happen. Children learn the sequence of events and logical order of events: first we do this (such as bath), then we do that (like have supper). Children learn that life can be predictable and safe. Children thrive on routine as routines provide a sense of stability in a child's life. Some children need stability, and the routine helps them feel safe even during difficult times, such as illness in the family.

A routine is a basic outline of events in a day. These are some basic principles of routine:

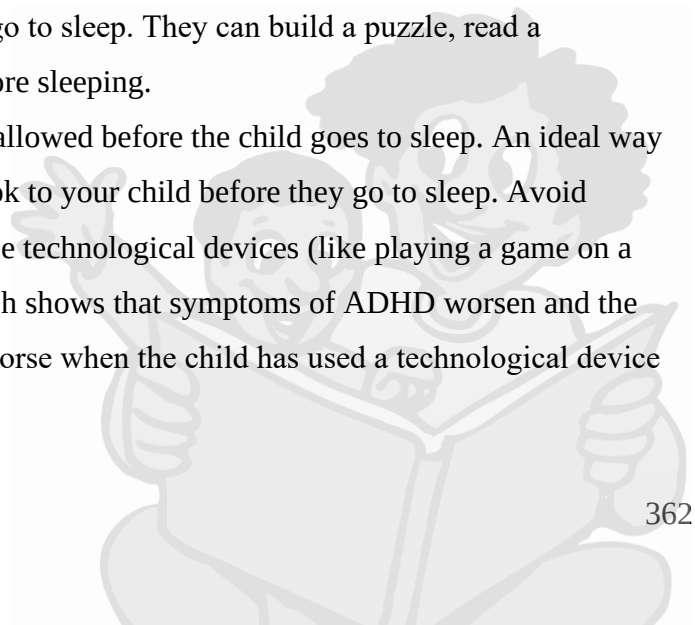
- The time that things happen is not as important as the sequence of events.
- The routine must be practical and must be able to work for the family; if the routine is too detailed, it will not be easy to follow and will be abandoned. It can cause unnecessary stress.
- It must meet the needs of the family: if the children participate in sport, for example, this must be included in the routine.
- The family can try the routine for a few weeks to see if it works. If it doesn't work, the routine needs to be changed to suit the family's needs.
- The routine should suit the parenting style and personalities of parents and children alike.

- The routine should be flexible and adaptable: there will be times and days when the routine won't be followed (like when a parent arrives home late from work after being stuck in traffic), the routine should allow for this. Some families have different routines for different periods of time such as when on holiday and when at home (school days); however, the sequence of events need to be similar. The stricter the routine, the more difficult it will be to follow and enforce.
- Routines can be adapted as children grow older. Let children help adjust the routine when they are older.
- The sequence of events should be logical: for example: brushing teeth after supper time. Think about what you would like the children to do before going to bed at night or school in the mornings and sequence the actions in a logical way to ensure that everything is done before sleep or school time.
- Include the children's input as much as possible: If children are allowed to contribute towards setting the routine, they are more likely to follow it.

Including children's input allows them to feel as though they "own" the routine and encourages them to follow the routine. This also allows the children to feel as though their opinions matter and builds self-esteem and self-worth in children. They feel as though they are important enough to have their ideas included. If the child has an outrageous idea which will definitely not work, encourage them to change the idea or suggest a better place (sequential step) for the activity in the routine.

Some ideas regarding a bed-time routine:

- Children need a regular bed-time.
- Make sure the child has enough sleep.
- A child in foundation phase should be in bed between 7 and 8pm even if they don't immediately go to sleep. They can build a puzzle, read a book or play quietly before sleeping.
- A time of quiet must be allowed before the child goes to sleep. An ideal way to do this is to read a book to your child before they go to sleep. Avoid allowing your child to use technological devices (like playing a game on a phone or tablet). Research shows that symptoms of ADHD worsen and the child's sleep quality is worse when the child has used a technological device prior to bedtime.



- Enforce the bed-time routine.
- During school holidays or on weekends, the child can go to bed a bit later than usual as the time to wake up the next morning will probably be a bit later too. This can also be used as a reward for the child.

Image: http://www.clipartbest.com/clipart-KTjpykxGc

The most important thing about a routine is that it is followed. If it is not, find out what is wrong with the routine, adjust it and try again!

Preparation: In preparation for our next meeting, think about the following:

1. Why do we discipline our children?
2. What methods of discipline were used on you when you were growing up? Did they work?
3. What methods did not work? Why not?
4. What methods have you tried with your child?
5. What methods have worked?

Topic Four: Effective discipline techniques and the use of positive reinforcement and motivation strategies

Discipline

A few weeks ago, you were asked to identify goals you would like your child to achieve and what you wanted for your child out of life. Discipline is one of the methods by which parents assist their children in becoming healthy, independent and successful adults.

Before we look at specific techniques, what are some of the principles of effective discipline?

1. Discipline needs to be enforced consistently, calmly and immediately. Children learn that their parents can be trusted to carry out their methods if parents respond when the child breaks the rules or disobeys. Following on from this, threats need to be realistic: children then believe that parents will carry through with what they say. It is no good saying you will never allow your child to play on their PlayStation ever again when they do something wrong. There might come a time when it may be convenient to allow your child to play on the PlayStation. Your child may then learn that you won't follow through with what you say when you allow them to play on it again.
2. Parents need to be united in their decisions regarding the child, including discipline. The child needs to be aware that one parent will not over-ride the other

parent's decisions and that both parents agree on a matter. We will look at this in more detail in a few weeks' time.

3. Children should not be punished for mistakes, accidents or failures. We all make mistakes, and sometimes we break things by accident. If children are punished for mistakes or accidents, they may develop a fear of failure or a fear of making mistakes which could lead to low self-confidence.
4. The parent-child relationship should not be destroyed by disciplining. If the child still feels loved and accepted after being disciplined, they are more likely to follow rules and behave better in future.
5. Children should not be made to feel badly about themselves through the chosen discipline method. Criticising, ridiculing, scolding and condemning the child is not likely to encourage them to change behaviour but rather leads to low self-esteem. In line with this is the principle of labelling the behaviour and not the child. We tend to live up to labels others have given us, whether intentional or not. If your boss says you are an amazing worker, your enthusiasm for work increases as you strive to maintain that ideal. By labelling the behaviour and not the child, you are allowing the child the opportunity to choose his behaviour. We can choose how we behave, and not who we are. We also tend to live up to our labels.
6. Don't become involved in a battle of wills: children will always challenge authority, at one time or another. They are testing boundaries to see how much they can get away with. As parents, it is important to make sure children know what will and won't be allowed. When a parent engages in a battle of wills, he is allowing the child to persuade him and effectively take control of decisions. To avoid a battle of wills, parents can use the "one warning" rule: remind the child of the instruction when the child does not obey and then the parent implements consequences, like removing privileges or other suitable punishment methods.

Working with your child's strong will

Children with ADHD are often strong-willed. Strong-willed children are often very difficult to parent because of their defiance and strong-willed nature.

Here are some strategies that can assist:

1. You catch more flies with honey than with vinegar: studies show that reward-based reinforcement strategies have been successful in managing disruptive and inappropriate behaviours. Plan ahead: set up expectations of behaviour beforehand and focus on positive reinforcement of behaviours.

a. Your child needs to know in advance what behaviours will be rewarded. Choose behaviours according to desired outcomes. For example, if you want to teach your child to pack their clothes away, tell them in advance that they will be rewarded for this and then reward them appropriately when they pack their clothes away. Some parents use a star chart or implement a point system with their child. Children are told what the target behaviour for the week is and rewarded for doing this behaviour. When the child has earned five points or stars, they are rewarded. One strategy that works well with rewards use

"surprises" to reward the child so that the child is not rewarded with the same thing every time. This provides an element of excitement, avoids boredom and teaches the child that rewards can be different, such as material (such as a toy or book), social (extra time with a friend on the weekend), entertainment-related (additional time playing on the PlayStation or watching TV on the weekend) or even the reward of choice (like deciding what meal the family will have for a take-away).

b. When possible, allow the child a say in what behaviours will be rewarded: getting your child to "buy in" to the behaviours and rewards will go a long way to ensure they work towards the goals. The child may be more enthusiastic about changing behaviour as they will be earning rewards they enjoy and will experience a sense of accomplishment when the goal is achieved.

c. If your child loses track, remind them of what reward they are working for instead of reminding them of which privilege you will remove if they don't obey.

2. Give your child verbal time reminders: remind them when you expect them to obey a command, for example: "we are going to have dinner in 20 minutes' time – you need to join us and switch the TV off" and then at 10 minutes: "we are eating in 10 minutes so you have 10 minutes left to watch TV before joining us for dinner". If your child has no concept of time, use a timer and leave it where they can see and hear it. Often unacceptable behaviours can be prevented when children are prepared for changes ahead of time.

3. When giving a command, use empathetic language. For example: instead of saying: "leave the television and go brush your teeth", you could have more success saying: "I know this is your favourite TV programme but you need to brush your teeth now. You can record it or watch it when it is on again on the weekend."

4. Use positive language in instructions: instead of saying "No, don't play with your brother's toys", try: "Rather play with your own toys" or redirect the child's attention to an activity they enjoy such as "It's such a lovely day, it may be fun to play outside." Explaining why behaviour is undesirable can also help: "If you jump off the roof you could break your leg and then you won't be able to swim for a long time." Keep it positive.

5. Praise good behaviour but be specific: if your child behaves appropriately, let them know: "You packed your clothes away neatly. Good job."

6. You can't win them all: pick your battles. If we spend time pointing out everything the child isn't doing right or is doing wrong, it will be a very negative environment and we won't have good relationships with our children. Choose what is most important and work on that first but start with something which is quite easy for your child to do. For example: good manners and respectful behaviour are more important than whether your child has eaten all the food on their plate for a snack. Children often respond better when there is some discussion about the issue and some form of compromise can be reached by both parent and child. The child may feel that their point of view is acknowledged and, as such, tends to "buy in" more to the agreed behavioural standard than if it is just forced upon them.
7. Choices are useful when encouraging your child to help with chores, for example: "You can feed the dogs or sweep the floor. Which are you going to do first?"
8. Follow through and be consistent: when telling your child you are going to check that they are obeying a command, make sure you actually check that they have done so. If you expect them to tidy their room this morning, make sure you expect them to tidy their room every morning and then check that they have done so.
9. Use a timetable to schedule all activities, including fun activities as well as those they find boring or unpleasant. Let them help you set the schedule. Allow them to see that in life there are always tasks which are more fun than others but that we still have to perform the unpleasant tasks no matter. Allow spaces in the home environment where your child is free to make a mess and to try new activities in a safe space.
10. Avoid lecturing your child: children tend to "switch off" when being lectured, nagged or spoken to sarcastically. You can show empathy but let your child know that you still expect the desired behaviour. If they throw a tantrum ignore it and acknowledge the child when they stop their tantrum. Praise them for calming down and provide empathy if needed before directing your child's behaviour again.

Please remember, if your child is behaving in a way that is endangering themselves or others, it is important to not give in to their demands but to take action to keep your child and

others safe. For example: if your child wants to run across a road, it is important to stop your child from doing so by action instead of negotiation and discussion. These situations need urgent and firm action.

Another discipline which works with strong-willed children is natural and logical consequences. These are NEVER used in any dangerous or life-threatening situations.

Examples include the following:

1. Your child refuses to put on their jersey in winter and they get cold during the day.
2. They refuse to eat breakfast then get hungry later.
3. Your child doesn't pack away their toys when they are told to do so and you want to clean their room. As a result, you tell them that you are going to lock away their toys if they don't pick them up.
5. The child talks to their parents disrespectfully. As a result, their parents don't answer them until they talk respectfully.

Benefits

1. It holds the child and parents responsible for the child's behaviour. Parents and children can solve problems together. This improves the parent-child relationship.
2. The child is given the opportunity to make their own decisions about the way they will act as well as which behaviours are acceptable. When the child takes ownership of the decisions made regarding behaviour, they can make choices about future behaviours. This empowers the child.
3. The child learns from the natural order of things instead of being forced to conform; it reduces the likelihood of the child rebelling.
4. The child learns to act appropriately even if an authority figure is not present.
5. The child learns lessons from their own experiences

Principles involved in logical consequences:

1. Inform the children:

- Decide beforehand what the results of certain types of behaviour will be.
- Parents must agree on the consequences.

- Tell the child before the act happens about what the consequences will be and explain why they must behave appropriately.

2. Try to understand your child's behaviour, purpose and emotions:
- Find out why the child behaved inappropriately: for revenge, attention-seeking, etc. Parents can offer alternatives when children explain why they behaved inappropriately. For example: Mary doesn't want to wear her school anorak (despite it being cold) as she has outgrown it since the last time she wore it. If her mother understands that she is shy as her anorak doesn't fit her any more, she can offer an alternative of wearing a school blazer or jersey instead. Mary is more likely to conform now when asked to wear something warm to school.
- Natural consequences are effective despite the aim of the child's behaviour.

3. Firm and friendly
- Use a firm but friendly tone when explaining the consequences to your child.
- Follow through with the consequences if your child misbehaves..

4. Don't try be the "perfect" parent
- Allow your child to face the consequences of their behaviour.
- Avoid being over-protective.
- The responsibility for the choice made is your child's. Try not to feel guilty for them making the wrong choice of behaviour; their experience of the consequence should be deterrent enough.
- Often parents don't follow through with logical consequences afraid that other people will judge them as parents.

5. Be predictable in your actions: be consistent as it helps children learn the consequences of their actions and make appropriate choices in future.

6. Separate the action from your child: Label the behaviour and not the child: show your child that you respect him even if his behaviour is not appropriate through careful choice of tone of voice and words. For example: "That was a naughty thing you did." Instead of: "You are a naughty child".

7. Encourage independence: don't do things for your children which they can do themselves. This improves the sense of their own competence and encourages them to act independently. Home environments can be arranged simply so that children can learn to perform age-appropriate chores and activities for themselves.

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8. Try not to feel sorry for your child when they are is faced with logical consequences: it's fine to empathise with your child but avoid showing them pity, for example: 'Yes, it isn't fun when you lose your TV-time" instead of "I feel sorry for you now that you don't have TV-time."

9. Decide whose problem the behaviour is: many parents decide that their child's behaviour is the parents' problem. Decide whose problem the behaviour is and act accordingly.

10. More doing and less talking: carry out the logical consequences without a lot of discussion. Children become deaf to their parents if the parents talk too much. Explain consequences to children when you are feeling friendly and are on good terms with them as they are more likely to listen to you at that time. Discussions about acceptable behaviours and consequences for unacceptable behaviours need to be held before the time. Likewise, discussions can also be held about acceptable behaviours and rewards (as consequences) for these.

11. Refuse to fight, argue or give in:

- Set limits and allow the child the opportunity to decide how they are going to react to the limits.
- Be prepared to accept your child's choices of behaving.
- Remember the goal: helping your child learn to take responsibility for their own actions.

12. When more than one child is involved, allow all the children to share responsibility for their actions

- In situations involving more than one child, all the children involved should face the logical consequences of their actions.
- Avoid identifying guilty parties and listening to tales about what "really" happened.
- As far as possible, let the children suggest ways in which the situation should be handled and decide on a suitable consequence from these.

Remember, consequences need to be logical for the action being discouraged or rewarded. Consequences are also temporary: if your child refuses to eat his vegetables at one meal and isn't allowed pudding as a result, if they eat their vegetables on another day, they may be allowed to eat pudding then. The consequence is not applied indefinitely.

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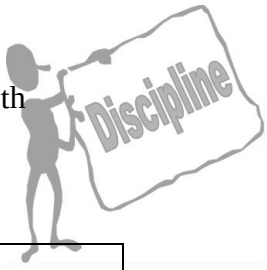


To prepare for our next meeting, ask your child how they would like to be helped with homework, studying and completing learning-related tasks.

Write your child's responses in the space below:

Topic Five: Helping with homework and studying and encouraging independence in learning-related tasks

Children with ADHD can have difficulties with learning because of problems with concentration. If your child doesn't pay attention at times during class lessons, it doesn't matter if they attend the most well-resourced or expensive school in the world, they could still be at risk for developing a learning disorder.

What are some things parents and teachers can do to help their children?

Communication between parents or caregivers and teachers is very important. Parents need to feel they can trust their child's teacher and this trust is earned through open communication between parents and teachers. Teachers can let parents know when they

notice changes in the child's behaviour, attitude, motivation levels and so on. Parents can let teachers know of any changes in the home or concerns they may have in the home.

Learning Difficulties

What are some of the learning disorders that children are at risk for developing?

The most well-known learning disorder is Specific Learning Disorder with Impairment in Reading which was formerly known as Dyslexia. This learning disorder affects the child's ability to read words and passages accurately, the child's ability to understand what they have read as well as ability to read at an age-appropriate level. Besides confusing letters and writing letters, words and numbers backwards, there are a different aspects which are considered before a diagnosis is made. Not all children show the same signs, including confusing letters and writing words backwards.

Another well-known learning disorder is what was previously known as Dysgraphia: handwriting which is difficult to read (not just untidy), poor spelling and grammar and clarity of writing (the person's ability to express their ideas in writing clearly). This is now referred to as Specific Learning Disorder with Impairment in Written Expression.

The third type of learning disorder is Specific Learning Disorder with Impairment in Mathematics. This includes difficulty with number sense, memorising arithmetic facts (like bonds and tables), fluent or accurate calculation and accurate mathematical reasoning (such as solving word sums). This was formerly referred to as Dyscalculia.

Learning disorders are complex to diagnose and are usually diagnosed by a specialist, such as an Educational Psychologist. The diagnosis involves a variety of standardised tests, usually including an IQ-test and standardised academic (scholastic) tests as well as considering other information.

Setting an effective homework routine

The most effective way to set good homework and studying techniques is to start early and set a good work routine.

Some ideas about a homework routine:

- From the time the child receives homework, it is important to set a homework routine.
- Allow the child to have a short break and snack <u>before</u> homework starts.
- Homework must be finished <u>before</u> play-time/ TV-time.

- Use play-time/ TV-time as a reward after homework: this will also encourage children to complete the homework within a set time and not drag out the homework time.
- Some parents use a timer: be careful though that children actually do their homework properly and not just as quickly as possible. This is especially important for children with ADHD as they often rush to complete their work so they can do something which is more fun or exciting.

From the first day your child receives homework, encourage good work habits. Remember children also learn from their parents' attitude towards homework and studying. If your child hears you complain about the amount of homework received or the level of difficulty of homework, they may decide to follow your example and do the same. Rather, have a productive discussion with your child's teacher if you have concerns.

Getting the basics right:

1. Find a suitable place for your child to do homework and study: this place should have enough lighting, be as free from distractions as possible (such as TV, especially for a child with a wandering attention), have a comfortable place for the child to sit at and work (not so comfortable that they fall asleep) and be ventilated as fresh air feeds the brain with oxygen which makes it easier to maintain attention.
2. The chosen homework space should preferably have a desk or table at which the child can sit. Some parents allow their children to work on a suitable-sized exercise ball or to sit on a hot water bottle filled with air if it does not distract the child further. The desk and chair should be at a comfortable height for the child so the child doesn't wriggle around after becoming uncomfortable. Your child must have stationery and equipment handy (like number charts) when starting homework.
3. Your child should have a homework diary in which they record the day's homework. This lets you know as parent what homework your child has and it can be helpful when planning your child's time.
4. Help your child decide what homework must be done on the day and what homework can be done on later days: look at deadlines and available time on each day – start with homework which is due for the next day, and time allowing, start work which is due for later days after the next-day homework (such as researching for a project and so on).
5. Your child's ideal place to study and work:

In the space below, draw a plan of your child's place of study and working which you can fit it into your existing home spaces:

My child refuses to do homework, now what?

At times children don't want to do homework or study. This is part of the reason why setting an enforceable and practical homework routine is important. As mentioned before, the parent's attitude towards school and homework is important as children learn from the models of behaviour they are shown.

If your child starts avoiding homework, it may be a good idea to talk with their teacher to find out if something more is going on, for example: Is the work which being done very difficult for your child and your child doesn't want to battle with it so they rather avoid doing the homework? Does your child understand the work or are they avoiding the work so that they don't feel not clever enough? Is your child physically tired at the end of the school day and doesn't have the energy to do homework then? You may need to look at your child's sleeping habits, diet and academic progress to see where the problem lies so you can take the best course of action going forward. If your child just doesn't want to do homework, using discipline strategies such as positive discipline and natural and logical consequences could be used.

In groups, discuss other strategies which have proven helpful when encouraging your child to do homework:

Building the foundation for studying

As your child is in the foundation phase and will probably not have long formal assessments or projects yet, it is a good idea to start laying the foundation for successful study before they enter the intermediate phase and beyond (From grade four onwards).

Handy hints:

- Encourage your child to pay attention in class and to ask the teacher if they don't understand work.
- Teach your child basic summarising skills:
    - Begin by reading through the information with your child.
    - Start with the first section only.
    - Underline/ highlight the important facts with your child and explain why you have selected these facts only.
    - Encourage your child to write these words down separately, either as a list or in a mind map/ brainstorm. This would be the list your child would learn when studying for a test.
- When your child enters the intermediate phase, it may be helpful to find out what kind of learner they are (auditory, visual, kinaesthetic) to find out which learning methods could be most useful.
- If your child is in the habit of summarising information and asking questions when they don't understand a topic, studying becomes easier as your child is used to doing part of it already.

Encouraging independence in learning-related tasks

Motivating your child to achieve according to their potential will assist in the long-term with encouraging independence in learning-related tasks.
If your child feels you and the teacher's expectations are fair, they may be more willing to obey. Try not to compare children's performance to the performances of other children as this could make them feel inferior, angry, resentful and so on. Teach your child to take responsibility for their own learning.

In the foundation phase, children may need a great deal of help with homework. However, with time, the amount of assistance should be lessened as the child learns more skills, becomes more mature to work independently and gains confidence in their skills. Some parents start homework tasks with their children and then allow the child to continue with items on their own but with parents still in the same room in case the child needs help. Using positive reinforcement (rewards) and following a practical homework routine are also useful.

To prepare for our next meeting, please answer the following questions as honestly as possible:

Who is in charge in your home?	
Do parents define the rules?	
Do children decide which rules they will follow and which they will ignore?	
Do parents support each other with rules and discipline?	
Do children know which parent to approach with a request as this parent is the “kinder” parent?	

Complete the following questionnaire before leaving today’s session and send photos of your responses to Mrs Downing. Your results will be given at the next session.

Parenting Style Questionnaire

Name of parent/ caregiver participant: _____

Name of child participant: _____Today's date: _____

Instructions:

For each item, indicate how much you agree or disagree with the statement by placing a **X** over your choice. Take your time and answer truthfully for the most accurate results.

Q1: Parents should provide direction but also listen and discuss their kids' concerns.				
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Q2: Society would be better if parents were stricter with their kids.				
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Q3: Kids should make most of their own decisions without parental direction.				
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Q4: There shouldn't be rigid rules for kids' behaviour.				
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Q5: Parents should provide direction and guidance in rational and objective ways.				
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Q6: Children should be told exactly what to do and how to do it.				
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Q7: Kids can make up their own minds and do what they want to do.				
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Q8: Kids need to learn early who the boss is in the family.				
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Q9: Children should get their way as often as their parents do.				
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Q10: Parents should discuss the reasons behind their policies with their kids.				
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Q11: Children should follow their parents' orders without asking questions.				

Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Q12: Parents should make their expectations of their children very clear and open to discussion.				
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Q13: Parents shouldn't restrict children's activities or decisions.				
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Q14: Children should conform to what parents know is right.				
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Q15: Kids should be encouraged to discuss family rules and restrictions.				
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Source: https://psychcentral.com/quizzes/parenting-style-quiz#quiz				

Topic Six: Effective communication strategies and improving the parent-child relationship and relationships within the family:

Improving family relationships

All members of a family need to be cared for and looked after, especially when one of the family members has a condition like ADHD. Research shows that families of children with ADHD often experience greater amounts of stress. Using strategies like positive communication, enforcing discipline and structure and focusing on positive characteristics can help to improve relationships within the family.

Part of keeping the strength of the family hierarchy is for the parents to have a good working relationship, whether they are living together or living apart.

Family hierarchy is an important part of structure in the home. Children need to know that both parents work together in deciding rules, limits and discipline. It may undermine the stricter parent's authority and can damage the child's relationships with both parents when one parent tends to "give in" to the child.

Parents must support each other's rational decisions. This is why it is important to have discussions about expectations regarding your child in private and ahead of time. A parent who comforts a child after the child is disciplined could cause the child to feel confused and this is damaging to the whole family unit, let alone the parents' working relationship. The parental relationship needs to be healthy and strong to keep the family structure and ensure parents remain in charge. If parents are together, this can be achieved by

regular time together, without the children, so that parents can re-energise and show the children that they are working together and they support each other's decisions.

But, what happens when parents are not living together and don't agree on many things? One of the ways to limit the possible negative effects of disagreements is for parents to go for mediation or to prepare a parenting plan or settlement agreement during the divorce or separation process. Help from of a suitably trained, professional person can help as the couple are given space to share different views to improve communication, identify ways to resolve conflict, decide on ways to share information about the child and make decisions in the best interests of the child to meet the child's growth and developmental needs. If the parenting relationship has broken down to the extent when there is no communication between parents except through legal representatives (such as attorneys), they could consider partnering with a Parenting Co-ordinator who smooths communication and helps the parents in making decisions in their children's best interests.

Closely related to family functioning is the parents' ways of parenting their children. These are referred to as parenting styles. Research shows that parents who interact positively with their children tend to help their children learn to control their own emotions. However, children's challenging behaviours can make it difficult for parents to interact positively with them and this can make the children's behaviours worse over time.

How do parenting styles affect children's behaviour? Parenting styles in which parents provide enough structure in the home environment are linked to higher levels of self-esteem in children with ADHD. Children whose parents interact with them in a mostly negative manner tend to show more aggressive behaviour. Research also suggests that angry parental styles are shown to increase ADHD symptoms in the child over time.

Last week, you completed a parenting style questionnaire. What type of parenting style do you tend to use mostly?

_____

There are three main types of parenting styles:

Authoritative: democratic decision-making for rules and expectations; a sense of fairness as you can adjust your standards according to what is happening in your family at the moment; you can have open and honest discussions with your family about rules and boundaries and you encourage your children to discuss how they feel about rules and structure. You are fine with admitting when you have made a mistake. You are responsive to your child and monitor their behaviour. This parenting style encourages your child to develop autonomy and behave independently.

Laissez-Faire (permissive): you may be permissive and want your children to grow and develop in the way they choose; you may find it hard to set expectations for your children and you could hope your children learn from your example without clearly setting rules and limits. You consider your children's views for everything. There is little or no parental control or monitoring.

Authoritarian: You set very firm boundaries and rules including what your children should do as well as how they should be doing things. Your children need to know who is in control and this helps them follow the rules. You could use strict punishment when your child disobeys. You may be reserved as a parent and could have difficulty trusting your child to do the right thing. Children tend to rely on parents to make decisions for them and could have difficulty behaving independently.

In groups, discuss how there are ways in which you could show a more balanced way of parenting children by including positive aspects of the different parenting styles:

What are some practical ways to improve communication in the home? First, we will focus on listening skills as we need to be able to listen effectively before we communicate, so that we communicate appropriately when we do.

Listening Skills

There is a difference between listening and hearing. Listening is paying attention when the child is speaking. It involves paying attention to <u>what</u> the child is saying as well as <u>how</u> they are saying it. The listener understands what the child is saying and, if not, tries to understand what the child is saying. Listening is <u>not</u> thinking about how you are going to respond or answer the child before they have finished speaking. It is also not giving the child the chance to say what they want to say or interrupting the child while they are speaking. Listening isn't asking the child questions which interrupt their thoughts or deciding what you want their message to mean. Listening avoids saying the child is not allowed to feel the way they say they feel by rejecting what the child says, it avoids thinking you can "read" the child's thoughts and decide how the child feels before they have said how they feel and more

often that not, it avoids giving advice and solutions without understanding the child's concerns.

How can we improve our listening skills? Here are some pointers from a technique called active listening:

- Offer sympathetic silence by being patient and allowing the child to finish speaking
- Acknowledge the child's response through non-verbal cues like making eye contact, looking directly at the child, showing a friendly and approachable facial expression, leaning forward and showing an open and relaxed body posture.
- Encourage the child to share more information by using phrases like "tell me more", "would you like to talk about it?" and "I am interested in hearing what you think"
- Summarise what the child has said to let the child know you have been paying attention and that you understand what they have said.
- Paraphrase or put in your own words what the child has said to make sure you have understood them correctly.
- Asking questions which encourage further discussion, such as when giving advice: "Can you think of a way you can solve this problem?"
- Show patience: listen to what the child has to say first.
- Use reflective listening by highlighting what the child has said and then reflecting/ stating this back to the child so they feel they have been understood and accepted, such as: "From what you have said it seems as though you are feeling sad and disappointed that your friend has hurt you." However, be careful of using reflective listening to the extreme (reflecting EVERYTHING your child says) or strengthening an incorrect goal (like focusing only on reflective listening and not allowing the child to solve their own problems sometimes).

Avoid closed responses as these show the child that you have NOT understood what they have said and that don't encourage further discussion. For example: "Now, why did you go and do that?" and "That is life! Life is not fair."

Instead, try open responses which encourage further discussion and let the child know they are being heard and understood. They take note of the child's feelings and show caring

and acceptance. For example: “You are sad that you can’t go with your friends” and “It seems as though you are angry with Peter”.

Role play:

1.1.Speaker One (trying to complete homework): I can’t do this!
Speaker Two: Talk rubbish! Start now and do your work!

Discuss: how does Speaker One feel when Speaker Two responds in this way?

1.2.Let’s try another way:
Speaker One (trying to complete homework): I can’t do this!

Speaker Two: It looks very difficult.

Discuss: now how does Speaker One feel after this new response?

2.1.Speaker One (five year old child showing dad her work from nursery school):
Look at my pretty work.
Speaker Two: Mmm. I see. Now go play! I have things I have to do.

How does the child feel after the mom’s response?

2.2.Speaker One (five year old child showing dad her work from nursery school):
Look at my pretty work.
Speaker Two: You are feeling very happy with your pretty work.

How does the child feel after the mom’s response?

3.1 Speaker One (teenage daughter after mom has refused for her to sleep at her friend after the daughter went night-clubbing without mom’s permission on the previous occasion) : You are the nastiest mother.
Speaker Two: How dare you say that to me! Have you no respect?

What is the likely end to this communication?

3.2 Speaker One (teenage daughter after mom has refused for her to sleep at her friend after the daughter went night-clubbing without mom's permission on the previous occasion) : You are the nastiest mother.
Speaker Two: I can see you are very angry with me.

What is likely to happen now in terms of their relationship and the daughter's behaviour?

Individual Activity:

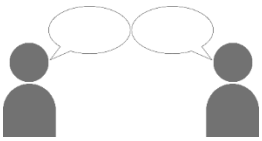
Choose the response that best shows active listening in the following conversation.

1. Child: I wish I could get sick once in a while like my friend. She is so lucky.
   Parent: a. You are feeling left out.
   b. You wish you could get sick.
   c. You're jealous of your friend.

2. Child: Yes. She gets to stay home from school and I never do.
   Parent: a. You wish you could stay out of school more.
   b. You wish she would go to school more.
   c. You'd like the principal to punish her for missing school.

3. Child: Yes, I do. I don't like to go to school every day I never miss a day. I get tired of it.
   Parent: a. But you know you should go to school every day.
   b. But generally you like school.
   c. You are really tired of school.

4. Child: Sometimes I hate school.
   Parent: a. Hate is a strong word.
   b. It's more than not liking school – sometimes you hate school.
   c. You don't hate it – you dislike it.



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5. Child: That's right. I hate the homework. I hate the long day.
   Parent: a. You must have failed a test today. What happened?

b. You will never get anywhere with that negative attitude!

c. You seem to hate some of the things about school.

The second part of effective communication involves responding appropriately. This part doesn't blame or accuse the child or assume the child is guilty. It involves trying to acknowledge the child's needs and to prevent the child from experiencing feelings of guilt. It aims to avoid a power-struggle between parent and child and shows the child that they are accepted. There are two types of messages: you-messages and I-messages:

1. I-messages: in this way of communicating, the child knows exactly how the parent feels about a situation and what is expected of the child in that situation

- I-messages specifically state how the parent feels in a situation.
- It is a specific statement which the child should be able to understand clearly.
- I-messages avoid a condemning attitude.
- For example: If you leave your toys on the floor, I'm afraid someone will step on them and break them and then you won't have your favourite toys to play with anymore.

2. You-messages: in contrast to I-messages, you-messages focus on the shortcomings of the listener.

- You-messages condemn the person.
- They make the person feel rejected.
- You-messages can lead to feelings of guilt, anger and frustration.
- You-messages may make the child feel inferior and helpless.
- An example of a negative You-message would be: You have no respect for your toys; that is why you left them lying all over the floor.
- However, there are some times when a You-message is appropriate such as when you want to show the child that they have a problem and encourage them to take responsibility for their choices and decisions. You would want to focus on their feelings.

  For example: You felt really embarrassed. What do you think you could have done differently?

Parts of the I-message: an effective I-message always contains the following 3 parts:

1. Describe the behaviour of your child: "When you …"
2. Describe your feelings regarding your child's behaviour: "I feel that …"
3. The result (effect) the child's behaviour has on the parent is described: "because …"

For example: When you play outside with your best clothes on, I feel worried because I can't afford to buy new clothes.

The most important thing about an I-message is that the focus is on the speaker (parent) and the child is not accused or blamed.

An example:

Your teenage son keeps you waiting an hour after school when you fetch him.

Instead of saying: Why are you so late?

Rather say: When you keep me waiting for you after school, I feel disrespected/ angry/ frustrated because it seems you don't respect my time.

Finding the honey

A further way to improve relationships within the family is through finding positives in situations and looking for strengths instead of focusing on difficulties.

Even though a parent wouldn't wish for their child to have any difficulties, there are some positive characteristics of children with ADHD. For example, because of high energy levels, children with ADHD may be vibrant and make the home a lively place to be. Parents often never know what to expect and this makes the parenting journey interesting; parents are given opportunities to learn new skills and learn more about themselves and their children in the process.

Children with ADHD often show a high level of attention when doing an activity they enjoy. This can be used positively when they are old enough to make their own choices, for example, when choosing subjects for grade ten or choosing a career. If they are interested in the subjects or career chosen, you may find they have the necessary motivation to do homework, study and complete associated tasks for these. This doesn't mean that they will never lack motivation, just like the rest of us, they will have more and less motivated days but at least, for some of the time, their motivation levels will be higher because of their increased interest.

Children with ADHD are also shown as having more emotional sensitivity. This implies they are good at reading others' emotions and could be empathetic and make good, sincere friends. They are often charismatic and charming and are often successful in sales and marketing careers.

Children with ADHD are also often known to "think outside of the box" and find solutions where others haven't been able to do so. They are often innovative, creative and may make good engineers and software developers when leaving school.

Focusing on positive aspects can assist in improving the general mood in the home. This is effective as it may improve the child's overall mood and also affect the parents' mood positively further. Parents are encouraged to find positive things happening which make them feel good instead of focusing on negative occurrences and stresses. This doesn't mean lying to your child if you're having a bad time, but rather trying to find something positive in the situation. For example, mentioning one positive thing about your day in front of your child, such as your boss' approval of a project or initiative or an enjoyable conversation with a friend.

When we meet again, we will have a discussion about how successful this programme has been for you and your family.

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Appendix V: Additional Information for Parent Training Sessions:

Session 3: start with discussion on how parents used exercise (page 15, Group Activity number 2)

Ask parents to share their responses to preparation questions (bottom page 15)

Page 16:

Discussion before going through Topic 3: Rules in society: why we have road rules, rules when playing a favourite game, etc

Page 17:

Applying rules (point number 3): parents can share what their bedtimes are for their children

Page 18: before start of number 4: what did parents think about when their parents nagged them?

Do parents read to their children? What is the value in reading with our children?

- Encourages good listening skills
- Language and vocabulary development
- Emotional bond between child and parents
- Lifelong love for reading (huge payoff for academic achievement as a reading is an integral part of education and learning)
- Fosters the child's imagination and creativity, etc

End off with questions on page 20: Preparation for next session

Sessions 4 and 5: start with discussion on parents' answers to questions on page 20

Page 22: Before starting: **Working with your child's strong will:**

What are some of the benefits of having a strong will?

- It shows the child knows who they are and what they want
- When the child is a teenager, if they are strong-willed about the right things, peer pressure isn't so much of a problem
- They can stand up for themselves

Page 25: what are some of the consequences you learned as a child? For example: don't run with wet feet around the pool – learned after slipping when running with wet feet

Page 26: Before number 4: Dangers of helicopter/ lawn-mower parenting:

- The child could learn to doubt their own ability to solve problems
- The child may become reliant on someone else to speak on their behalf, especially true for older children and teenagers
- Could cause conflict in the family

- Can parents think of other dangers?

End section with preparation questions on page 28

Page 28: Helping with homework and studying

Parents can share children's responses about how they would like to be helped with homework, etc (preparation questions from end of last session)

Page 28: Communication: how is communication facilitated at your child's school? Is there a WhatsApp group? Do parents receive sms notifications or emails or phone calls?

Page 29: homework routine

Why do teachers set homework?

- Learn to complete work independently
- Reinforcing of content and work from class
- Allows the child to work alone to determine if they understand the work

What was your homework routine as a child? How has this affected your expectations from your child with regards to completing homework?

Page 31: homework space: parents to draw in and share

Page 31: **My child refuses to do homework:**

- Were there times as parents when you refused to do homework?
- Why?
- What did your parents do?
- Did it help?

Page 32: discuss together strategies which have proven helpful

- Incentivising/ rewarding homework completed: earning points/ rewards

Page 33: preparation questions for next session

Completion of parenting style quiz: parents can share directly (privately – not on group) with Mrs Downing (take photos of responses) at <u>end of session</u>

Session 6: Effective Communication

Page 36: parents can reflect back on their answers to preparation questions (page 33)

Page 36: Improving family relationships:

What is a working parenting relationship?

One in which parents may or may not be living together and all communication is positively aimed at making decisions or sharing information in the child's best interests.

Page 37: results given of parenting style questionnaire by Mrs Downing

After reading through different types of parenting styles:

- Were parents surprised at the results?
- What did they learn from looking at different styles?

Page 38: ways in which parents can include positive aspects of other parenting styles: parents can share verbally after completing ideas in the table

For example: trying to be more flexible with some things, such as later bedtimes during school holidays

Page 38: differences between listening and hearing: parents can share ideas before we work through information under **Listening Skills**

Page 39: role plays: parents can answer questions verbally with group and complete while doing so

Page 41: **Individual Activity**

Parents to circle their chosen options and share as a group after completing

Page 43: before **Finding the honey**:

- Can parents think of their own examples of using I-messages?

For example: When you tease your sister, it makes me feel sad as I know you could get along better with her and have a good friend in her.

Page 44: Before final paragraph starting with "Focusing on positive":

- Do you know any celebrities who have ADHD?
- What have they accomplished in life?

Example of Richard Branson: has ADHD and Dyslexia (Specific Learning Disorder with Impairment in Reading): owns multiple companies, entrepreneur, influential business person, different way of working with staff and business, owns his own island and has been to space

What are some of the positive attributes you have discovered with your child? Shared with teacher: "25 things to love about ADHD" (see below)

Final session: Addition of:

1. **Celebrities with ADHD**

Michael Phelps

ADHD made schoolwork difficult for Phelps when he was little. He liked to move, acted up in class, and had a hard time getting his work finished. Phelps was diagnosed with ADHD at age 9.

"I [saw] kids who, we were all in the same class, and the teachers treated them differently than they would treat me," Phelps told People magazine. "I had a teacher tell me that I would never amount to anything and I would never be successful."

Medication made his symptoms better, but it was in the pool that Phelps found the ability to deal with his disorder. The routine of practice and the soothing effects of the water helped him to cope and excel.

“I think the biggest thing for me, once I found that it was okay to talk to someone and seek help, I think that’s something that has changed my life forever,” he says. “Now I’m able to live life to its fullest.”

At his retirement, Phelps was the most decorated Olympian of all time. He’s won 28 Olympic medals, 23 of which are gold.

Howie Mandel

This game show host and stand-up comedian is known for his vivacious personality as well as for his disorders. Mandel has both ADHD and obsessive-compulsive disorder (OCD). He grew up with these disorders during a time when they weren’t officially diagnosed or understood.

“Back in the 1960s, when I was growing up, my symptoms didn’t have a name and you didn’t go to the doctor to find out. So, in my case, they were called ‘Howie Mandel,’” Mandel wrote for Additude magazine.

Today, the “America’s Got Talent” host takes medication and attends therapy to help him deal with his disorders.

After I impulsively revealed that I have OCD on a talk show, I was devastated. I often do things without thinking. That’s my ADHD talking,” Mandel wrote. “Out in public, after I did the show, people came to me and said, ‘Me, too.’ They were the most comforting words I’ve ever heard. Whatever you’re dealing with in life, know that you’re not alone.”

Adam Levine

This Maroon 5 frontman and host of “The Voice” has come a long way to his success. He wrote for Additude magazine that as a kid, he struggled with what seemed normal to other kids — sitting still, completing work, focusing.

His parents helped him find treatment, but his problems with attention persisted into adulthood.

“I had trouble sometimes writing songs and recording in the studio. I couldn’t always focus and complete everything I had to. I remember being in the studio once and having 30 ideas in my head, but I couldn’t document any of them,” he wrote.

He went back to the doctor and learned that the ADHD hadn’t gone away as he’d grown up. In fact, he still deals with it daily.

“ADHD isn’t a bad thing, and you shouldn’t feel different from those without ADHD,” he wrote. “Remember that you are not alone. There are others going through the same thing.”

Justin Timberlake

Justin Timberlake, the multifaceted singer and actor, revealed in an interview with Collider.com that he has both OCD and ADD.

“I have OCD mixed with ADD,” he says. “You try living with that [combination].”

Since that interview, Timberlake hasn’t spoken about either of his conditions or how the two affect his day-to-day life. But the multiple Grammy and Emmy award winner has clearly found a way to manage his symptoms and live a fulfilling, highly successful life.

https://www.healthline.com/health/adhd/celebrities

will.i.am

The rapper says his music helps him deal with his ADHD. Plus, his mind is always moving and that's good for his craft, he says. He tells Britain's Sunday Mirror: "Those traits work well for me in studios and in meetings about creative ideas. … If I was stuck at a different job I'd be horrible and wouldn't survive. Music is my therapy. … Music keeps me sane and keeps my mind on something. It's fragile up there."

https://www.webmd.com/add-adhd/ss/slideshow-celebrities-add-adhd

Trevor Noah

Host of The Daily Show

When Jon Stewart retired from the Emmy and Peabody Award-winning The Daily Show in 2015, few people had heard of his hand-selected replacement, Trevor Noah. Today, the 38-year-old South African comedian is a household name — and an entertainment juggernaut in his own rite.

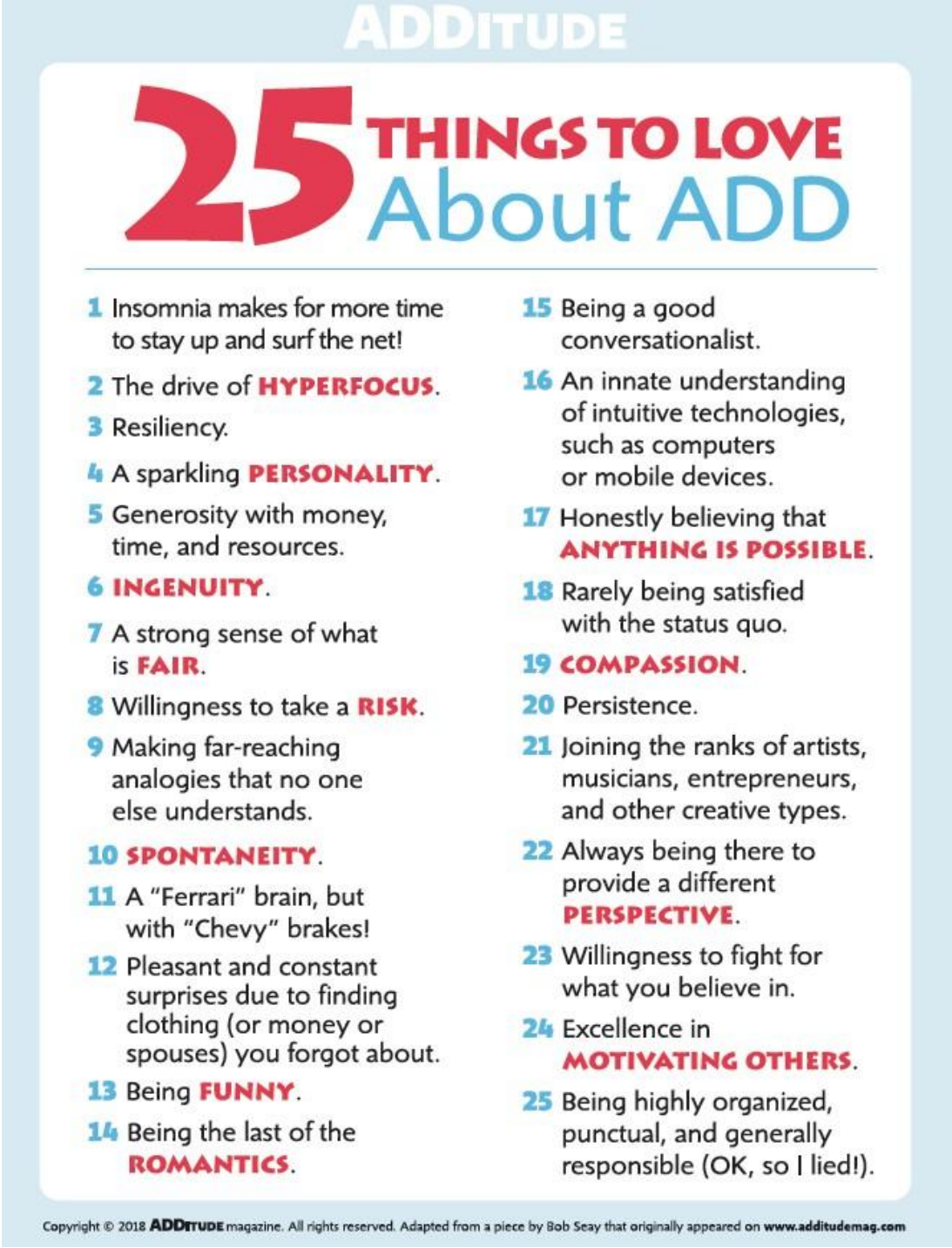
Aside from hosting the 2022 Grammy Awards, Noah has extended his Back to Abnormal comedy tour through 2022 and debuted his stand-up special Trevor Noah: Lost in Translation on Comedy Central. Rumors are also surfacing that he may take over for James Corden as host of The Late Late Show on CBS.

Noah also recently shared his personal struggle with ADHD and depression in a CBS interview with Leslie Stahl.

“What I've come to learn, thanks to some great therapists, is my depression is created by a severe level of ADHD,” Noah said. “If I'm not careful in how I sleep, how I eat, how I manage my routine, I can become overwhelmed and it can feel like the whole world is just too heavy to bear.”

https://www.additudemag.com/slideshows/famous-people-with-adhd/

2. **25 things to love about ADHD**



ADDITUDE

25 THINGS TO LOVE About ADD

1 Insomnia makes for more time to stay up and surf the net!

2 The drive of **HYPERFOCUS**.

3 Resiliency.

4 A sparkling **PERSONALITY**.

5 Generosity with money, time, and resources.

6 **INGENUITY**.

7 A strong sense of what is **FAIR**.

8 Willingness to take a **RISK**.

9 Making far-reaching analogies that no one else understands.

10 **SPONTANEITY**.

11 A "Ferrari" brain, but with "Chevy" brakes!

12 Pleasant and constant surprises due to finding clothing (or money or spouses) you forgot about.

13 Being **FUNNY**.

14 Being the last of the **ROMANTICS**.

15 Being a good conversationalist.

16 An innate understanding of intuitive technologies, such as computers or mobile devices.

17 Honestly believing that **ANYTHING IS POSSIBLE**.

18 Rarely being satisfied with the status quo.

19 **COMPASSION**.

20 Persistence.

21 Joining the ranks of artists, musicians, entrepreneurs, and other creative types.

22 Always being there to provide a different **PERSPECTIVE**.

23 Willingness to fight for what you believe in.

24 Excellence in **MOTIVATING OTHERS**.

25 Being highly organized, punctual, and generally responsible (OK, so I lied!).

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https://drblied.com/wp-content/uploads/2020/09/25-Things-to-Love-About-ADHD.pdf

Appendix W: Supplementary Tables

Table 29

Correlation between the number of sessions attended and the End of Intervention Parent Participant Rating Scale (N=16)

Variable	Number of sessions attended	
	r[a]	***p***
End of Intervention Parent Participant Rating Scale	-.388	.137

Note. [a]Spearman's rank-order correlation was conducted due to the violation of normality assumptions

Table 30

Correlation between the number of sessions attended and the End of Intervention Parent Participant Rating Scale (N=15)

Variable	Number of sessions attended	
	r[a]	*p*
End of Intervention Parent Participant Rating Scale	.598	.233

Note. [a]Spearman's rank-order correlation was conducted due to the violation of normality assumptions