

AN INVESTIGATION OF BEHAVIOUR MANAGEMENT STRATEGIES ON
LEARNERS WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER IN THE
CLASSROOM.

by

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I declare that **AN INVESTIGATION OF BEHAVIOUR MANAGEMENT STRATEGIES ON LEARNERS WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER IN THE CLASSROOM** is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

SIGNATURE

(MRS R WULFSOHN)

DATE

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ABSTRACT

Learners with Attention Deficit Hyperactivity Disorder (ADHD) traditionally display disruptive and other associated negative behaviour in the classroom setting. Behaviour management strategies utilised by the teacher in the school environment can assist in reducing this type of behaviour that impacts negatively upon their academic performance. This research study develops and investigates the effectiveness of a programme of practical behaviour management strategies designed to reduce disruptive behaviour of learners with ADHD in the classroom.

KEY TERMS

Attention Deficit Hyperactivity Disorder (ADHD); Behaviour management strategies; disruptive; behavioural intervention; classroom; hyperactivity; impulsivity; inattention; learners with ADHD; behaviour problems

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LIST OF ACRONYMS

ADHD	Attention Deficit Hyperactivity Disorder
CM	Contingency Management
ACTeRS-2	ADD-H Comprehensive Teacher Rating Scale – 2 nd Edition
DSM-IV-TR	Diagnostic and Statistical Manual of Mental Disorders 4 th Ed Text Revised
CTRS-R	Revised Conners' Teacher Rating Scale

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- Appendix 1 An example of the Consent Form signed by each learner and his parent.
- Appendix 2 Behaviour management strategies given to the learners.
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1 Chapter 1 Orientation

1.1 Background

Attention Deficit Hyperactivity Disorder or ADHD as it is commonly known is a neurological condition affecting children, adolescents and adults. The brain circuitry's failure to develop results in reduced monitoring of inhibition and self-control (US Department of Education 2003:1).

Focusing on the identification and treatment of Attention Deficit Hyperactivity Disorder, the most distinctive characteristics are seen as the deficits in both inhibitory control and behavioural inhibition. Learners with ADHD commonly display poor sustained attention and/or hyperactivity-impulsiveness. The resulting behaviour often appears to be purposeful non-compliance whereas it can be a manifestation of the disorder, which requires specific interventions.

The US Department of Education (2003:1) further unpacks Attention Deficit and Hyperactivity Disorder, explaining that learners with ADHD displaying hyperactivity will show excessive motor activity such as fidgeting and jumping out of their seats. Inattention displayed by learners with ADHD is reflected in their failure to attend to detail, their misplacing of items and their inability to sustain attention for the duration of a task. Impulsivity displayed by learners with ADHD includes the inability to regulate their behaviour resulting in their moving from task to task without completion of any one task and not waiting their turn in the answering of questions. These behaviours must be prevalent in two locations such as home and school, and be age-inappropriate, to warrant a diagnosis of ADHD (Ek, Fernell, Westerlund, Holmberg, Olsson & Gillberg 2007:756).

Learners' ADHD symptoms can be detrimental to their academic performance and impact upon the other children in the classroom (Junod, DuPaul, Jitendra, Volpe & Cleary 2006:88; Moonsamy, Jordaan & Greenop 2009:326). Their productivity in class can be impaired in terms of the amount of work they manage to complete as well as the accuracy

of that work (US Department of Education 2003:15). The fact that, to date, no permanent cure for ADHD has been discovered or implemented does not, however, mean that there are no effective treatment options available. According to Abramowitz and O'Leary (1991:229), behaviour strategies, medication and indeed multimodal methods are frequently inspanned to treat this disorder. For the purpose of this study, behaviour management strategies and their effects on learners in a classroom situation are to be investigated. Behaviour management approaches focus on the modification of both the physical and social environment, in order to change a learner's behaviour.

1.2 Analysis of problem

Analysing the problem begins with a growing awareness thereof. To explore the problem, a preliminary literature study will be done, culminating in the formulation of the problem statement, and research question.

1.2.1 Awareness of the problem

As school counsellor, I have many referrals of learners, every week, by staff complaining of the following:

- Learners' disruptive ways,
- Learners' inattention
- Learners' negative impact upon other members of the class.

Often, a poor academic record is also cited. Most of the learners being referred for counselling are found to be those already diagnosed as having ADHD, and who are often taking prescribed medication for the disorder each day. This behaviour leads to impatience, frustration and even anger in staff members who at times feel that they are making no progress academically, with learners exhibiting ADHD-type symptoms in a classroom situation.

When I contact the parents of these learners, they are usually aware of the poor academic performance and also often experience similar feelings towards their children, as those experienced by staff – particularly as regards homework. Thus, the main role players in the learner’s environment appear to share the frustration of handling the learner and are aware of the problems associated with academic learning.

As the number of cases being referred to me has remained consistently high over the past three years, research into the problem raised the possibility of utilising special management techniques on learners with ADHD, operating in a classroom environment. This study will entail establishing certain behaviour management techniques as practical strategies, to be utilised by the selected teacher on learners with ADHD in the classroom.

Resulting from this, the following questions arise:

- Which behaviour management strategies are found to be effective?
- What aspects of the classroom situation do they improve eg academics or adaptation to norms within the classroom?
- Are teachers able to sustainably harness behaviour management strategies in a classroom setting?

1.2.2 Investigation of the problem

The literature study will allow the exploration of the questions posed above. By focussing on behaviour management strategies - how they are implemented and what results have been shown to date – a clearer picture will emerge regarding their efficacy.

Firstly, an accepted premise of this study is that learners with ADHD are indeed posing a problem in a classroom setting. This belief is upheld by Pelham, Wheeler and Chronis (1998:190) “ADHD children and adolescents have serious impairments in many domains of functioning, including academic achievement and deportment in school...” More recently, Webb and Myrick (2003:108) describe the ADHD learner as problematic in a school situation, where there is a need for them to remain focussed and in-seat as a result of classroom rules and academic tasks. Moonsamy et al. (2009:326) refer to the poor

academic performance of learners with ADHD, citing cognitive processing deficits as a cause. Most recently, Erchul, DuPaul, Bennett, Grissom, Jitendra, Tresco, Volpe, Junod, Flammer-Riviera and Mannella (2009:29) have conducted extensive research based on documented evidence that learners with ADHD experience considerable difficulties that have vital educational implications. Based on this evidence, learners with ADHD can be seen to be struggling in multiple areas in the classroom setting.

Those suffering from ADHD battle with distractibility and impulsivity which can result in extremely disruptive behaviour in the two settings in which they spend most of their lives – at home and in the classroom. Gordon and Asher (1994:79) found that parents and teachers agree that this can impact negatively on family members and peers. Some problems are typically experienced in the classroom situation for learners with ADHD, where certain behaviours often contrast sharply with what is expected and acceptable within classroom parameters.

Loe and Feldman (2007:647) have noted that given the significant impact of ADHD on academic and educational performance, treatment plans should be developed in consultation with teachers and other educational staff. Similarly, Junod et al. (2006:88) have stated that attention and behavioural difficulties are known to seriously impair scholastic functioning among learners with ADHD. For these learners, academic success is unlikely. Research by Vanoverbeke, Annemans, Ingham and Adriaenssen (2003:79) suggests that the use of medication is usually the first treatment option, but it is often followed by a switch to behavioural therapy or, at least, combined treatment. Concannon and Tang (2005:625) assert that behavioural intervention has been under-utilised despite its documented positive role.

It is possible that many school problems experienced by learners with ADHD do not result solely from the biological factors underlying the disorder, but from a mismatch between the child and his environment. Pellegrini and Horvat (1995:15) have researched this ‘fit’ or lack thereof and have suggested that success or failure in the classroom setting depends largely on how well within-child variables interact with environmental variables.

Rather than assuming that the child is the problem and keeping in mind the fact that within-child variables are difficult to change, intervention programmes can alter environmental variables, attempting to meet individual learning needs. Evaluating the effects of behaviour management strategies could lead to the extension of current methods being used to alleviate the problems associated with learners with ADHD in the classroom. If behaviour management strategies prove to impact positively upon the classroom behaviour of learners with ADHD, they could serve as a useful addition to medication or possibly replace medication in some cases.

Studies comparing behaviour of learners during periods on and off behaviour therapy show the effectiveness of behaviour therapy (Pelham and Fabiano 2001:316). Research as early as 1996 reflects evidence of behavioural training, where teachers are taught child management skills which equip them to use direct teaching and reinforcement strategies. This has shown to engender positive behaviour and discourage inappropriate behaviour. Research by Gureasko-Moore, DuPaul and White (2006:160) has shown the current philosophy in the school system to be, that if learners with ADHD symptoms are properly medicated and participate in teacher-run contingency management programs, then their academic and social difficulties will largely correct themselves.

Behaviour modification techniques, according to Kirby and Kirby (1994:143) can be beneficial in improving behaviour of children diagnosed with ADHD. Also referred to as 'adjustments in environment' by Stevens (1997:187), strategies in behaviour management have been seen to counteract many of the problems associated with ADHD, such as inattention, impulsivity and social acceptance, at classroom level. With this in mind then, researching strategies in a classroom situation can lead to a better handling of ADHD learners in the educational context.

Research by Holz and Lessing (1999:237) further supports this premise by acknowledging that teachers' knowledge of the manifestations of ADHD will enable them to appreciate and accommodate the learners with ADHD in their classrooms by adapting their teaching programmes and methods. Research by DuPaul and Stoner (1994:5) into classroom behaviour problems commonly reported for learners with ADHD, has identified

difficulties in completing independent seat work, disorganized school materials, frequent out-of-seat behaviour and talking with classmates at inappropriate times.

Harlacher, Roberts and Merrell (2006:6) maintain that individualised school-based interventions are too time-consuming and taxing for the teacher, however, class-wide interventions targeting learners with ADHD may be an effective alternative. Other advantages include allowing the learners with ADHD to remain anonymous as well as allowing the performance of all students to be enhanced, with special reference to academic performance and behaviour.

Class-wide interventions can be categorised into academic and behavioural, for targeting academic deficits associated with ADHD as well as the behavioural manifestations of the disorder. Contingency Management (CM) is one such behavioural intervention which has produced positive results according to Harlacher et al. (2006:6-12). Defined as the application of consequences contingent on specified behaviours by Wolery, Bailey and Sugai (1988:494), this strategy involves positive reinforcement for particular, appropriate behaviours in order to increase their frequency. CM can involve learners earning tokens for specific behaviours that can in turn be exchanged for selected rewards that serve as greater reinforcers. Any subsequent removal of those tokens is contingent on inappropriate behaviour. Abramowitz and O'Leary (1991:221) have drawn conclusions from extensive research into CM that highlight class-wide interventions combining various strategies, as having the highest efficacy when promoting positive behavioural and academic performance. They, too, have focused research on classroom management strategies from contingent teacher attention, through classroom token economies to peer-mediated interventions.

This strategy can be widened to include an entire class's behaviour resulting in rewards for learners. Other disruptive behaviours associated with ADHD, like out-of-seat behaviour and talking out-of-turn have also been reported by Abramowitz and O'Leary (1991:221) to have decreased due to CM.

Academic performance including accuracy and task completion has also reportedly increased for the whole class, according to Trout, Ortiz Lienemann, Reid and Epstein

(2007:224). CM appears to enable a teacher to effectively manage a large group of learners at once, working to improve academic performance and to minimise disruptive behaviour in the classroom setting. Classroom interventions target areas like academic instruction, materials or the environment. The frequency with which learners with ADHD (Daly, Creed, Xanthopoulos and Brown 2007:77) struggle with academic achievement is correlated to the high incidence of learning disabilities these learners present with. Research shows that a majority of learners with ADHD, in fact up to eighty percent, present with learning problems (Trout et al. 2007:207). Webb and Myrick (2003:109) describe the learning skills of sustained attention, listening and the following of instructions that learners with ADHD lack, which are required for any form of academic achievement.

Other direct CM strategies include verbal praise, time-out and daily report cards which reflect a number of clearly defined, positive behavioural goals. Teachers utilize these behavioural modification techniques in the classroom setting due to their efficacy in targeting traditional areas of difficulty with ADHD learners.

A second classroom management technique which has reportedly been used successfully in manipulating behaviour is teaching learners the technique of self-management. This is a more individualised intervention which includes self-monitoring and involves agreement between learner and teacher, on certain learner behaviours up to a maximum of three that the learner must monitor, then evaluate and record. Similarly, the teacher rates the learner too and their evaluations are compared. Harlacher et al. (2006:8) have researched this classroom management strategy and found that, over time, a learner comes to report a rating that matches the reality of his/her behaviour. Learners might monitor, for instance, their increased time on-task, after which teacher and learner both independently rate the level of performance of that particular behaviour on a Likert scale. At this point, the teacher withdraws her input and the learner is left to independently self-monitor.

Another strategy, class-wide peer tutoring, has been shown by Harlacher et al. (2006:9) to demonstrate an increase in on-task time and an improvement in academic performance in learners with ADHD. This instructional manipulation strategy involves learners being paired up on an academic task, where each, in turn, provides assistance, instruction and

feedback to the other (Greenwood, Maheady & Carta 1991:179). Learners seem to benefit from the one-on-one method with immediate feedback. Spin-off from this intervention appears to be the promotion of pro-social behaviour. Peer relationships – the formation and maintenance thereof – also present potential stress for learners with ADHD. Evidence of difficulties in this realm is well-documented (Daly et al. 2007:78) and being paired with a ‘buddy’ has resulted in learners with ADHD demonstrating improved academic performance and enjoying higher-quality friendships. Similarly, task and instructional modification has also been found to target learners’ academic needs. It involves changes being made to an assignment as in formulating more frequent deadlines or modifications being made daily within the classroom setting. It can also increase opportunities for learners to make a choice between possible alternatives or substituting oral responses for written, formal responses. This strategy has been found to enhance the academic and behavioural performance of learners with ADHD.

There is no doubt that an holistic (multimodal) approach to the treatment for ADHD is needed (Sherman, Rasmussen & Baydala 2008:348), an essential part of which must be classroom management in the form of interventions as detailed in this literature search.

1.2.3 Problem statement

From my own work perspective, it is clear that learners with ADHD struggle to conform to behaviour considered appropriate and acceptable in the classroom setting. The learner often performs poorly, academically, and the class as a whole is often impacted upon negatively which leads to learners with ADHD being labelled and simply remaining a problem for themselves and others around them.

The preliminary literature study documents the use of behaviour management strategies in the classroom setting. Given the significant impact of ADHD on academic and educational performance generally, it is clear that classroom management of learners with ADHD is considered to offer the practical assistance that they require. Positive class-wide interventions include smaller class sizes, reduced distractions and increased choice-making as well as CM, self-management and peer tutoring, all of which could be beneficial to such children as a solution to their classroom-based difficulties.

The problem is that learners with ADHD experience both social and academic problems in the classroom. Teachers need strategies to overcome these problems in order to assist these learners to succeed in the classroom and to minimise any disruption to other learners. The question underpinning this research is:

‘Will a programme of behaviour management strategies used on learners with ADHD significantly reduce their disruptive and associated negative behaviour in the classroom?’

1.3 Aims of research

There is firstly a general aim relating to the findings of the literature study, followed by a specific aim of the empirical research undertaken.

1.3.1 General aim

The general aim of this research is to complete a literature study which will investigate behaviour management strategies used on learners with ADHD in the classroom setting. This will inform the subsequent process of designing a programme of effective and successful behaviour management strategies that can be used by teachers of ADHD learners in the classroom on a daily basis. To achieve this aim, the following questions are posed in order to direct this research:

- What is the nature of ADHD? (see 2.2)
- What problems are experienced (see 2.3)
 - by teachers associated with ADHD learners in an educational context?
 - by learners with ADHD in a classroom setting?
- Which behaviour management strategies (see 2.4)
 - have been utilized by teachers in the classroom situation?
 - have been found to be most effective?

1.3.2 Specific aim

The specific aim of this research is to develop a programme that will provide teachers with effective, practical behaviour management strategies to utilize on learners with ADHD in the classroom, on a daily basis. The programme will be explained to a selected teacher who will conduct learning in the classroom according to the strategies suggested. Members of the class including the learners with ADHD will be taught in an environment where specific behavioural management techniques are utilised each day. The programme sets out the researched interventions that are to be introduced. Furthermore, the programme will be applied to a number of learners with ADHD and the influence thereof determined. The Revised Conners' Teacher Rating Scale (CTRS-R) will be filled out for each ADHD learner before the programme begins and again after the programme has been running for a month, to evaluate the effects of the interventions used.

1.4 Research design

Durrheim (2002:30) describes a research design as an action plan which serves as a strategic framework linking the research question(s) and the execution of the research and ultimately providing answers to the former. The research question '**Will a programme of behaviour management strategies used on learners with ADHD significantly reduce their disruptive and associated negative behaviour in the classroom?**' reflects the focus of the research problem to be on the impact of behaviour management strategies on learners with ADHD in the classroom, given the behavioural, social and academic problems these learners experience.

1.4.1 Research problem and aims

The literature study is the first method of research used. As it is an investigation, existing strategies of behaviour management in the classroom are researched, as is the behaviour of learners with ADHD in a classroom setting, in line with the general aim of this study. The literature study is conducted using books, journal articles, self-help (support group) websites and articles from periodicals and as such is in a descriptive format. In

accordance with the specific aim of this study, a programme of behaviour management strategies will be formulated, based on research results. It will propose practical behaviour management interventions (the independent variable), to be utilised in the classroom by the teacher.

1.4.2 Formulation of hypotheses

Research indicates that attention, hyperactivity, social skills and oppositional behaviour are important and relevant aspects of behaviour exhibited by learners with ADHD in a classroom situation. Given that the primary goal of this research study is to determine the influence of behaviour management strategies on the behaviour of learners with ADHD, relevant hypotheses relating to these aspects of ADHD behaviour need to be formulated.

1.4.3 Research setting, paradigm and method

The setting for the study is a mainstream multi-cultural state boys' high school, utilising Grade 8 learners with ADHD.

The positivist paradigm, or theoretical framework, underpinning this research study is based on the empirical method of scientific research (Dash 2005). The existence of natural cause-effect laws and the belief that knowledge consists of verified hypotheses that can be regarded as facts or laws (Voce 2004) form the foundation of the positivist paradigm that informs this research study.

A quantitative empirical investigation will follow the literature study. Data will be collected by means of a one-group pre-test post-test design. This design will measure the dependent variable (behaviour of learners with ADHD in the classroom) firstly when no independent variable (the behaviour management programme) is present and subsequently after the intervention programme has been introduced. The researched interventions are predicted to alter behaviour positively in learners with ADHD, when utilised in the classroom by the teacher. The selected method of measurement for this research topic is the CTRS-R. The levels of disruptive and associated negative behaviour of each learner

with ADHD will be measured, in terms of raw scores which will then be plotted on the ADD-H Comprehensive Teacher Rating Scale - 2nd edition (ACTeRS-2) Profile, totalled under the categories of Attention, Hyperactivity, Social skills and Opposition, and their position in relation to the baseline score for that area determined.

Measures of the dependent variable (behaviour of learners with ADHD in the classroom) are compared for two different states of the independent variable, within the same group. Results obtained from this comparison will be tested for statistical significance. Chapter 3 details the research design in depth.

1.4.4 Data collection and sampling

The research study entails non-probability sampling (Strydom 2005:201) within two categories; firstly a teacher is required to apply the intervention and secondly, Grade 8 learners with ADHD are required to participate. The teacher will be required to acquaint herself with the behaviour management strategies which form the intervention programme to be utilised in the classroom when teaching the selected sample of learners with ADHD. Learners fulfilling the inclusion criteria (see 3.5.2) are approached, together with their parents, to gain permission for them to be part of this study.

1.4.5 Revised Conners' Teacher Rating Scale

The CTRS-R will be utilised as the instrument to measure disruptive and associated negative behaviour in the classroom. It is a questionnaire in the form of a rating scale for assessing the classroom behaviour of learners with ADHD.

The programme of behaviour management strategies will form the intervention when it is applied to the selected sample of learners with ADHD, in the classroom, for a period of a month. In response to learners exhibiting disruptive and associated negative behaviour symptomatic of ADHD, the teacher will respond with appropriate strategies as outlined in the intervention programme.

1.4.6 Validity and reliability

The CTRS-R is a commonly utilised tool in both research and clinical settings and will be tested for overall reliability. Furthermore, an attendance register will be kept as confirmation of administration of the intervention programme to the selected sample group.

1.4.7 Ethical considerations

The strict adherence to moral principles in empirical investigations is essential. A researcher's conduct and selected empirical strategies must be governed by ethics to ensure no harm to, or deception of, experimental subjects. Respect for confidentiality of participants and the responsibility of their restoration once the research is finished, in the form of a debriefing session, form part of the researcher's ethical obligations.

1.4.8 Analysis of data

Data in the form of raw scores obtained from the CTRS-R before and after the intervention is applied, will be compared. A statistician (Gerber 2009) will analyse the data using the SPSS programme to calculate the statistical significance of the results.

1.5 Significance of the study

Problems encountered by learners with ADHD in the classroom frustrate and hamper them and their teachers and impact upon peers in the classroom setting. Research outlines impaired academic performance as well as poor peer relationships as some of the outcomes learners with ADHD experience. This study aims to test the effectiveness of behaviour management strategies, in reducing the disruptive and otherwise negative behaviour commonly displayed by learners with ADHD in the educational setting. A programme of behavioural strategies, focussing on modifying the physical and social environment, if successful, could bring relief to learners with ADHD in the form of improved academic achievements as well as peer relationships, with a knock-on positive effect on other learners in the classroom.

1.6 Demarcation of the research

The disruptive and associated negative behaviour displayed by learners with ADHD in the classroom has been well-documented, as has the negative spin-off effect on their academic performance. While learners are generally diagnosed at primary school level or before, the problems associated with ADHD are often still apparent in adolescence. To this end, the study will be undertaken in a mainstream state boys' high school, using multi-cultural Grade 8 learners who have been diagnosed with ADHD.

Focusing on how behaviour management strategies can significantly reduce the disruptive and negative behaviour in the classroom setting, the investigation is aimed at developing a programme with effective, practical behaviour management strategies for everyday use in the classroom, by teachers of classes that include learners with ADHD. Regardless of the subject taught, basic behaviour management strategies, some of which are class-wide interventions, will be developed for use by the teacher, to improve classroom functioning of learners with ADHD.

1.7 Clarification of the concepts

Concepts used widely in this dissertation are defined as follows:

1.7.1 Attention Deficit Hyperactivity Disorder (ADHD)

ADHD is a neurological condition involving problems with inattention and hyperactivity-impulsivity that are developmentally inconsistent with the age of the child. A function of developmental failure in the brain circuitry that monitors inhibition and self-control, this loss of self-regulation impairs other important brain functions crucial for maintaining attention. ADHD children can also show excessive motor activity, which results in disruptive behaviour and is often perceived as purposeful non-compliance, while this may well be a manifestation of the disorder and may be in need of specialized interventions (US Department of Education 2003:1). According to Daly et al. (2007:73), ADHD is the most commonly diagnosed behavioural disorder of childhood affecting approximately 5%

of school-age learners in the USA – a chronic disorder that places learners at a higher than average risk for academic, behavioural and social difficulties.

1.7.2 Behaviour management strategies

Behaviour management strategies is a blanket term for a broad set of specific interventions that have a common goal of modifying the environment, both physically and socially, in order to alter behaviour (US Department of Education 2003:9). An example of this would be re-seating learners with ADHD in the front row of a classroom, removed from proximity to door or windows. Behaviour management strategies, as researched by Purdie, Hattie and Carroll (2002:67) use principles of reinforcement and punishment to reduce problematic behaviour and increase desirable behaviours, effectively establishing behaviours conducive to classroom learning.

1.7.3 Contingency Management (CM)

Contingency Management is the application of consequences contingent on specified behaviours or the provision of positive reinforcement for particular, appropriate behaviours (Harlacher et al. 2006:8) and the removal thereof for negative, inappropriate behaviours. An example of CM is giving learners who are on-task, the right to earn time to play a game.

1.7.4 ADD-H Comprehensive Teacher Rating Scale - 2nd Ed (ACTeRS-2) Profile

Working from the CTRS-R, totalled raw scores reflecting levels of behaviour with regard to Attention, Hyperactivity, Social skills and Opposition are plotted on the ACTeRS profile for each learner, producing an easy-to-interpret graphical display of the results. Significant correlation of these four sub-scales has been established (Erford & Hase 2006). The baseline score for each sub-section is clearly shown on the profile, as is the direction of problem behaviour.

1.8 Research programme

There are five chapters of this dissertation.

Chapter 1 introduces the subject of the research by giving background and stating the problem to be investigated. The research method and the outline of the research programme are included.

Chapter 2 provides an in-depth literature study, investigating behaviour management strategies used on learners with ADHD, in the classroom. The questions posed in the general aim of the research are answered, through findings in the literature search. Various behaviour management strategies for learners with ADHD are investigated for efficacy and success in daily implementation.

Chapter 3 expounds on the quantitative research design used in the empirical investigation. The research setting and method are explained as is the paradigm underpinning the study. The method of data analysis is discussed.

Chapter 4 is a description of the research findings. These results and the significance thereof are discussed.

A summary of the study including conclusions reached and any recommendations is provided in Chapter 5. Any information leading to possible further study and research opportunities is also discussed in this final chapter. Should any limitations of the study be discovered, these will also be highlighted at this point.

1.9 Summary

This first chapter has sketched the background of the problem before a formal statement of the problem was made and both general and specific aims were set. The research method was discussed, relevant concepts defined and a research programme was outlined.

In the next chapter, the literature study will investigate the classroom behaviour manifested by learners with ADHD. The consequences and strategies of management thereof will be explored and expounded on.

2 Chapter 2 Overview: ADHD learners' behaviour, consequences and management thereof, in the classroom

2.1 Introduction

This chapter provides a report on the literature study undertaken on ADHD, classroom behaviour of learners with ADHD, the outcome of this behaviour and behaviour management strategies.

2.2 The nature of ADHD

Attention Deficit Hyperactivity Disorder is described as a behavioural disorder characterised by three core symptoms: inattention, impulsivity and hyperactivity (Harlacher et al. 2006:6; Alloway, Gathercole, Holmes, Place, Elliott & Hilton 2009:353). Simplicio (2007:140) includes boredom with these core symptoms when describing the diagnostic label of ADHD. The Diagnostic and Statistical Manual of Mental Disorders: DSM-IV-TR (American Psychiatric Association, 2000) classifies ADHD under the subheading: Attention Deficit and Disruptive Behaviour Disorders, which are disorders in which children do not have adequate control over their thoughts, feelings and behaviour. Three subtypes of ADHD are recognised: predominantly inattentive, predominantly hyperactive-impulsive and a combined type.

Furthermore, the Diagnostic and Statistical Manual of Mental Disorders: DSM-IV-TR has established criteria to determine the presence of ADHD, according to a standardised clinical definition. Several characteristics need to be present in order for a clinical diagnosis of ADHD to be made. The US Department of Education (2003:3) cites the following criteria from the DSM-IV-TR as the standardised clinical definition to determine the presence of ADHD: severity of behaviour, early onset, duration of symptoms, impact on child's academic and/or social life and lastly, settings. According to DuPaul (2007:183), in order to meet DSM-IV-TR criteria, individuals must present with at least six inattention or at least six hyperactive-impulsive symptoms before the age of seven, for a minimum of six months in two or more settings, with concomitant academic

or social impairment. Although core symptoms affect attention, self-control and impulsiveness, displaying any of these symptoms does not necessarily imply the presence of ADHD (Holz & Lessing 2002:107). Research by Daly et al. (2007:73) indicates that ADHD is a chronic disorder with deficits in multiple areas of functioning where both cognitive and behavioural manifestations typically emerge during the childhood years (DuPaul & Weyandt 2006:172). ADHD is recognised by a persistent pattern of significant problems occurring more frequently than is typical, in the areas of attention, motor activity and impulsivity (Efron, Sciberras & Hassell 2008:187). Furthermore the transition into adolescence brings with it new sets of problems due to physical and social maturation and also possibly due to the fact that the use of medication has been shown to drop during this phase of development (Evans, Serpell, Schultz & Pastor 2007:257). The US Department of Education (2006:7) reports that the core symptoms of inattention, impulsivity and hyperactivity result in, among other things, immature behaviour that may have social consequences. Difficulties in romantic relationships, traffic violations and substance abuse are just some of the problems encountered by adolescents with ADHD (Huizink, van Lier & Crijnen 2009:1). According to Loe and Feldman (2007:645), the initial symptoms of hyperactivity, distractibility, impulsivity and aggression tend to decrease in severity over time, although more recent research (Sitholey, Agarwal & Tripathi 2010:692; Garnier-Dykstra, Pinchevsky, Caldeira, Vincent & Arria 2010:133) suggests that the impact of ADHD is felt even beyond adolescence into adulthood.

ADHD affects 3% to 6% of school-age children (Holz and Lessing 2002:103; Weber, Jourdan-Moser & Halsband 2007:1511). Behaviours are developmentally inconsistent with the age of the child, and ADHD affects children differently at different ages. Children can, in fact, exhibit a range of symptoms and levels of severity. As a function of their ADHD symptoms, learners with this disorder experience numerous difficulties within the school setting such as behaviour control and academic achievement (Barkley 2006 cited in DuPaul & Weyandt 2006:161). When behaviours associated with ADHD are exhibited by a child, the consequences thereof can include difficulties forming peer relationships if appropriate interventions aren't implemented (US Department of Education 2003:1-2). Maintaining friendships have also been found to be problematic (Hoerger & Mace 2006:147). Through research, Hoza (2007:102) has confirmed the peer rejection that children with ADHD often experience. In the classroom, distractibility and

excess motor activity combine to create a learner whose peer interactions are fraught with difficulty, primarily due to the high levels of verbal and physical aggression they often display (DuPaul & White 2006:58). In focusing on peer relationships of learners with ADHD, it appears that rejection is not the only issue. Their peer difficulties relate to both excesses of negative behaviour as well as deficits in social skills.

Research by Junod et al. (2006:88) suggests that scholastic progress is therefore impaired and ADHD learner relationships within the school situation are negatively affected due to the feelings of frustration and other negative emotions. Interplay between inattention, peer conflict and learning disabilities, amongst other factors, compromise learning for learners with ADHD (Efron et al. 2008:188). DuPaul and White (2006:58) document the significant academic difficulties experienced at school resulting in learners with ADHD achieving grades well below their potential. Closing the achievement gap for learners with ADHD is thus of critical importance, according to Jitendra, DuPaul, Volpe, Tresco, Vile Junod, Lutz, Cleary, Flammer-Rivera and Mannella (2007:218).

Understanding the nature of the three core symptoms characterising ADHD is vital. Focusing firstly on the inattention category, it becomes clear that learners with ADHD manifest problems such as giving and sustaining attention, when compared to learners of the same age without ADHD. This inattentiveness can be the cause of learning problems. In a school environment, they fail to complete work set and their organisation and processing of information is impaired. Forgetfulness, listening problems and inability to pay attention to detail are further signs of ADHD, as are classroom behaviour problems (Anhalt, McNeil & Bahl 1998:67). Scime and Norvilitis (2006:377) present findings showing that learners with ADHD have unique needs, such as the need to use coping skills when frustrated and to be able to work at a slower pace than other learners.

The difficulty these learners with ADHD face in maintaining on-task behaviour results in them producing poor quality work in the classroom if, in fact, they manage to follow through when given instructions (Harris, Friedlander, Saddler, Frizelle & Graham 2005:145). Moonsamy et al. (2009:327) describe the behaviour of learners with ADHD as shifting attention away from an assigned task to a competing task, as immediate gratification may be provided by the latter. This is supported by Antrop, Buysse, Roeyers

and van Oost (2005:64), who report that it is particularly in stimulus-rich settings that inattention is expressed by learners with ADHD.

Impulsivity is a second core symptom of ADHD and can be experienced as a learner's difficulty in delaying impulses, so that consequences are not considered before a course of action is taken. Impulsivity, possibly the defining characteristic of ADHD, is also described as behavioural disinhibition and results in poor planning and organisation (Moonsamy et al. 2009:327).

Hyperactivity is the third symptom, referring to excess and immature motor activity which is often highly inappropriate and more frequently expressed in settings that are stimulus-poor (Antrop et al. 2005:64). Impulsivity and hyperactivity are most often connected and these two core symptoms are more aversive and disruptive in nature than that of inattention, according to Graczyk, Atkins, Jackson, Letendre, Kim-Cohen, Buamann and McCoy (2005:96), who anticipate that learners with ADHD would be more challenging in the classroom setting than learners without ADHD. It is in situations that cause difficulties such as waiting, that learners with ADHD will exceed activity levels of non-ADHD learners (Antrop et al. 2005:63). Behaviour manifested by learners with ADHD that differentiates them from learners without ADHD includes negative vocalisations, gross motor movements and general level of activity (Lauth, Heubeck & Mackowiak 2006:386). Research by Parsons, Bowerly, Buckwalter, and Rizzo (2007:375) found learners with ADHD to exhibit more overall body movement than their peers without ADHD, and noted that increased hyperactivity in a learner resulted in greater inattention given to a task. This suggests that the core symptoms are in fact interrelated, which impacts in a complex manner on the behaviour of learners with ADHD. In general, these three symptoms combine and non-compliant behaviours are exhibited. Impulsivity in learners with ADHD often results in an immediate negative reaction, which translates into oppositional behaviour (Kapalka 2005:270).

The effects of ADHD on a learner's schooling are not limited to any of the symptoms mentioned above. Gordon and Asher (1994:82) as well as Adams, Finn, Moes, Flannery and Rizzo (2009:120) have suggested that there may be numerous associated problems. Often familiar topics in familiar settings involving repetition mean that tasks have lost their

novelty and the learner with ADHD compensates for boredom with maladaptive behaviour. DuPaul and White (2005:27) explain that organisational factors, like the nature of classroom tasks and the behavioural management style at school, affect the expression of this disorder. ADHD symptoms have been found to be significant predictors of concurrent and future academic difficulties. The difficulties experienced by learners with ADHD often result in lower than potential grades and less chance of their pursuing tertiary education. DuPaul (2007:184) concludes that learners with ADHD often experience poor educational functioning throughout their school career.

2.3 The behaviour of learners with ADHD in the classroom and its observed impact.

With ADHD being the most common psychiatric disorder among children, according to Sherman et al. (2006:196), there is a wealth of information available, much of it highlighting the challenges associated with the disorder. Statistics show that the classroom represents a primary setting where ADHD problems are recognised, as the school environment calls specifically for attention, learning and self-control (Lauth et al. 2006:388). Research thus highlights the classroom situation as a complex one for teachers and learners with ADHD alike (Gureasko-Moore et al. 2006:160). As learners diagnosed with ADHD are commonly placed in inclusive classes in general education settings, their struggle with inattention, hyperactivity, impulsivity and non-compliance, by necessity, must impact upon peers, teachers and not least, their own academic achievements.

Brown (2007:22) has found that for decades ADHD has been thought of as a cluster of behavioural problems and thus learners who cannot stop moving, talking or disrupting their class have been labelled as such by psychologists, educators and parents alike. However, ADHD is no longer regarded as a simple behavioural disorder as it affects the ability to attend to detail, to sustain or shift focus, to use short-term working memory, access recall and regulate processing speed. Derrington (2004:10) expounds on the difficulties ADHD learners have in using their working memory and believes it involves a problematic ability to hold information over a short time period. They are less able to use hindsight, also known as retrospective functioning, and foresight, also known as

prospective functioning. This results in an inability of learners with ADHD to adapt their actions relative to past errors or to read warning signs correctly.

Graczyk et al. (2005:95) has also stated that learners with ADHD often face their greatest challenges in the school setting, being three to seven times more likely than their peers to repeat years, be suspended or expelled. Junod et al. (2006:88) find academic achievement problems associated with ADHD to be non-specific and not confined to one particular subject area, like maths for example. Poor academic performance is frequently the outcome of ADHD and research by Daly et al. (2007:73) shows that both children and adolescents with ADHD are placed at higher than average risk of experiencing academic difficulties.

In the classroom, learners with ADHD battle to remain on-task. They frequently engage in disruptive off-task behaviour, exhibiting higher rates of gross motor activity, fidgeting, negative verbalisations, interference with others and aggression than learners without ADHD (Junod et al. 2006:89). It is these elevated levels of off-task behaviour that contribute significantly to their academic underachievement. Further to this, ADHD students are 2.5 times more likely than their peers to engage in off-task behaviour. The inattention component is reflected in learners' classroom behaviour as disorganisation of books and self, and in the losing of belongings. These learners' attention often wanders and they drift off into what appears to be a daydreaming state. Research has shown that these learners may even be distracted by their own internal thoughts (Derrington 2004:8). This 'tangential thinking', where thoughts spring from one topic to another, can lead to procrastination. Easily distracted by views through doors or windows or events, attention span is extremely limited for these learners. Derrington (2004:7) states that learners with ADHD basically lack focused attention. It is not that they are not attending, but that they are attending to everything. This also impacts upon their contribution to other learners during group work, as they lack the sustained focus needed to make a meaningful contribution to a group effort (Simplicio 2007:140).

Impulsive responses, like butting into conversations or finishing sentences for others, typify the communication style of learners with ADHD (Derrington 2004:9). Learners' impulsivity in the school setting is reflected in a learner with ADHD interrupting, talking

out of turn and starting work before the teacher has finished giving instructions (Holz & Lessing 2002:107). Derrington (2004:9) has found that impairment of the brain's executive functions, forethought and planning, and regulating impulsive responses is the cause of the ADHD learner's impulsiveness. In classroom settings, learners with ADHD often appear to act on a whim, without considering consequences and without learning from their past experiences. This impacts upon and highlights another area of difficulty - that of peer relationships. Social skills of learners with ADHD are often lacking and their peers are often critical of their behaviour, which is found to be rude and offensive (Daly et al. 2007:79). In class, learners are required to take part in frequent group work and those with ADHD have been described by peers as being overbearing, annoying and immature and are subsequently rated by peers as lower on social preference, are less well-liked and in fact, more often in the rejected social status category (Daly et al. 2007:79). The hyperactivity factor may lead learners to act as if a motor were driving them (US Department of Education 2003:1). Hoerger and Mace (2006:157) suggest that learners with ADHD fidget in the classroom to pass time more quickly, which for them, minimises the perceived delay. Further to this, research results support the fact that learners with ADHD who typically prefer a small reward after a short delay, present with increased gross motor behaviour in the classroom than those non-ADHD learners who prefer a large reward after a longer delay. Daly et al. (2007:73) have documented the impeding effect of ADHD on a learner's capacity to exercise age-appropriate inhibition on a cognitive task or in a behavioural setting.

Lauth et al. (2006:387) have found that there is more distracting of others, more self-stimulating behaviour like for example, singing and inappropriate attention-seeking, such as calling out to the teacher, to be found in a consistent pattern in the behaviour of learners with ADHD than in those without. It was further discovered that learners with ADHD can be clearly distinguished from their peers in the classroom by the frequencies of difficult behaviours that they display in class.

Research has identified a cognitive management system of the brain responsible for executive functioning. Six executive functions work together in various combinations to function in integrated and dynamic ways to carry out a variety of tasks (Brown 2007:24; Randall, Brocki & Kerns 2009:163). These consist of a self-regulatory action, memory

recall, modulation of emotion, regulation of sustained effort and processing speed, focus and organisation. Children with ADHD are substantially more impaired in their ability to utilise these executive functions than others of similar age and developmental level (Toplak, Bucciarelli, Jain & Tannock 2009:53). This is manifested in the school environment, by inability to cope with demands of study, poor classroom performance, incomplete homework tasks and problematic social interactions with peers and family (Brown 2007:24). Classroom behaviour problems, such as difficulties in completing independent in-seat work and talking with classmates at inappropriate times, are described as challenging behaviour, which is reported to put learners with ADHD at risk of significant difficulties in more than one functional area (Anhalt et al. 1998:67).

Research shows that learners with ADHD are less able to estimate time than other learners and battle with time management problems or 'time-awareness' (Derrington 2004:11). More often than not these learners do not complete assigned tasks by the due time or date. Thus, learners with ADHD have the tendency to move from one uncompleted activity or task to the next, they frequently make careless errors and work is of a variable standard and quality. This statement is supported by research showing that scholastic issues include inconsistent work production and low rates of academic engagement (Junod et al. 2006:88).

US Department of Education (2003:10) has found that problems of learners with ADHD are rarely limited to the core symptoms themselves. Certain disabilities appear to co-exist with ADHD more often than others, such as learning disabilities and disruptive behaviour disorders. Patterns of aggression as well as disruptive and inappropriate behaviour in a classroom setting can be the result of a learner manifesting ADHD.

Research by Lessing and Dreyer (2009:150) highlights the fact that teachers even battle to cope with problematic behaviour of learners without ADHD in their classrooms. The most common intervention strategy utilised for learners with ADHD is psychostimulant medication, despite the researched fact that 20% to 30% of learners experience unfavourable reactions (Trout et al. 2007:208). Furthermore, significant limitations of this treatment include the fact that teachers have very little control over who receives medication, levels of medication, the administration thereof or the adherence to

medication schedules (Trout et al. 2007:223). Thus the development of effective non-medical interventions that teachers themselves can implement is vital. In this research, the alternative interaction methods that have been suggested to maintain discipline in the classroom have been found to be effective. Palumbo and Sanacore (2007:67) discuss the efficacy of focusing on classroom management which will also assist mainstream learners to become academically engaged. Their research reflects a need to solve problems before they mushroom, in a classroom situation. Teachers dealing with learners with ADHD have therefore an even greater need to employ similar techniques.

2.4 Behaviour management strategies

Extensive research has shown a wide range of classroom interventions to be efficacious. Review of relevant literature has shown a variety of valuable intervention options available to teachers, with which they can address the needs of learners with ADHD in the classroom. Both individualised and class-wide interventions have been found to have favourable outcomes. Cole, Pelham, Gnagy, Burrows-MacLean, Fabiano, Chacko, Wymbs, Tresco and Walker (2005:105) show research results supporting the positive impact of behavioural interventions across a wide variety of learners. Behavioural strategies, according to Gordon and Asher (1994:78), form a systematic intervention through an approach that is logically connected to the perceived function of the target behaviour. Furthermore, they have found school interventions to be an essential component of any comprehensive treatment for ADHD. Simplicio (2007:140) reports that not all techniques are found to be successful or effective for all students in the traditional classroom setting. Niesyn (2009:227) suggests that teachers can be slow to implement behaviour management strategies as they believe these to be too time-consuming.

According to Purdie et al. (2002:67) behaviour management is the utilisation of interventions that use both the principle of reinforcement and punishment with the aim of increasing desirable behaviours and decreasing problematic behaviours. Providing learners with instruction and feedback for improving behaviours promotes socially acceptable behaviour (Franzen & Kamps 2008:150-151). Furthermore their research suggests that specific settings contain unique features in context that are believed to contribute to behavioural problems and thus support in specific settings is highly recommended. DuPaul

and White (2006:58) stress that rather than focusing on the ADHD-related behaviours, interventions need to focus on improving academic and behavioural functioning. The creation and maintenance of systems for the teaching of appropriate behaviour and the reduction of problem behaviours in separate settings has been found to be effective as a behaviour support strategy. Non-compliance being commonly displayed by learners with ADHD means that proper management to reduce the non-compliance is important when teaching (Kapalka 2005:270). Rules and classroom procedures often call for learners to be attentive and remain focused on scholastic tasks. Maladaptive and disruptive behaviour is also the product of learners with ADHD failing to adhere to classroom rules (Gordon & Asher 1994:83). Proper management of learners with ADHD in the classroom situation results in these learners making a real contribution instead of being a distraction or obstacle for the class.

Findings by Muscott, Mann and LeBrun (2008:190) indicate that school learners in general present a challenge to teachers with regard to problem behaviour. These behaviours interfere with the ability of teachers to keep order in the class and to proceed with tasks of an academic nature. The need to increase time on academic engagement and improve academic achievement applies equally to all learners (Muscott et al. 2008:191). Webb and Myrick (2003:108) and Girio and Owens (2009:17) display findings that reflect the fact that teachers often rely on the use of behavioural techniques to manage their learners. Many of the strategies that are successful for learners with ADHD are also useful in helping other learners, making class-wide strategies a viable option (DuPaul & White 2006:60). Reducing the frequency and complexity of learners' maladaptive behaviour patterns and, in fact, replacing these with appropriate behaviours is not, it seems, limited to teachers of ADHD learners only. Learners, in general, not obeying commands in the classroom - a behaviour frequently exhibited by learners with ADHD - is reported by Kapalka (2005:277) to be one of the most frustrating problems encountered by teachers. Simplicio (2007:141) advises the active involvement of learners with ADHD in lessons in a meaningful way.

In this literature survey, behavioural, cognitive-behavioural and educational interventions have been widely researched and specific interventions have been selected to form the basis of the intervention programme in this investigation. Behavioural interventions researched include CM, contingent teacher attention and classroom token economies. Cognitive-

behavioural interventions include self-management and the teaching of cognitive skills like problem-solving and self-instruction. Educational interventions are seen by Purdie et al. (2002:68) primarily as classroom academic management or the organisation of the actual learning environment. Peer tutoring is included as is instructional modification. These approaches generally use direct teaching, with reinforcement strategies for positive behaviours and direct consequences for inappropriate behaviour (US Department of Education 2003:9).

Research has widely shown that for academic progress as well as emotional well-being, effective interventions in the classroom setting are essential to target problem behaviours (Junod et al. 2006:88).

2.4.1 Behavioural interventions

DuPaul and White (2006:59) document the most effective intervention as including a balance between antecedent- and consequent-based procedures. Weyandt, Fulton, Schepman, Verdi and Wilson (2009:952) suggest a variety of strategies for the classroom success of learners with ADHD. These range from the provision of frequent feedback and the use of tasks which are action-oriented and require active response, to study skills programmes and positive reinforcement.

2.4.1.1 Contingency Management (CM)

CM has been found to be a very common behavioural intervention for learners with ADHD. Harlacher et al. (2006:8) describes CM as the application of consequences, both positive and negative, contingent on specified child behaviours. This approach positively reinforces appropriate behaviours in order to increase their frequency. Research by Gordon and Asher (1994:97) suggests that positive consequences can have a dramatic effect on the behaviour of learners with ADHD if it is immediate, frequent, salient and avoids habituation; so much so that their behaviour may become indistinguishable from those learners without ADHD. Consequences that have the potential to reinforce or strengthen desired learner behaviour must be identified. (Gordon & Asher 1994:98).

Teachers are encouraged to watch the everyday behaviour of learners with ADHD to discover which reinforcers or rewards learners with ADHD find motivating. Morisoli and McLaughlin (2004:101-102) suggest that as reinforcers tend to lose their reinforcing value quickly for learners with ADHD, teachers should strive to change these rewards frequently.

Negative consequences also form part of CM, although they should be implemented in conjunction with positive consequences as, in order to change behaviour, Gordon and Asher (1994:108) find that a reward intervention should precede a punishment intervention. This is because it is much more effective to integrate information about what is inappropriate with information about what is appropriate. Pelham, Burrows-MacLean, Gnagy, Fabiano, Coles, Tresko, Chacko, Wymbs, Wienke, Walker and Hoffman (2005:120) found that a comprehensive behaviour modification programme, with both reward and cost components, showed ADHD symptoms of learners to be significantly reduced in a classroom-based treatment programme.

CM operates in various ways such as providing contingent teacher attention, token economy and time-out. Abramowitz and O'Leary (1991:221) report contingent teacher attention as constituting the most universally utilised classroom management technique. Contingent teacher attention consists of the teacher praising appropriate behaviour while ignoring inappropriate behaviour (Lessing & Dreyer 2009:150). In any classroom situation, teachers usually give learners much verbal and non-verbal feedback. Pfiffner, DuPaul and Barkley (2005:563) suggest that consequences serve as frequent feedback, to assist the learner to maintain appropriate behaviour in the classroom situation. As long ago as 1968, Madsen, Becker and Thomas (1968, cited in Abramowitz and O'Leary 1991:221) have found that a combination of praise for appropriate behaviour and ignoring inappropriate behaviour could lead to the reduction of class disruptiveness. Overall, praise was found to be more effective than reprimands. Other subsequent studies have reported, however, that reprimands or other negative consequences are essential for successful behaviour management (Morisoli & McLaughlin 2004:103). Much research around contingent teacher attention has produced parameters for the successful use of reprimands. Immediate and consistent reprimands are more effective, as are short-phrased reprimands. In a similar vein, it is also mentioned that timing and strategic applications of

consequences are much more crucial to the management of learners with ADHD than learners without ADHD. This is in terms of reward as well as punishment – which should be swiftly conferred yet not harsh (Pfiffner et al. 2005:562). This source also highlighted the fact that delays in consequences undoubtedly degrade their efficacy for learners with ADHD. Hoerger & Mace (2006:148) as well as Mahone & Wodka (2008:276) document research results consistently showing that learners with ADHD prefer immediate rather than delayed rewards or reinforcement, compared to typically developing learners. Years ago, Gordon and Asher (1994:108-109) suggested that negative consequences be seen as a normal part of life that are impossible to avoid, and that children be allowed to learn through repetition of a certain behaviour and the ensuing consequences. They have also found that ignoring inappropriate behaviour, as a means to reducing it can result in the learner intensifying this behaviour. They further advise that acquiescing would teach the learner to be more persistent and thus more inappropriate. In more recent years however, research by Reiber and McLaughlin (2004:4) suggests caution in ignoring the learner's behaviour, warning against possible negative effects to the learner's self-esteem. This modern view supports consistent and calmly delivered consequences which are not personal nor delivered out of anger.

2.4.1.2 Token economies

Token economies are also widely used in the classroom situation, as a behavioural intervention. According to Harlacher et al. (2006:8), token economy is described as learners earning tokens for appropriate behaviours that can be exchanged for greater reinforcers also known as rewards. Reiber and McLaughlin (2004:6) explain classroom token economies as the presentation of tokens to learners, or the removal thereof, contingent upon their desirable or inappropriate behaviours. Essential to the use of a token economy is an identified relationship between tokens and backup reinforcers as well as clearly defined explanations as to how and when learners may exchange the tokens for these rewards. The tokens have value in that they can be swapped for a wanted object, an event or an activity on a pre-arranged basis. Examples of this are extra time on the computer, or a 'free' period on a Friday afternoon. Reiber and McLaughlin (2004:6) suggest that learners be involved in selecting the reward, as in that way they are more likely to work for something they are interested in. Gordon and Asher (1994:104) see the

tokens in a token economy in the light of purchasing privileges. Tokens may also, however, be lost when learners display inappropriate behaviours. Social reinforcement such as verbal praise or visible records of achievement may have a further impact on the efficacy of the token system (Daly et al. 2007:77).

Barkley (1997, cited in DuPaul & Weyandt 2006:164) has found that many behaviours exhibited by learners with ADHD appear to be caused by impaired, delayed response to environmental events, so token reinforcement earns learners immediate contingencies which frequently are necessary to effectively change behaviour.

Classroom token economy systems can be utilised as overall management approaches, encompassing any one of a variety of behaviours that needs to be encouraged, or discouraged, in the classroom situation. Token economies can be utilised for individual learners or as a group contingency where responsibility to others may further improve individuals' level of behaviour (Reiber & McLaughlin 2004:7).

2.4.2 Cognitive-behavioural modifications

Cognitive-behavioural approaches are grounded in the belief that learners must be taught to act as their own behaviour-change agents. Self-management revolves around learners recognizing their own behaviours and identifying which to repeat and which to minimise, by recording actual behaviour and setting behavioural goals. The rationale underlying this is based on the belief that behaviours and emotions are guided by a person's thoughts and are thus controllable. If learners are helped to change the way they think about tasks in the classroom situation, an improvement in their performance of tasks will follow (Cratty 2004:5). By focusing on his/her behaviour and monitoring it accurately, a learner with ADHD may reduce disruptive and other negative behaviour exhibited in the classroom. (Barry & Messer 2003:238-239). Cognitive-behavioural techniques involve changing thinking patterns which, in turn, results in self-control, a method endorsed by Cratty (2004:2). Several benefits emerge from researched self-management interventions (Gureasco-Moore et al. 2006:162; Niesyn 2009:230) with learners taking responsibility for their own actions. Less demand is placed upon teachers in the classroom environment as learners themselves are in control of the intervention. This has the added advantage of

having the potential to be generalised across classroom settings in the educational context, which could result in learners with ADHD utilising newly-learnt skills in new tasks and new situations.

In this self-management approach, learners are taught to use self-talk, self-monitoring and self-reinforcement to problem-solve and motivate themselves to develop self-control over their inattention and impulse behaviour problems. Research by Cratty (2004:5) supports the self-talk approach which is assumed, after repeated usage, to be internalised.

Work completion is an example of classroom behaviour that can be self-monitored (Reiber & McLaughlin 2004:9) and at particular times, the learner is required to rate such behaviours on a Likert scale, showing how well he/she performed the specified behaviour. This is compared to the teacher's independent rating, with the learner scoring points for matching his/her rating to the teacher's. As long ago as 1984, Christie, Hiss and Lozanoff (1984:404) found that individualized self-monitoring of learners with ADHD has returned positive results with increased time on-task and a reduction in inappropriate classroom behaviour. The effectiveness of implementing self-monitoring with gradual reduction of teacher prompts, as a behavioural strategy in a classroom setting, is supported by research carried out by Barry and Messer (2003:248)

Other cognitive skills include self-instruction and problem-solving, where learners are taught to follow a series of steps when planning a task. They may repeat instructions, describe a task to themselves, think about the consequences of a chosen approach and verbalise their plan. Performing the task, then reflecting and evaluating their progress is essential in this approach. The training process includes learning a step-by-step method of completing a task using repetition. Self-instruction techniques taught to learners with ADHD include them asking themselves questions such as 'what is the problem', 'what is the plan', 'am I following the plan' and afterwards, 'how did I do it' (Miranda, Presentacion & Soriano 2002:549). Teachers supervise learners in the self-instructional sequence until they are able to independently adopt the procedure. Morisoli and McLaughlin (2004:103) describe the ultimate goal of cognitive-behavioural training, for learners with ADHD, as the ability to identify an issue, choose a possible solution and consider possible consequences thereof.

2.4.3 Educational (academic) interventions

School can become an extremely challenging experience for ADHD learners. For some, it can become a battleground, as the core symptoms of ADHD - inattention, hyperactivity and impulsivity - result in learners finding the day-to-day rigours of school difficult and demanding.

US Department of Education (2003:13) has found that learners with ADHD are usually only identified as such after being noticed for their inability to comprehend or follow classroom rules, complete tasks or for their disruptive ways in the classroom environment. These issues are shown to go hand in hand with poor academic performance, including lower than average marks, failed grades and the inability to complete assignments. It is suggested by Junod et al. (2006:98) that it is the elevated level of off-task behaviour that learners with ADHD exhibit that contributes significantly to their chronic academic underachievement. Research shows that learners with ADHD are unable to attend to or finish academic tasks set, due to their disruptive and inattentive behaviour in a classroom setting. From this it can be inferred that ADHD learners will benefit from instructional strategies or activities that offer a greater potential to actively respond to academic material. DuPaul and White (2006:59) suggest that academic interventions be introduced as early as possible, given that learners starting school present with below-average skills. This provides support for the utilisation of peer-mediated strategies like peer tutoring. Pfiffner et al. (2005:551) argue that to ask the same academic skills of learners with ADHD as of those without ADHD places a significant burden on the former, in a classroom situation. ADHD symptoms can furthermore directly interfere with the process of learning.

Peer tutoring is an academic intervention involving two learners working together on an academic activity, where each learner provides assistance and instruction to the other, in turn. Target learners, who are paired by the teacher or individual choice, alternately tutor each other the curriculum materials with which they have been provided. The advantages are the immediate feedback and error correction the learner with ADHD receives, which would otherwise be difficult to provide, during whole-class instruction. Studies (DuPaul, Ervin, Hook & McGoey 1998:589; Niesyn 2009:229) have produced positive results in the

increased actively engaged time for learners with ADHD as well as the decreased off-task behaviour. In fact, the significant improvement in this area has been compared to the effects of stimulant medication, which is believed to be the most effective intervention for this disorder. This is a class-wide intervention which can benefit all the learners, not just those with ADHD. Class-wide interventions also have the advantage of not stigmatising the ADHD learner. Harlacher et al. (2006:11) have found class-wide interventions to impact significantly on both academic and behavioural difficulties. As a function of peer tutoring, both learners with ADHD and their peers without ADHD, showed increased active engaged time and increased weekly academic test marks (Daly et al. 2007:78). Positive changes for learners with ADHD in two spheres – classroom behaviour and academic performance - have similarly been documented by DuPaul et al. (1998:590).

Hoza (2007:102) highlights the additional dimension of the core symptoms of ADHD, hyperactivity-impulsivity and inattention, which make positive interaction with peers difficult. Overbearing and unrestrained social functioning often results in peer rejection of learners with ADHD (Da Fonseca, Segulier, Santos, Poinso & Deruelle 2009:111). Peer tutoring is a relationship within which both learners are of an equal status, thus offering opportunity for the development of skills critical to learners with ADHD, such as negotiation, co-operation and problem-solving.

Educational interventions usually consist of academic management in the classroom, the manipulation of environmental conditions such as antecedent events and establishing classroom rules. Antecedent interventions are attempts to change the environment for learners with ADHD so that desirable behaviours are more likely and inappropriate behaviours less likely to occur (Langberg, Epstein, Altaye, Molina, Arnold & Vitiello 2008:652). According to Gordon and Asher (1994:85), efforts are directed toward change before a problem arises, thus placing the emphasis on antecedent interventions rather than consequence interventions. For example, the learners' environment can be structured to accommodate their needs as children with ADHD in a classroom setting. They can be seated away from potentially distracting areas. Cluster seating is not recommended for learners with ADHD, in fact, front row seating will enable the teacher to best observe and monitor behaviour. Gordon and Asher (1994:87) suggest the learner with ADHD be surrounded by peers who behave appropriately and show a high rate of on-task behaviour.

Instructions should be given for one task or assignment at a time rather than for multiple tasks at once. More difficult work should be dealt with earlier rather than later in the day, if possible. With assignments, learners with ADHD can be given more frequent deadlines than their peers.

Gordon and Asher (1994:89) have researched a set of rules being established in the classroom. Rules show expectations, thus learners are clear on what is expected of them. Consistent application and enforcement of rules assists in encouraging learners to demonstrate consistent behaviour. Therefore, developing and enforcing classroom rules is especially important to the learner with ADHD. It is, in fact, an effective way to redress the disadvantages experienced by learners with ADHD as a result of their impaired functioning in the educational context. (Reiber & McLaughlin 2004:2; Niesyn 2009:230).

Research by DuPaul and Eckert (1997:5) supports the assertion that educational interventions are as effective as strategies of CM regarding the improvement of ADHD-related behaviours, although this does not automatically translate into improved academic performance. Purdie et al. (2002:67) assert that while the target behaviour is achievement, the focus behaviours are usually attention or some technique of behavioural management and it is often falsely claimed that improvement in the latter behaviours results in improvement in the former. What research has shown to be clear is that on-task, in-seat behaviours are essential for learners to achieve academically. DuPaul and White (2006:60) present researched findings that support the necessity of strategies to assist learners with ADHD to make academic progress and to learn self-control.

As teachers have more one-on-one contact with learners than any other school professionals, this makes them uniquely advantaged in being able to identify learners with ADHD as well as implement effective behavioural management interventions in the classroom situation. For teachers, knowledge of behaviour management strategies is thus crucial in the treatment of learners suffering from the most commonly diagnosed behaviour disorder of childhood, ADHD (Weyandt et al. 2009:960).

2.5 Programme of behaviour management strategies (compiled for this study)

There are a variety of practical strategies teachers can choose from and the programme outlining the behaviour management strategies to be used in this research project has been drawn from the literature study.

2.5.1 Introduction

According to Purdie et al. (2002:64), behaviour management is the utilisation of interventions that use both the principle of reinforcement and punishment with the aim of increasing desirable behaviours and decreasing problem behaviours.

This intervention programme includes behavioural, cognitive, educational and instructional modification management techniques. The teacher is tasked with consistently applying these specific strategies on learners with ADHD in the classroom environment, for a period of a month.

2.5.2 Behavioural interventions

CM is the application of consequences, both positive and negative, contingent on specified learner behaviours. The teacher will introduce the concept of a classroom token economy to the learners. Together, they are tasked with selecting rewards for which tokens may be exchanged. The teacher will then begin to employ reward and punishment interventions through the awarding and removal of tokens. By applying consequences as detailed below to positive and negative learner behaviour during lesson times for a period of a month, the teacher will attempt to bring about a change in behaviour. The *Do's* and *Don'ts* below are to be consistently applied by the teacher.

2.5.2.1 *Do's*:

- The teacher must reinforce appropriate learner behaviours such as in-seat, on-task and self-controlled behaviours immediately, consistently and saliently, to increase their frequency. This must be done utilising contingent teacher attention, tokens or verbal praise.
- She must establish a cost component for inappropriate behaviours such as inattention, excessive motor activity and impulsive verbalisations or gestures, that learners clearly understand.
- The teacher must reprimand learners immediately, consistently and in short phrases when necessary.
- She must remember that to change behaviour, a reward intervention should precede a punishment intervention.
- The teacher must observe over time which consequences are seen to be reinforcing, so that desired behaviours can be strengthened.

2.5.2.2 *Don'ts*:

- The teacher must not ignore inappropriate learner behaviour as this will intensify it.
- She must remain firm on important issues and not acquiesce as this teaches a learner to be more persistent and more inappropriate.
- She must never delay consequences in the classroom as timing is crucial for learners with ADHD.

2.5.3 Cognitive interventions

Cognitive-behavioural interventions focus on learners being taught to act as their own behaviour-change agents. The learners need to be taught to self-regulate their own behaviour. To encourage independence on the learner's part, the teacher must teach self-monitoring skills and the ability to problem-solve within the classroom situation, where possible. By consistently applying the *Do's* and *Don'ts* below, in the classroom, for the period of a month, learners are being taught to take responsibility for their own actions.

2.5.3.1 *Do's*:

- The teacher must let learners record and evaluate their own behaviour.
- This can then be compared to a similar evaluation done by the teacher.
- The teacher must constantly monitor learner behaviour such as work completion, remaining seated and not talking out of turn.
- She must let learners score points for matching their ratings positively with hers.
- The teacher must slowly fade out her own rating, in favour of learner self-monitoring.
- She must teach learners to plan a task using a series of steps. They may repeat instructions, think about consequences and verbalise their plan, as part of problem-solving.
- The teacher must supervise these sequences until learners independently adopt the procedure.

2.5.3.2 *Don'ts*:

- The teacher's delivery of contingencies must not suddenly be removed as the growth of independence on the part of the learner is a gradual process.

2.5.4 Educational interventions

Classroom academic management and the manipulation of environmental conditions form the basis of educational modifications. The teacher focuses on changing the environment for the learners, to accommodate their needs as children with ADHD in a classroom setting. Antecedent interventions are mainly utilised. She formulates a set of classroom rules to lend structure to the learning environment and restructures the physical classroom environment to prevent problems arising. The *Do's* and *Don'ts* below are implemented by the teacher for a period of a month, so as to make learners' desirable behaviours more likely and inappropriate behaviours less likely to occur.

2.5.4.1 Do's:

- The teacher seats learners away from potentially distracting areas in the classroom.
- She reseats learners with ADHD in the front row as far as possible, to be able to observe and monitor their behaviour.
- The teacher surrounds learners with ADHD with peers who behave appropriately, and show a high rate of on-task behaviour.
- She establishes a set of rules in the classroom from the start and ensures that learners understand what is expected of them.

2.5.4.2 Don'ts:

- The teacher does not wait for a problem to arise before making the changes.
- She must not be inconsistent when enforcing the classroom rules.
- The teacher must not allow off-task, out-of-seat behaviours.

2.5.5 Instructional modification

Peer-mediated strategies offer great potential for learners to actively respond to academic material. Peer tutoring allows this which would otherwise be difficult to provide during class-wide instruction. The teacher will pair each learner with ADHD with a peer who does not have ADHD, for academic tasks. The assistance and feedback from this instructional manipulation strategy can benefit learners in terms of academic performance, with improved peer relationships a spin-off of this intervention. The *Do's* and *Don'ts* below will be carried out by the teacher for a period of a month, in the classroom situation.

2.5.5.1 Do's:

- The teacher will selectively pair ADHD learners with non-ADHD members of the class.

- She will ensure that peer tutoring is a class-wide intervention, to benefit all the learners.
- The teacher will explain to the learners how peer tutoring will work, as well as the advantages of the assistance and instruction provided by one to the other.
- During academic exercises, learners will be allowed alternate turns for tutoring.
- The teacher will encourage immediate feedback and error correction by peers.

2.5.5.2 Don'ts:

- The teacher must not allow stigmatisation of the learners with ADHD.

2.6 Conclusion

Behaviour management strategies for use in the classroom vary. Manipulating environmental factors in the classroom and teaching learners with ADHD cognitive-behavioural skills are a few of the multitude of behavioural interventions widely available. Research shows many of these to be effective in encouraging appropriate behaviour and discouraging inappropriate or disruptive behaviour in the classroom. If utilising any or all of these strategies can assist learners with ADHD with any or all of the difficulties and problems which they face on a daily basis at school, it would be a win-win situation for all concerned – the teacher, learners with ADHD and their peers.

Chapter 3 explains the quantitative research design that is to be used in the empirical study.

3 Chapter 3 Research design

3.1 Introduction

Chapter 3 will describe the research design used in this study. The aims of this investigation as well as the methods used will be explained. Sample selection, the gathering of data and the analysis thereof will also be discussed herein. Issues that were considered with regard to conducting the research in an ethical and professional manner are presented. This empirical process will elicit information required to answer the research question posed: **‘Will a programme of behaviour management strategies used on learners with ADHD significantly reduce their disruptive and associated negative behaviour in the classroom?’**

3.2 Research problem, aims and rationale of the empirical research

It is widely recognised that learners with ADHD experience social and academic problems in the classroom, a situation with which teachers struggle on a daily basis. It is hypothesized that a programme of behaviour management strategies used on learners with ADHD will significantly reduce their disruptive and associated negative behaviour in the classroom.

The general aim of the research is to establish specific behaviour management techniques as practical strategies to be utilised on learners with ADHD in the classroom on a daily basis. The specific aim is to enable teachers of learners with ADHD to implement effective and successful behaviour management strategies in the classroom situation. Furthermore, the objective is to statistically test the hypotheses relating to the research question and the instrument of measure.

It is well-documented that medication alone does not cure the core symptoms of ADHD which are inattention and hyperactivity-impulsivity. As the school environment, particularly, requires attention, learning and self-control of its learners, the value of

behavioural interventions in addressing these problems experienced by learners with ADHD, should not be underestimated.

3.3 Hypotheses

Considering the literature reviewed in Chapter 2 as well as the primary goal of this research study which is to determine whether a programme of behaviour management strategies used on learners with ADHD will significantly reduce their disruptive and negative behaviour in the classroom, there are four relevant hypotheses that relate to aspects of ADHD behaviour.

3.3.1 Hypothesis 1

Behaviour management strategies will improve the attention of learners with ADHD.

Rationale: It is widely accepted that ADHD is characterised by inattention on the part of the affected learner. Inattention is described as difficulty in concentrating (DuPaul & White 2006:57). Derrington (2004:7) describes learners with ADHD as lacking focused attention. By focusing on their own behaviour and monitoring it accurately, Cratty (2004:5) suggests that learners can change their thinking patterns and thus act as their own behaviour-change agents through the use of self-management techniques. Managing behaviour of learners with ADHD in the classroom setting is attained by various means including allowing these learners to develop self-control over their inattention. Furthermore, research shows that teachers managing the classroom environment successfully can address faulty attention behaviours in students (Cratty 2004:8).

3.3.2 Hypothesis 2

Behaviour management strategies will reduce the hyperactivity of learners with ADHD.

Rationale: Hyperactivity is commonly accepted as one of the core symptoms of ADHD. Hyperactivity is often reflected in learners' excessive motor activity and excessive talking in the classroom. Applying consequences to disruptive behaviour in the classroom setting, is one way of decreasing instances of negative behaviour while increasing positive behaviour exhibited by learners with ADHD (Purdie et al. 2002:64). This technique is

known as CM, widely researched by Harlacher et al. (2006:8) who report its efficacy in the reduction of hyperactivity in the school environment.

3.3.3 Hypothesis 3

Behaviour management strategies will improve the social skills of learners with ADHD.

Rationale: The inability of learners with ADHD to forge and maintain peer relationships is well documented. DuPaul and White (2006:57) have researched the problematic interactions with their peers that learners with ADHD often experience and, to counteract this, have suggested peer tutoring as a behaviour management strategy in the classroom situation. The powerful impact of such an intervention is supported by Pfiffner et al. (2005:552).

3.3.4 Hypothesis 4

Behaviour management strategies will reduce the oppositional behaviour of learners with ADHD.

Rationale: Non-compliance is a common problem amongst learners with ADHD and is often expressed as general self-control problems, protesting, escalation of conflict or ignoring the authority figure (Kapalka 2005:271-272). Research shows that the three core symptoms of ADHD - inattention, hyperactivity and impulsivity - are interrelated resulting in immature behaviour which stems from learners with ADHD not having adequate control over their thoughts and feelings (US Department of Education 2006:7). Muscott et al. (2008:191) highlight the need to replace such learners' maladaptive patterns of behaviour with appropriate behaviour. CM, classroom rules and self-management techniques are all forms of behaviour modification investigated and suggested as class-wide interventions by Reiber and McLaughlin (2004:1).

3.4 Research setting, research paradigm and research method

Given that this study focuses on the influence of behaviour management strategies on learners with ADHD, the research will take place in the classroom setting. The paradigm underpinning the study will be discussed and the empirical research method explained.

3.4.1 Research setting

This study is to take place in a mainstream state boys' high school, using multi-cultural Grade 8 learners who have been diagnosed with ADHD, in inclusive classes. For the purpose of this research, the researcher has chosen to use the boys' high school in which she holds the position of School Counsellor, as a convenient sampling. This position gives her access to vital information, supplied by primary school confidential reports or in some cases, reports from paediatricians or general practitioners, on file for each learner indicating whether that learner has, in fact, been diagnosed with ADHD. In this way, she is able to identify all Grade 8 learners who have been diagnosed with ADHD.

3.4.2 Research paradigm

A paradigm can be defined as a theoretical or interpretive framework which orientates one's thinking, fundamentally influencing how one views the world. A paradigm thus provides a basis for choices made in research such as methods and design, methodology and literature (Mackenzie & Knipe 2006:193). Terre Blance and Durrheim (2002:6) describe paradigms as systems that define the nature of the researcher's enquiry along the dimensions of ontology, epistemology and methodology. They further explain that ontology refers to the reality that is going to be studied, epistemology describes the nature of the relationship between the researcher and the knowledge and methodology explains the practical way the researcher can study that which he or she believes can be known. Furthermore, three of the more common theoretical paradigms are positivist, interpretive/constructionist and critical theory.

The positivist paradigm is based on the empirical method of scientific research (Dash 2005) and the belief that an objective reality governed by unchangeable natural cause-effect laws exists. In this paradigm, it is also believed that knowledge consists of verified hypotheses that can be regarded as facts or laws (Voce 2004).

The interpretive/constructionist paradigm is based on the belief that reality is subjective. Knowledge is thus personally experienced rather than being acquired (Voce 2004). Dash (2005) states that the interpretive/constructionist paradigm is concerned with the meaning that is made in people's lives from the process of understanding and interpreting phenomena.

Voce (2004) suggests that the critical theory paradigm views reality as governed by conflicting and underlying social, political, cultural, ethnic, gender and economic structures. Knowledge, which is constituted by the lived experience, is believed to be dispersed and distributed.

A holistic approach to treatment of learners with ADHD is the tenet upon which the study is based. There is no permanent cure for ADHD and medication alone is insufficient, in many cases, to raise the learner with ADHD to the same level as peers without the disorder, academically and behaviour-wise. As it is believed that biological factors alone are not the sole cause of the disorder, and that a mismatch between learner and environment also contributes to the problem, a behavioural approach to treatment is needed, where classroom management plays a major role.

A positivist paradigm underpins this study, searching for causal relationships through an objective and methodical process of inquiry and investigation into an existing situation in order to provide a solution (Voce 2004).

The nature of reality, according to the chosen positivist paradigm, consists of pre-existing patterns that can be discovered. In this study, it is assumed that there is at least one learner with ADHD to be found in every classroom. Positivism asserts that a theory can thus be tested in a controlled setting to support or falsify hypotheses. In this research, the management of behaviour through the utilisation of a programme of behaviour strategies

is hypothesised to be critical in the reduction of disruptive and other negative behaviours that learners with ADHD commonly display in a classroom situation. It is the correlation between these variables that is empirically analysed in this investigation. As people under certain conditions will probably engage in specified behaviour, the results can be generalised to a large group of people. The positivist paradigm supports the belief that the same cause will have the same effect on everyone (Voce 2004).

3.4.3 Research method

This will be a quantitative study. Quantitative studies can be defined as an inquiry into a social or human problem, the basis of which is the testing of a theory consisting of variables which is measured by numbers and finally analysed with statistical procedures so that it is possible to predict and control human behaviour (Fouche & Delpont 2002:79). Rudestam and Newton (2001:32) warn against the tendency that researchers have, in over-emphasizing statistically significant findings whilst under-emphasizing clinically or socially significant findings. They also focus on the object of research being the ability to make meaningful inferences about behaviour rather than to achieve statistical significance.

The researched interventions are predicted to successfully alter behaviour positively in learners with ADHD, when utilised by the teacher in the classroom. A pre-experimental design (Fouche & de Vos 2002:139) is followed where a one-group pre-test post-test design is envisaged for the research. This design, as explained by Fouche and de Vos (2002:144), firstly measures the dependent variable when no independent variable is present, in a pre-test. Thereafter, the independent variable - the treatment - is introduced, followed by the measurement of the dependent variable in the post-test. Strydom (2005:145) summarises descriptions of the single-system design, known as single subject research. The single subject can describe an individual or a group such as a family or an organisation. In this study, the single subject is the sample group of Grade 8 learners with ADHD. The dependent variable of behaviour is measured by the teacher, using the CTRS-R before and after the intervention. The independent variable, or intervention, is a programme of practical behaviour management strategies that has been developed through an extensive on-topic literature study, and suitable methods, as described in Chapter 2,

will be used in this research. The one group design can be used efficiently to evaluate the effectiveness of a treatment intervention (Strydom 2005:145).

3.5 Data collection and sampling

The choice of data collection method for this study is the CTRS-R. The research entails non-probability sampling (Strydom 2005:201) in two categories, firstly a teacher who is prepared to intervene and secondly, learners with ADHD who are willing to participate. The selected teacher will be provided with twenty copies of the CTRS-R for the pre- and post-tests that need to be administered on a selected sample of learners with ADHD in the classroom setting. These will be retrieved by the researcher, for scoring purposes.

3.5.1 Selection of teacher

Purposive sampling (Strydom 2005:202) was applied as a teacher who teaches Grade 8 learners is needed to conduct the intervention programme in the classroom. For the purpose of this research, a member of staff has been identified as having the ability to conduct the intervention programme in her classes, where 10 learners with ADHD, scattered throughout four class groups, will be targeted, in order to ascertain the effectiveness and success of the programme. The teacher (Mrs M) has been approached and has agreed to be introduced to the behaviour management techniques that are to be utilised in the classroom.

In one-on-one sessions with the researcher, the teacher will be tutored in the application of the programme. As she is an experienced teacher who has regularly taught classes containing one or more ADHD learners, she is capable, firstly, of identifying symptoms of inattention, hyperactivity, impulsivity and non-compliance as exhibited by learners with ADHD. Secondly, she is willing to apply selected strategies appropriate to the situation, taken from the intervention programme. The learners attend two subjects taught by her - Computer Literacy (twice a week for a total of 100 minutes) and Life Orientation (50 minutes once per week).

3.5.2 Selection of learners with ADHD

Purposive sampling (Strydom 2005:202) was applied in the selection of learners with ADHD. Inclusion criteria for the sample of learners to be drawn from this population are that the selected educator (Mrs M) teaches them for, at minimum, 150 minutes a week. From this population 10 participants, across 4 class groups have been selected. They, together with their parents, were approached to gain permission for them to take part in this study. The intervention programme of basic behaviour management strategies, some of which are class-wide interventions, will be explained to the participants. Participants are assured that they may withdraw from the study at any time and that any information collected from the study will be confidential, following which they will be asked to sign their agreement to involvement in the study.

3.5.3 Revised Conners' Teacher Rating Scale (CTRS-R)

The CTRS-R is an instrument using observer ratings to routinely assess Attention Deficit Hyperactivity Disorder in children and adolescents. The test items define four scales: Attention, Hyperactivity/Impulsivity, Social skills and Opposition. There are twenty-four statements to which the teacher, observing learners in the framework of a consistent and normative classroom setting, responds on a five-point scale. The CTRS-R is a commonly used tool to measure disruptive and associated negative behaviour in a classroom situation for research and clinical purposes (Conners, Sitarenios, Parker & Epstein 1998:279; Deb, Dhaliwal & Roy 2008:950) and has thus been selected to measure the behaviour of the sample at the beginning of the project and again after the intervention has taken place. These raw score totals are transferred to the ACTeRS-2 profile, in a graphic representation of the results. Their proximity to the baseline score, representing levels of behaviour that are considered consistent with that of learners with ADHD, is measured in each of the four areas tested. This widely used scale is built on more than 30 years of research into psychopathology of children and adolescents.

3.5.4 Intervention

The intervention programme of behaviour management strategies (see 2.5) will be applied to the sample of ADHD learners in the classroom for a period of a month. During this time, Mrs M will keep an attendance register. In her classes, she will apply appropriate behaviour management strategies as outlined in the programme, in response to ADHD-type symptoms such as excess motor activity, inattention or negative spin-off that might impact on other class members.

Mrs M will complete the initial filling out of the CTRS-R for each learner in the sample, prior to applying the intervention programme. The CTRS-R will be filled out again by the teacher, which will provide the researcher with the measurement and quantification of the behaviour of the learners with ADHD, after they have undergone the intervention programme.

3.6 Validity and reliability

The CTRS-R is a commonly used research and clinical tool for assessing learners' behaviour in the classroom. This scale is a recognised measurement instrument with a large normative database to help support the instrument's reliability. The measurement characteristics as well as the administration and scoring of the scale will be as in the standard use of the CTRS-R.

During the month within which the intervention will run, learners are assumed to be present in Mrs M's classes for a minimum of 150 minutes per week. To ensure reliability, Mrs M will make use of an attendance register in each lesson, to confirm administration of the intervention to the listed participants.

3.7 Ethical considerations

Strydom (2002:63) defines ethics as being a set of widely accepted moral principles, offering rules and behavioural expectations governing the most correct conduct such as

treatment of experimental subjects and respondents by researchers. Rosnow and Rosenthal (2005:60) understand the term ethics to mean values which evaluate a researcher's conduct and their chosen empirical strategies. The researcher needs to be aware of the general agreement about what is proper or improper in scientific research. She must be capable of ethical decision-making in a responsible manner.

3.7.1 Harm to experimental subjects and/or respondents

It is important to be aware that subjects can be harmed physically and emotionally when taking part in a study. Rudestam and Newton (2001:265) define one of the main ethical issues in social science research as the need for subjects to emerge unharmed from the experience. The researcher is ethically obliged to protect respondents from any such harm and this goes further than simply attempting to repair or minimise any harm afterwards. Strydom (2002:64) highlights the fact that it is extremely difficult to predict and then eliminate all harm that may come to subjects during an investigation. Subjects have the right to be briefed completely, regarding the potential impact of the investigation. They also have the right to back out of the investigation if they so choose.

3.7.2 Informed consent

At the start of the study, the informed consent of all the subjects must be obtained (this implies that all potential information from the objective, the course of study, advantages, disadvantages and even dangers to subjects, has been shown to respondents or those legally representing them). Rudestam and Newton (2001:271) highlight the importance of ensuring that a participant who may experience pressure to participate, explicitly understands that the decision to participate or decline to participate will be confidential. Strydom (2002:65) underlines the need for information to be both accurate and complete, to ensure full comprehension of subjects, enabling them to make an informed decision regarding their co-operation in the investigation. The participants must be fully aware of the demands the investigation will make of them in terms of time, what they are expected to do and any confidential information they will be expected to disclose. It is noted, however, that despite this, all possible problems cannot be seen ahead of time. Researchers must therefore deal with unforeseen issues that arise in an ethically correct way.

3.7.3 Deception of subjects/respondents

Rudestam and Newton (2001:266) define the most controversial type of research design as one that utilises concealment or deception. Deception of subjects can be intentional or that which the researcher was not aware of. Deception includes withholding information, misrepresenting facts or offering incorrect information. According to Strydom (2002:67), deception must not be inflicted on the subjects and should it occur inadvertently, should be immediately rectified, either during or after the debriefing session. Deception constitutes an ethical problem in science, with one view being that deception in any form is morally wrong while some argue that special circumstances do arise where deception is necessary to ensure the integrity of significant data (Rosnow & Rosenthal 2005:71).

3.7.4 Violation of privacy/respecting the privacy of research participants

Researchers have a vital responsibility to protect the privacy and identity of subjects. Privacy refers to the element of personal privacy, while confidentiality refers to the careful management of the often sensitive information that has been collected during the study. The right of respondents to privacy and confidentiality can be violated in numerous ways and this must be safeguarded against. Both these elements are interlinked and thus scientific sampling must be used to ensure privacy of subjects. This ensures that no subject is included in the investigation merely because the researcher knows or does not know the person. It also rules out particular persons being selected or deselected for reasons of convenience. Hidden apparatus such as one-way mirrors, concealed cameras or microphones can compromise privacy and confidentiality of subjects, so should never be used without first obtaining permission of subjects. The more sensitive the information or the more hidden the manner of information gathering, the greater the researcher's obligation to safeguard the subject. Violation of subjects' privacy can result from interview questions or questionnaires which deal with confidential and private information not usually discussed in public. This can affect respondents negatively with regard to feelings of guilt and anxiety. It is of significance to note that anonymity of subjects when giving information ensures their privacy. Rosnow and Rosenthal (2005:68) conclude that not requiring any personal information that could identify participants in any way automatically protects them. Rudestam and Newton (2001:272) explain the concept of

anonymity as distinct from confidentiality. Anonymity protects the identity of the subject and no-one, including the researcher, will know the identity of that subject, whereas confidentiality means that the subject's identity will be preserved by the researcher.

3.7.5 Actions and competence of researchers

Researchers have an ethical obligation to ensure that they are competent to carry out their investigation. They need to be sufficiently skilled to deal with potentially sensitive investigations and are ethically bound to ensure that they are sufficiently proficient in relevant experience and qualifications, to undertake their specific study. If this is not the case, the research study could fail or produce invalid results. Strydom (2002:69) expounds on the importance of a competent researcher not making value judgments about the actions or points of view of the respondents, even if they conflict with those of the researcher. Respect across cultural boundaries must also be practised by researchers.

For the empirical research that is pertinent to this study, the researcher has appropriate teaching experience, counselling experience and has extensively researched ADHD and behaviour management strategies. In this way she is competent to score both the pre-test and post-test as well as develop the intervention programme of behaviour management strategies that form an integral part of this investigation.

3.7.6 Release or publication of findings

Ethical guidelines apply throughout the research process, including the writing up of results (Rosnow & Rosenthal 2005:78). The researcher has an ethical obligation to keep the investigation proceeding correctly and to ensure that no one is deceived by the findings. Strydom (2002:71) emphasizes the importance of an accurate and objective report on findings.

To be viewed as research, findings should always be released in writing available to the reading public. The ultimate findings from this particular research must be clear so that

teachers who may implement the strategies, have a good understanding of what they are implementing.

3.7.7 Restoration of subjects or respondents

The researcher has a duty to the subjects once the research is completed. Debriefings are considered ethically essential unless the nature of the study deems it impossible or inadvisable (Rosnow & Rosenthal 2005:74). Any misperceptions that the participants may have must be corrected by the researcher in a debriefing session.

During this interview, anything that may have been withheld from the subjects must be made known to them. Strydom (2002:73) describes a research project as a learning experience for both participant and researcher. Feedback itself, according to Rudestam and Newton (2001:273), needs to be in language directed at the lay individual and general enough to be informative yet not harmful. Participants need to receive summarized data rather than any individualized test results.

3.8 Analysis of the data

Fouche & Delport (2002:79) have researched the meaning of quantitative studies and define this as an inquiry into a problem either social or human which has as its base a theory composed of variables to be tested. This is then measured with numbers and analysed statistically to investigate whether generalisations of the theory hold true. Quantitative research is also described as the encompassment of procedures and techniques that result in observed data being recorded in a numerical form (Rosnow & Rosenthal 2005:86). Data obtained from filling in the CTRS-R before and after the intervention programme will be compared.

Data analysis will be carried out by a statistician (Gerber 2009) to calculate the statistical significance of the results. The quantitative data will be analysed by computer, using the SPSS programme. Analysis entails the summarising and manipulation of data into an

interpretable form. This enables the data to be explained in order to establish answers to research questions (Kruger, de Vos, Fouche & Venter 2005:218).

3.9 Conclusion

Chapter 3 outlined the research design utilized in this research project. The research methods were clearly explained as were the data collection, sample selection and choice of instrument. Ethical responsibilities were also considered, particularly as the participants were minors.

Chapter 4 will present and discuss the results and findings from the statistical analysis of the data collected.

4 Chapter 4 Results and discussion of results

4.1 Introduction

In this chapter, the results measuring the effectiveness of the intervention programme of behaviour management strategies applied in the classroom during the test period, will be presented and discussed. The literature study is used to construct the behaviour management programme used in the intervention and the empirical study is used to test its degree of success.

The CTRS-R is used to provide behavioural scores for each learner with ADHD, before and after the intervention, which are compared for change. Changes are calculated, analysed for statistical significance and discussed in terms of the impact of these results.

4.2 Research problem and hypotheses

The research problem that this study is empirically investigating is as follows: **‘Will a programme of behaviour management strategies used on learners with ADHD significantly reduce their disruptive and associated negative behaviour in the classroom?’** The CTRS-R which was selected to measure the disruptive and associated negative behaviour indicates four areas of behaviour, namely Attention, Hyperactivity, Social skills and Opposition. In order to test the formulated hypotheses (see 3.3), four null hypotheses were formulated and tested statistically.

The analysis of the results will answer the question of whether such a programme of behaviour management strategies can, in fact, significantly reduce the disruptive and associated negative behaviour of learners with ADHD in the classroom.

4.3 Analysis of raw scores

The raw scores obtained have been compiled from 24 questions comprising the CTRS-R and totalled for the four areas: Attention, Hyperactivity, Social skills and Opposition. These scores are presented for each of the learners in the tables 4.1, 4.2 and 4.3 below.

4.3.1 Baseline scores

In each of the four areas of Attention, Hyperactivity, Social skills and Opposition there is a baseline score unique to each area, above or below which the learner is classified as displaying distinct ADHD symptoms such as inattention, hyperactivity, poor social skills and non-compliance that constitute disruptive and negative behaviour. This baseline score is below 16 for Attention, above 16 for Hyperactivity, below 21 for Social skills and above 14 for Opposition. According to whether learners' individual scores fall, either below or above the baseline score in each of the four areas, their behaviour can be categorised either as consistent with ADHD, uncharacteristic of ADHD or as borderline.

In the area of Attention, the higher the learner score between 16 and 30, the greater the sustained attention levels displayed. In Hyperactivity, the lower the score between 5 and 16, the less inappropriate and impulsive movement is exhibited. In Social skills, the higher the score between 21 and 35, the greater the exhibition of successful peer relationships and social skills. In the area of Opposition, the lower the score between 6 and 14, the more compliant the behaviour exhibited by learners. The exact level at which each learner actually operates with regard to Attention, Hyperactivity, Social skills and Opposition can be measured by the proximity of their individual score to the baseline in each of the four areas.

4.3.2 Test scores obtained before the intervention was applied

The pre-test results yielded a score for each learner in each of the four areas commonly characterising ADHD behaviour (as presented in Table 4.1). For each individual, scores differed in each area according to their unique mix of ADHD characteristics and the

operating levels thereof. Each learner in the sample, however, had one or more score out of the four areas that, when compared to the baseline score for that area, confirmed the learner to be suffering from ADHD.

Table 4.1 - Pre-test raw scores

Sample	Attention	Hyperactivity	Social Skills	Opposition
Baseline score	>16	<16	>21	<14
Lowest possible score	6	5	7	6
Highest possible score	30	25	35	30
Appropriate Behaviour	16 → 30	5 ← 16	21 → 35	6 ← 14
Learner A	17	21	18	23
Learner B	7	19	15	19
Learner C	14	5	19	6
Learner D	19	22	21	24
Learner E	19	19	16	6
Learner F	24	18	23	7
Learner G	13	5	11	6
Learner H	13	20	15	18
Learner I	26	10	11	7
Learner J	27	16	19	6
Total	179	155	168	122
Mean	17.9	15.5	16.8	12.2
Median	18	18.5	17	7
Range	20	17	12	18
Number of learners not meeting baseline	4	6	8	4
Number of learners above mean	5	7	5	4
Number of learners above median	5	5	5	4

4.3.2.1 Pre-test scores for attention

As learners with ADHD commonly display deficits in sustained attention, in the pre-test it is anticipated that scores for Attention will be in the low range (below the baseline score of 16) where 6 is the lowest and 30 the highest possible score on the CTRS-R. The closer the scores are to 6, the greater the learner's off-task behaviour in the classroom.

The range of pre-test scores is 20 out of a possible range of $(30-6 =) 24$, indicating a wide range of sustained attention amongst learners, with the lowest score being 7, the highest being 27 and the other eight learners' scores falling in between. The mean of 17.9 reflects that the average learner whose score falls above the baseline score of 16, shows sustained attention levels not characteristic of learners with ADHD. This is similarly shown by the median of 18, falling marginally higher than the mean score.

While four learners' scores fall below the baseline score of 16 (**bolded** in Table 4.1), displaying a level of off-task behaviour commonly displayed by sufferers of ADHD, the majority of the learners in this sample (6) display a level of sustained attention in the classroom with three out of these six displaying a high level of sustained attention.

4.3.2.2 Pre-test scores for hyperactivity

Hyperactivity scores are expected to be high (above the baseline score of 16) for those learners with ADHD who display deficits in inhibitory control. In this area, 25 is the highest and 5 is the lowest score possible to attain on the CTRS-R. The closer the scores lie to 25, the greater the excessive motor activity and other impulsive behaviour displayed in the classroom.

The range of pre-test scores is 17, out of a possible range of $(25-5 =) 20$, showing a wide range of degrees of hyperactivity between the most hyperactive learner who scored 22 and the two least hyperactive learners in the sample that scored 5. The mean pre-test score of 15.5 reflects that the average learner score falls just below the baseline score of 16, reflecting borderline levels of hyperactivity. The median of 18.5 shows a level of hyperactivity commonly associated with ADHD.

Six learners' scores fall above the baseline score of 16 (**bolded** in Table 4.1), clearly displaying the impulsivity and high degree of motor activity that characterises learners with ADHD in the classroom. Four learners' scores in the sample do not reflect the excessive movement and impulsivity common to learners diagnosed with ADHD. Two of these learners' scores, while indicating low hyperactivity (5), however show inability for sustained attention (13, 14), which may be an indication of withdrawal or daydreaming.

4.3.2.3 Pre-test scores for social skills

Pre-test scoring of Social skills is expected to be low (below the baseline score of 21), as is consistent with learners with ADHD whose disruptive behaviour in a classroom serves to disadvantage them in peer relationships. The lowest possible score is 7 and 35 is the highest score possible to attain on the CTRS-R. The closer the score is to 7, the less functional the peer relationships exhibited.

The range is 12 out of a possible range of $(35-7=) 28$. The difference between the highest score (23) and the lowest score (11) within the sample group, indicates a narrow range of levels of positive socially interactive behaviour. The pre-test mean score of 16.8 translates into the average learner score falling below the baseline score of 21, reflecting the unsuccessful social interactions characteristically exhibited by learners with ADHD. The median of 17 supports this premise.

Eight of the learners' scores fall below the baseline level of 21 (**bolded** in Table 4.1), clearly demonstrating their unsuccessful relationships with peers in the classroom environment. The remaining two learners' scores reflect positive socially interactive behaviour not consistent with that of chronic ADHD sufferers.

4.3.2.4 Pre-test scores for opposition

Disruptive and associated negative behaviour resulting from ADHD, often appears to be purposeful non-compliance, yet it is a manifestation of the disorder. In the area of Opposition, it is anticipated that pre-test scores will be high (above the baseline score of

14), where 30 is the highest and 6 the lowest possible score, on the CTRS-R. The closer to 30 the scores of the learners lie, the less compliant they are found to be in the classroom situation.

The range of scores in this area is 18 out of a possible range of $(30-6=)$ 24, showing a wide range of levels of learner opposition where 24 is the highest and 6 the lowest score. The pre-test mean of 12.2 reflects that the average learner score falls below the baseline score of 14, showing compliant learner behaviour in the classroom setting that is not characteristic of learners with ADHD. The median of 7 highlights the low level of non-compliance within the learner sample.

Four learners' scores fall above the baseline score of 14 (**bolded** in Table 4.1), consistent with the non-compliance commonly displayed by learners with ADHD while the other six learners in the sample returned scores that reflect compliant behaviour not consistent with that characteristic of learners with ADHD.

4.3.3 Test scores obtained after the intervention was applied

The post-test results yielded a score for each learner in each of the four areas. This score had the potential to be higher, lower or the same as the pre-test scores, as a result of the intervention programme.

Realising a higher score in the areas of Attention and/or Social skills in the post-test, would indicate improved behaviour in these two areas after the intervention was introduced. If a lower score was attained, this would indicate that on-task focus and successful peer relationships respectively had decreased after the intervention had taken place. No change in score in these two areas would indicate that the intervention had no effect on learners' sustained attention and/or socially interactive behaviour.

A lower score obtained in the post-test, in the areas of Hyperactivity and Opposition would indicate increased levels of in-seat and compliant behaviour respectively. An increase in scores would reflect an increase in excessive motor activity and non-compliant

behaviour in the classroom setting. No change in score from pre-test to post-test would be indicative of a lack of effect of the intervention on learners' behaviour.

Table 4.2 - Post-test raw scores

Sample	Attention	Hyperactivity	Social Skills	Opposition
Baseline Score	>16	<16	>21	<14
Lowest possible score	6	5	7	6
Highest possible score	30	25	35	30
Appropriate Behaviour	16 → 30	5 ← 16	21 → 35	6 ← 14
Learner A	17	22	21	23
Learner B	11	11	18	13
Learner C	28	5	28	6
Learner D	19	15	26	15
Learner E	26	15	26	6
Learner F	29	10	23	6
Learner G	23	5	19	6
Learner H	20	20	30	6
Learner I	28	5	16	6
Learner J	27	7	26	6
Total	228	115	233	93
Mean	22.8	11.5	23.3	9.3
Median	24.5	11.5	24.5	6
Range	18	17	14	17
Number of learners not meeting baseline	1	2	3	2
Number of learners above mean	6	4	5	3
Number of learners above median	5	5	5	3

4.3.3.1 Post-test scores for attention

The intervention programme targeted deficits in sustained attention, through the use of techniques to improve on-task behaviour, thus it is anticipated that post-test scores for Attention increase compared to pre-test scores. The closer the scores are to 30, the highest possible score, the greater the learner's ability to remain on-task in the classroom.

The range of post-test scores is 18, out of a possible range of $(30-6=)$ 24, indicating a range of sustained attention skills, from the lowest score of 11 to a high of 29. The mean of 22.8 reflects that the average learner score in this sample falls well above the baseline score of 16, showing sustained attention levels not consistent with those of learners with ADHD. The median at 24.5 is slightly higher, supporting these findings.

Although one learner's post-test score falls below the baseline of 16 (**bolded** in Table 4.2), nine out of ten learners in this sample reflect a level of ability to remain on-task that is superior to typical levels of inattentiveness commonly displayed by learners with ADHD in the classroom.

4.3.3.2 Post-test scores for hyperactivity

Hyperactivity post-test scores are expected to decrease, compared to pre-test scores, due to behavioural strategies introduced in the intervention programme that target excessive motor activity and out-of-seat behaviour. The lower the scores are below 16, the baseline score, the less the excessive motor activity and other impulsive behaviour displayed in the classroom setting.

The range of post-test scores is 17 out of a possible range of $(25-5=)$ 20, showing a wide range of degrees of hyperactivity between the most hyperactive learner scoring 22 and the least hyperactive learner in the sample scoring 5. The mean post-test score of 11.5 falls well below the baseline of 16, reflecting that the average learner exhibits levels of hyperactivity and impulsivity that are well below that commonly expected of learners with ADHD in a classroom setting. The median of 11.5 supports these findings.

Although two learners' scores fall above the baseline of 16 (**bolded** in Table 4.2), classifying them in the ADHD range in terms of their impulsivity and high degree of motor activity, the other eight learners' scores reflect behaviour that is uncharacteristic of learners with ADHD in the classroom setting.

4.3.3.3 Post-test scores for social skills

Post-test scores for Social skills are expected to increase, as the intervention programme offers corrective measures for addressing disruptive behaviour in a classroom setting that serves to disadvantage learners with ADHD in peer relationships. The further learner scores are from the lowest possible score of 7, the less the disruptive behaviour and associated poor peer relationships displayed by learners with ADHD.

The post-test range is 14 out of a possible range of $(35-7=)$ 28, indicating no extremely high or low scores within the sample group. The post-test mean score of 23.3 plots the average learner's score above the baseline of 21, not consistent with the problematic social interactions displayed by learners with ADHD. The median of 24.5 further supports this.

Three learners' scores fall below the baseline level of 21 (**bolded** in Table 4.2), clearly demonstrating their unsuccessful interactions with peers in the classroom environment while the majority of learners in the sample (7) returned scores that categorise their behaviour at a level superior to that characteristic of learners with ADHD.

4.3.3.4 Post-test scores for opposition

Non-compliance in the form of disruptive and associated negative behaviour, is a manifestation of the disorder that the intervention programme is designed to address. In the area of Opposition, it is thus anticipated that post-test scores will decrease. The closer learners' post-test scores lie to the lowest possible score of 6, the more compliance they display in the classroom situation.

The range of scores in this area is 17 out of a possible range of (30-6=) 24, showing a sizable difference between the highest and lowest scored level of learner opposition at 23 and 6 respectively. The post-test mean of 9.3, falling well below the baseline of 14 reflects learner compliance on the whole, rather than opposition levels characteristic of learners with ADHD in the classroom. The median at 6 reinforces these findings.

Two learners' scores fall above the baseline of 14 (**bolded** in Table 4.2), consistent with the non-compliance commonly displayed by learners with ADHD, while eight out of the ten learners in the sample returned scores that fall outside the range associated with the oppositional behaviour traditionally exhibited by learners with ADHD in the classroom setting.

4.3.4 Comparison of raw data of pre- and post-tests

The intervention is designed to impact upon the characteristics of inattention, hyperactivity, poor social skills and non-compliance displayed by learners with ADHD. The histograms for each of these areas (Figures 4.1, 4.2, 4.3 and 4.4) compare the pre- and post-test scores, after the programme of behaviour management strategies has been applied.

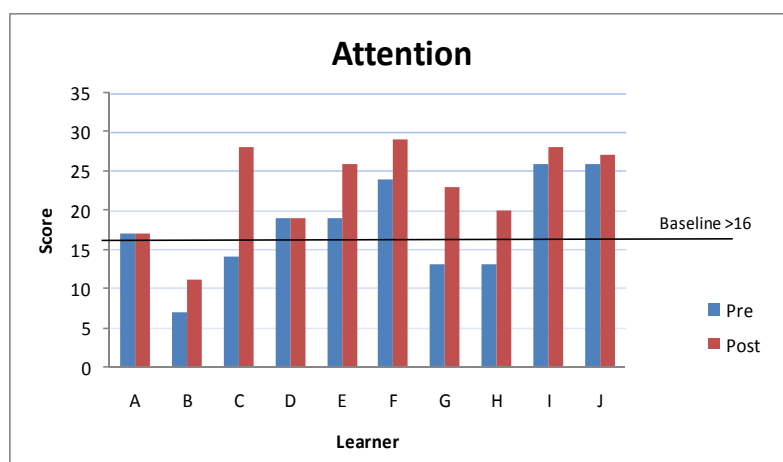


Figure 4.1 Histogram of pre- and post-test scores in attention

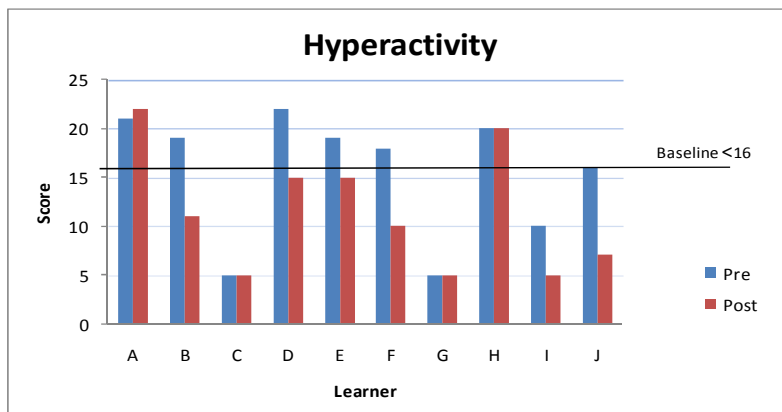


Figure 4.2 Histogram of pre- and post-test scores in hyperactivity

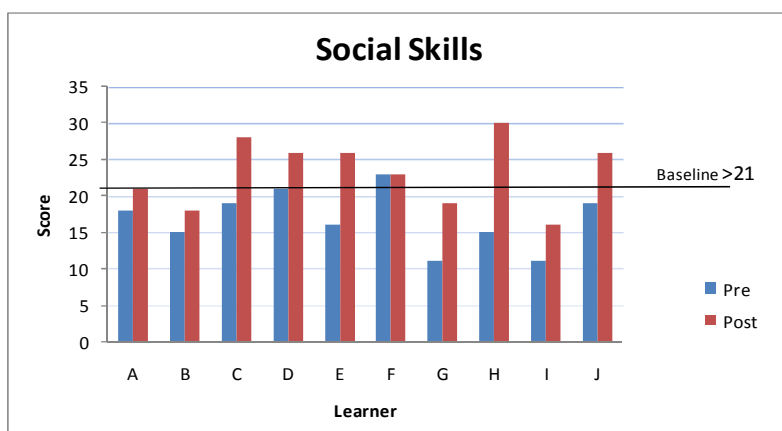


Figure 4.3 Histogram of pre- and post-test scores in social skills

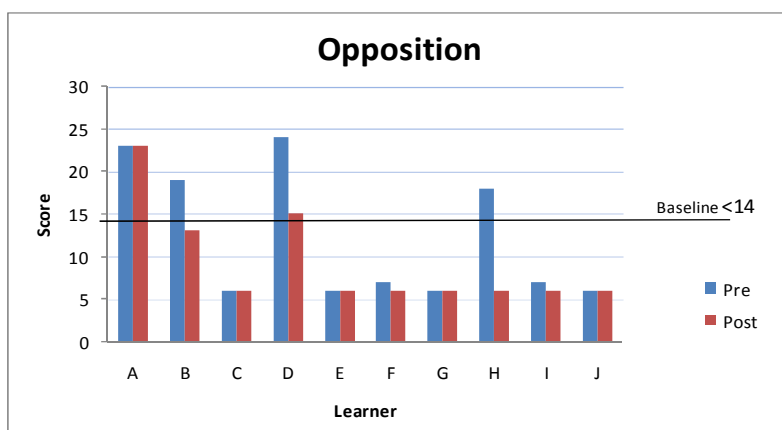


Figure 4.4 Histogram of pre- and post-test scores in opposition

A holistic picture of the learners with ADHD can be formed using the pre- and post-test data for Attention, Hyperactivity, Social skills and Opposition. Table 4.3 sets out a summary of this data for comparison.

Table 4.3 - Pre- and post-test raw scores

Sample	Attention		Hyperactivity		Social Skills		Opposition	
Baseline score	>16		<16		>21		<14	
Lowest possible score	6		5		7		6	
Highest possible score	30		25		35		30	
Appropriate Behaviour	16 → 30		5 ← 16		21 → 35		6 ← 14	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Learner A	17	17	21	22	18	21	23	23
Learner B	7	11	19	11	15	18	19	13
Learner C	14	28	5	5	19	28	6	6
Learner D	19	19	22	15	21	26	24	15
Learner E	19	26	19	15	16	26	6	6
Learner F	24	29	18	10	23	23	7	6
Learner G	13	23	5	5	11	19	6	6
Learner H	13	20	20	20	15	30	18	6
Learner I	26	28	10	5	11	16	7	6
Learner J	27	27	16	7	19	26	6	6
Total	179	228	155	115	168	233	122	93
Mean	17.9	22.8	15.5	11.5	16.8	23.3	12.2	9.3
Median	18	24.5	18.5	11.5	17	24.5	7	6
Range	20	18	17	17	12	14	18	17
Number of learners not meeting baseline	4	1	6	2	8	3	4	2
Number of learners above mean	5	6	7	4	5	5	4	3
Number of learners above median	5	5	5	5	5	5	4	3

4.3.4.1 Analysis of pre-test to post-test change in scores

The changes in scores from the pre-test (Table 4.1) to the post-test (Table 4.2) have been calculated. In reading these results it should be noted that positive changes in Attention and Social skills scores reflect improved levels of behaviour, whereas conversely, in the areas of Hyperactivity and Opposition, negative changes in scores reflect an improvement in behaviour. Regression in a score from pre to post intervention is highlighted in red in the summary which is presented below in Table 4.4.

Data in the form of changes that have occurred in scores from pre-test to post-test, needs to be interpreted. This is to present an overall picture of the results in terms of the hypotheses which are testing for significance of the efficacy of the intervention programme of behaviour management strategies in the areas of attention, hyperactivity, social skills and opposition. Selected statistical techniques are explained and applied in 4.4.

Table 4.4 - Pre- to post-test change in scores

Sample	Attention	Hyperactivity	Social Skills	Opposition
Appropriate Behaviour	16 → 30	5 ← 16	21 → 35	6 ← 14
Learner A	0	1	3	0
Learner B	4	-8	3	-6
Learner C	14	0	9	0
Learner D	0	-7	5	-9
Learner E	7	-4	10	0
Learner F	5	-8	0	-1
Learner G	10	0	8	0
Learner H	7	0	15	-12
Learner I	2	-5	5	-1
Learner J	0	-9	7	0
Total	49	-40	65	-29
Mean	4.9	-4.0	6.5	-2.9

The total and mean changes in learners' scores for each of the four test scales show that the intervention has produced results indicating an improvement in some learners' focus and on-task behaviour, their social interactions with peers, compliance in the classroom situation, and reduced motor activity and impulsiveness; although the magnitude of the improvement varies. It is observed that not all learners are impacted upon equally.

On the whole, an improvement was noted within the sample of ten as two learners' (B and D) scores improved in all four areas tested, four learners (D, E, F and H) exhibited an improvement in three out of the four areas targeted and three learners (C, G and J) returned improved scores in two of the areas targeted. One learner's (A) behaviour improved in one of the areas targeted and it is noted that this learner regressed marginally in the area of Hyperactivity (highlighted in red in Table 4.4). The statistical significance of the observed changes are analysed below.

4.3.4.1.1 Changes in attention

In the pre-test data (Table 4.1), in the area of Attention, the minimum and maximum scores are 7 and 27, giving a range of 20. After the intervention (Table 4.2), as anticipated, these metrics increase with the minimum and maximum scores rising to 11 and 29. The minimum score increases by more than the maximum score i.e. 4 points versus 2 points, thus the range decreases to 18. The pre-test mean score is 17.9 and rises by 4.9 to a post-test score of 22.8.

The changes described above show that after the intervention, the levels of on-task behaviour of learners at the bottom end of the scale have increased more than those of learners at the top end of the scale. The average learner's on-task behaviour has increased and can be plotted even higher above the baseline score of 16, than it was pre intervention.

An improvement is noted in the area of Attention, as seven out of the sample of ten learners showed positive changes post intervention. Four learners produced pre-test scores reflecting sustained attention levels below the baseline score of 16, yet post intervention, only one learner's score remained at a level considered to be consistent with the off-task behaviour characteristic of ADHD learners. A further three learners who initially scored above the baseline score of 16 produced still higher scores post-test, implying a class-wide benefit to the introduction of the intervention programme in terms of improved on-task behaviour of all learners in the classroom setting.

4.3.4.1.2 Changes in hyperactivity

In the pre-test data (Table 4.1) we find a minimum and maximum score for Hyperactivity of 5 and 22, giving a range of 17. After the intervention (Table 4.2) there was no change in the minimum and maximum scores. The minimum score of 5 is the lowest score possible in this area, denoting a lack of hyperactivity or impulsivity in learners. Two learners scored 5 in the pre-test and, not unexpectedly, as there was little room for improvement, there was no change in this score in the post-test results. The mean score decreased by 4 points to 11.5 in the post-test, which plots the average learner's level of hyperactivity and

impulsivity well below the baseline of 16 compared to the borderline levels plotted using the pre-test mean.

Six learners in the sample of ten produced pre-test scores above the baseline of 16, reflecting excessive motor activity and impulsivity, yet post intervention only two learner's scores remained at this level, commonly associated with the behaviour of ADHD learners in a classroom setting. An overall improvement is noted in the area of Hyperactivity, in that decreased scores denote improved behaviour in the form of reduced hyperactivity levels and impulsivity in learners with ADHD, resulting from the intervention programme.

4.3.4.1.3 Changes in social skills

In the pre-test data (Table 4.1) the minimum and maximum scores for Social skills are 11 and 23 respectively, giving a range of 12. After the intervention (Table 4.2) all of the metrics were found to improve, with the minimum rising to 16, and the maximum to 30. The range rises to 14 as the maximum score increased by more than the minimum score i.e. 7 versus 5. In this area of Social skills, this reflects a slightly greater improvement in learners' behaviour at the top end of the scale than those at the bottom end but, nonetheless, shows the intervention to have helped the learner at both ends of the scale. The post-test mean score rises by 6.5 points to 23.3, showing, as anticipated, the improvement in the average learner's level of positive peer interaction from the pre-test below baseline score of 21.

Positive score changes occurred in nine out of ten learners in the sample. Five of these learners increased their pre-test score considerably from below baseline to above, which translates into improved learner interactions with peers resulting from the intervention, at a level no longer characteristic of learners with ADHD in the classroom setting.

4.3.4.1.4 Changes in opposition

In the pre-test data (Table 4.1) the minimum and maximum scores for Opposition are 6 and 24, giving a range of 18. The four learners who scored 6 in the pre-test reflect virtually no evidence of non-compliance and after the intervention, not unexpectedly, their minimum score was found to remain the same. The post-test results (Table 4.2) yield a further three learners' scores placed at this minimum score as well. The maximum score decreases by 1 point to 23 showing an improvement in this area. The post-test mean score decreases by 2.9 to 9.3 showing, as anticipated, the improvement in the average learner's level of compliance compared to the pre-test mean score of 12.2.

From the sample of ten, five learners have returned decreased post-test scores, reflecting a reduction in non-compliant behaviour. Before the intervention, four learners' Opposition scores fell above the baseline score of 14 reflecting oppositional behaviour commonly associated with ADHD learners in the classroom setting. Post intervention, only two learners' scores remained at this level, while the other two returned scores that had improved considerably to a level below the baseline score of 14, which no longer categorises their behaviour as that characterising learners with ADHD.

4.4 Statistical significance of changes in pre- and post-test scores

A number of techniques were applied to determine the statistical significance of the changes in scores, denoting changes in learners' behaviour, as in Table 4.4. A statistician was consulted in determining the appropriate analysis and statistical tests to be conducted.

The Shapiro-Wilk is an objective test used to compare scores in a sample to a normally distributed set of scores, to ascertain whether or not it is significantly different from a normal distribution (Field 2005:744). In this study, the difference in scores from the pre-test to the post-test were calculated and assessed for normality of distribution (see 4.4.1). The normality of the distribution is used to decide which test is most appropriate for testing the significance of the changes pre to post intervention.

The t-test is a parametric test used to compare two small sets of quantitative data when data in each sample set are related in a special way. It is based on a normal distribution and used to test if the difference between the pairs is significant (Field 2005:287). In this study with two experimental conditions and the same participants in each condition, the t-test is selected to calculate the statistical significance of change in Social skills scores from pre- to post-test, which have been confirmed as having a normal distribution.

The Wilcoxon Signed-Rank test is a non-parametric test used for matched pairs as the alternative to the paired t-test, when the data set is found not to be normally distributed (Field 2005:534). In this study, it is appropriate to use the Wilcoxon Signed-Rank test, as there are two sets of scores, pre and post intervention, from the same participants to compare, and the data is not normally distributed in the areas of Attention, Hyperactivity and Opposition.

The Cronbach alpha test measures the internal consistency and reliability of the instrument in use. Individual items or sets of items are expected to produce results consistent with those of the overall questionnaire. This test identifies items with low correlation to the total score of the questionnaire (Field 2005:676). In this study, the CTRS-R is analysed for consistency and Cronbach's alpha identifies items that would improve the overall reliability of the scale if removed, as well as indicating the overall reliability of the questionnaire.

4.4.1 Normality of distribution

The frequency of scores occurring in the data set is known as the distribution. A symmetrical distribution with the majority of scores lying around the centre of the distribution, characterised by a bell-shaped curve, is known as a normal distribution, (Field 2005:8). The Shapiro-Wilk test assesses how well the cumulative frequency distribution curve for a data set fits the expected cumulative frequency curve or normal distribution (Ovais 2010 [b]). The normality of the distribution is an important factor in deciding which method is most appropriate for testing the significance of the changes in the scores measured pre and post intervention (as performed in 4.4.2).

The size of the sample for the intervention was 10 ($n=10$). The Shapiro-Wilk test was selected as it can be used for sample sizes greater than 3 and less than 500 (Ovais 2010 [b]). Although Shapiro-Wilk can be inaccurate for sample sizes less than 30, it can be used if higher thresholds are applied to the result. For sample sizes $n < 15$ the recommended threshold is 50%, which has been applied.

A further note present (Ovais 2010 [b]) is that if the test indicates rejection of H_0 ie that the distribution is not normal, one can have confidence in the results. The highest risk is, therefore, that the distribution of any of the four areas is accepted as normal when it is, in fact, not normal. The testing below was performed using the excel template provided at (Ovais 2010 [a]) and finds that three of the four areas (Attention, Hyperactivity and Opposition) are considered to be not normal. Confidence can therefore be placed in the results of these three areas. For the fourth area (Social skills), the tests for both normal and not normal samples are applied to cover the risk of an incorrectly assessed normality.

4.4.1.1 Attention

The distribution of the changes (as shown in figure 4.5) determines the test to be used in assessing the statistical significance. The distribution does not have the majority of scores lying around the centre, appears asymmetrical and therefore not normal. This is due to the fact that the intervention has not impacted equally upon all learners in the sample. Three learners' scores remained unchanged while seven learners' scores did reflect changes - five learners showed change in single digits and two learners reflected a major change of score in double digits.

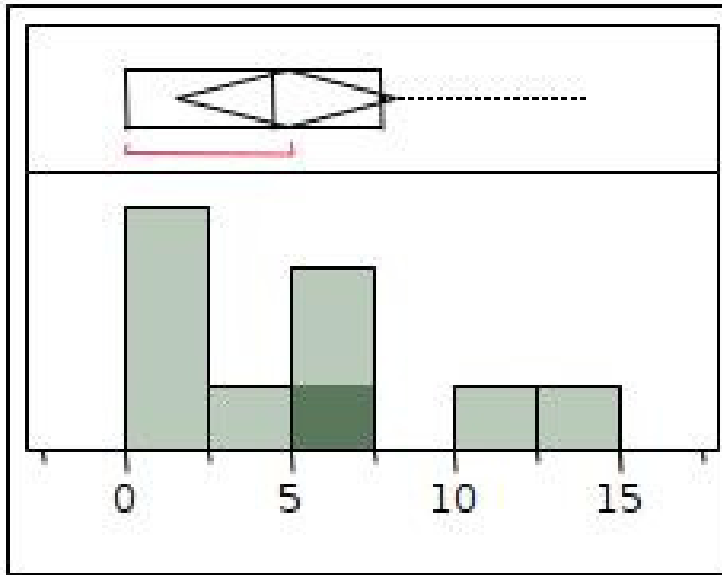


Figure 4.5 Histogram for distribution of change in attention

To confirm that the distribution is, in fact, not normal, the Shapiro-Wilk test was performed using the excel template referred to in 4.4.1. At the required 50% threshold, the changes were confirmed to differ from the normal distribution.

Table 4.5 Shapiro-Wilk test results for changes in attention

<i>Measure / Area</i>	<i>Attention</i>
50% Threshold	Does differ

4.4.1.2 Hyperactivity

The distribution of the changes (as shown in figure 4.6) determines the test to be used in assessing the statistical significance. The distribution does not have the majority of scores lying around the centre, appears asymmetrical and therefore not normal. This is due to the intervention not impacting equally upon all learners in the area of Hyperactivity, resulting in three learners' scores remaining unchanged, one learner showing change in the form of regression and six learners reflecting change in the form of increased scores.

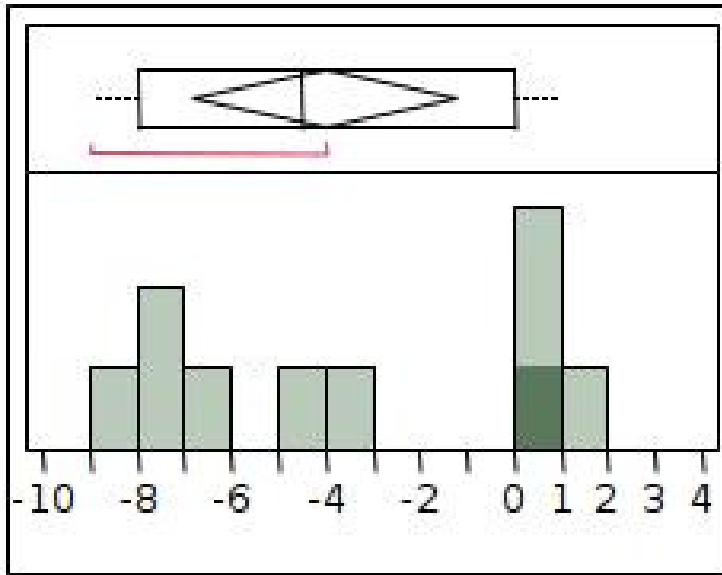


Figure 4.6 Histogram for distribution of change in hyperactivity

To confirm that the distribution is in fact not normal the Shapiro-Wilk test was performed using the excel template referred to in 4.4.1. At the required 50% threshold level the changes were confirmed to differ from the normal distribution.

Table 4.6 Shapiro-Wilk test results for changes in hyperactivity

<i>Measure / Area</i>	<i>Hyperactivity</i>
50% Threshold	Does differ

4.4.1.3 Social skills

The distribution of the changes (as shown in figure 4.7) determines the test to be used in assessing the statistical significance. The distribution appears symmetrical and is characterised by the bell-shaped curve and, as such, appears normal. The intervention appeared to impact upon the majority of the learners in the area of Social skills equally; while one learner's score remained unchanged, nine out of the ten learners in the sample returned changes in the form of increased scores.

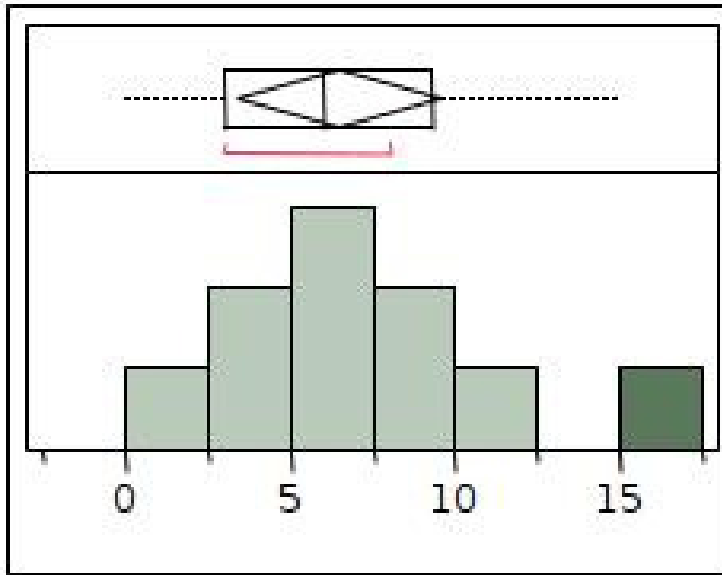


Figure 4.7 Histogram for distribution of change in social skills

To confirm that the distribution is in fact normal, the Shapiro-Wilk test was performed using the excel template referred to in 4.4.1. At the required 50% threshold level the changes were confirmed to not differ from the normal distribution.

Table 4.7 Shapiro-Wilk test results for changes in social skills.

<i>Measure / Area</i>	<i>Social Skills</i>
50% Threshold	Does not differ

4.4.1.4 Opposition

The distribution of the changes (as shown in figure 4.8) determines the test to be used in assessing their statistical significance. The majority of scores are not lying symmetrically around the centre and the distribution appears not to be normal. This is due to the fact that, in the area of Opposition, the intervention did not impact equally upon all learners in the sample. Five learners' scores remained unchanged and the remaining five learners in the sample returned changes in the form of decreases in scores, one of which was in double figures.

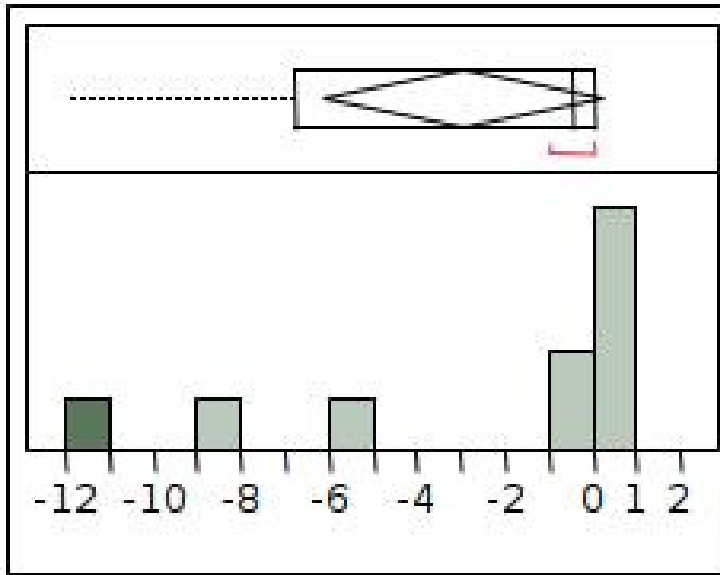


Figure 4.8 Histogram for distribution of change in opposition

To confirm that the distribution is in fact not normal the Shapiro-Wilk test was performed using the excel template referred to in 4.4.1. At the required 50% threshold level the changes were confirmed to differ from the normal distribution.

Table 4.8 Shapiro-Wilk test results for changes in opposition

<i>Measure / Area</i>	<i>Opposition</i>
50% Threshold	Does differ

4.4.1.5 Summary of normality of distribution

The Shapiro-Wilk test (summarised in Table 4.9) shows that the changes from pre- to post-tests differ from the normal distribution for all of the areas except Social Skills at the required threshold. Based on this, the t-test will be used to test for statistical significance of change in Social skills while the Wilcoxon Sign-Rank test will be used for the other three areas of Attention, Hyperactivity and Opposition.

Table 4.9 Summary of test results for pre- to post-test changes

<i>Measure/Area</i>	<i>Attention</i>	<i>Hyperactivity</i>	<i>Social Skills</i>	<i>Opposition</i>
50% Threshold	Does differ	Does differ	Does not differ	Does differ

4.4.2 Statistical significance of change

In this study, changes in scores from pre-test to post-test have been observed and statistically analysed, and a test statistic calculated; if the probability of obtaining that test statistic is > 0.05 it can be concluded that the effect of the intervention is too small to be detected and if < 0.05 then it can be inferred that the effect of the intervention is significant (Field 2005:35).

4.4.2.1 Statistical significance of change in attention scores

The Wilcoxon Sign-Rank test was selected to test significance of the change as the distribution of the pre to post differences was found to differ from a normal distribution. This test calculated the p-value ($|z|$) as 0.0156, reflecting a statistically significant difference between the ranks, at a 95% level of confidence (as indicated in Table 4.10).

4.4.2.1.1 Testing of hypothesis 1

With regard to hypothesis 1 (see 3.3.1), the following null hypothesis was tested:

There is no significant change in the attention of learners with ADHD after the behaviour management strategies have been applied.

Table 4.10 Wilcoxon Sign-Rank calculations for changes in attention

Statistical Measure	Result
Test Statistic	14.000
Prob > z	0.0156*
Prob > z	0.0078*
Prob < z	0.9922
* denotes statistical significance at a 95% confidence level	

From the above results it seems that the null hypothesis can be rejected. Thus, behaviour management strategies will improve the attention of learners with ADHD.

4.4.2.2 Statistical significance of change in hyperactivity scores

The Wilcoxon Sign-Rank test was selected to test significance as the distribution of the pre to post differences was found to differ from a normal distribution. This test calculated the p-value (|z|) as 0.0313, reflecting a statistically significant difference between the ranks, at a 95% level of confidence (as indicated in Table 4.11).

4.4.2.2.1 Testing of hypothesis 2

With regard to hypothesis 2 (see 3.3.2), the following null hypothesis was tested:

There is no significant change in the hyperactivity of learners with ADHD after the behaviour management strategies have been applied.

Table 4.11 Wilcoxon Sign-Rank calculations for changes in hyperactivity

Statistical measure	Result
Test Statistic	-13.000
Prob > z	0.0313*
Prob > z	0.9844
Prob < z	0.0156*

* denotes statistical significance at a 95% confidence level

From the above results it seems that the null hypothesis can be rejected. Thus, behaviour management strategies will reduce the hyperactivity of learners with ADHD.

4.4.2.3 Statistical significance of change in social skills scores

Graphically represented in Figure 4.9 are the matched pairs of pre and post scores for Social skills.

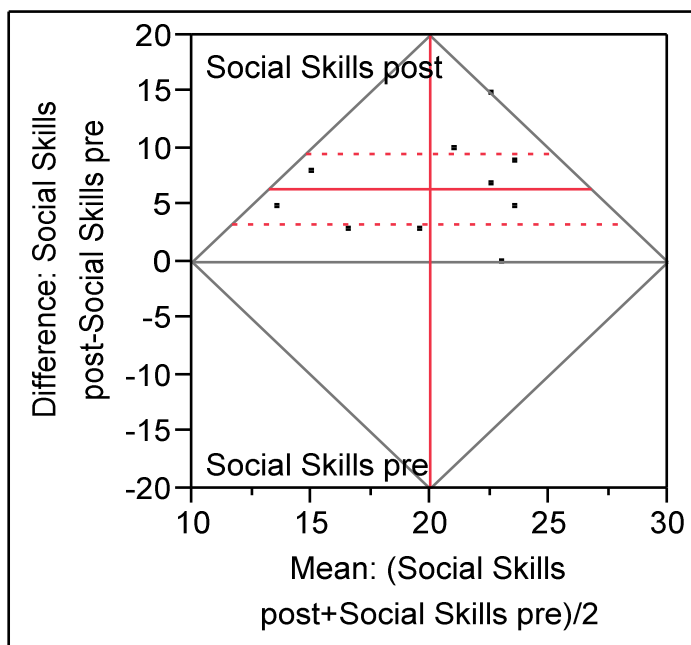


Figure 4.9 Matched pairs for social skills

The solid horizontal red line represents the mean difference between the scores of the pre- and post-test for social skills. The dotted lines represent the 95% Confidence intervals.

The upper triangle is the area showing where the pre-score is less than the post-score. The lower triangle is the area where the pre-score is greater than the post-score. No learners fall in this lower triangle. The horizontal line at zero is found within the confidence region if the means are not significantly different, however, this is not the case, therefore the means are significantly different (at a 0.05 level).

The mean difference of 6.5 was calculated from the difference in the matched pairs in the area of Social skills. Since Social skills was confirmed as having a normal distribution the t-test can be used. The statistical t-test shows the p-value (|t|) as 0.0010, reflecting a statistically significant difference between the ranks, at a 95% level of confidence (as indicated in Table 4.12 below).

4.4.2.3.1 Testing of hypothesis 3

With regard to hypothesis 3 (see 3.3.3), the following null hypothesis was tested:

There is no significant change in the social skills of learners with ADHD after the behaviour management strategies have been applied.

Table 4.12 Statistical t-test for changes in social skills

.Std Error	1.35195	t-Ratio	4.807858
Upper 95%	9.55833	Prob > t	0.0010*
Lower 95%	3.44167	Prob > t	0.0005*
Correlation	0.51633	Prob < t	0.9995
<small>* denotes statistical significance at a 95% confidence level</small>			

The Wilcoxon Sign-Rank test has been performed for comparative purposes. The test calculated the p-value (|z|) as 0.0039 reflecting a statistically significant difference between the means, at a 95% level of confidence (as indicated in Table 4.13).

4.13 Wilcoxon Sign-Rank calculations for changes in social skills

Statistical Measure	Result
Test Statistic	22.5000
Prob > z	0.0039*
Prob > z	0.0020*
Prob < z	0.9980
<i>* denotes statistical significance at a 95% confidence level</i>	

From the above results it seems that the null hypothesis can be rejected. Thus, behaviour management strategies will improve the social skills of learners with ADHD.

4.4.2.4 Statistical significance of change in opposition scores

The Wilcoxon Sign-Rank test was selected to test significance as the distribution of the pre to post differences was found to differ from a normal distribution. This test calculated the p-value(|z|) as 0.0625, which is larger than the required value of 0.05, suggesting that the difference between the ranks is not statistically significant, at a 95% level of confidence (as indicated in Table 4.14).

4.4.2.4.1 Testing of hypothesis 4

With regard to hypothesis 4 (see 3.3.4) the following null hypothesis was tested:

There is no significant change in the oppositional behaviour of learners with ADHD after the behaviour management strategies have been applied.

Table 4.14 Wilcoxon Sign-Rank calculations for changes in opposition

Statistical measure	Result
Test Statistic	-7.500
Prob > z	0.0625
Prob > z	0.9688
Prob < z	0.313*
<i>* denotes statistical significance at a 95% confidence level</i>	

If a lower confidence level (eg 90%) was selected, then the result would be considered statistically significant, so while being wary of over-emphasising the success of the intervention on decreasing oppositional behaviour within the classroom, the result should not be discarded outright as minor improvements to the programme may increase the scores sufficiently to prove for a statistically significant result.

From the above results it seems that the null hypothesis cannot be rejected. Although behaviour management strategies will reduce the oppositional behaviour of learners with ADHD, the reduction is not statistically significant.

4.5 Summary of statistical significance of change in behaviour of learners with ADHD

Statistical significance of the pre- to post-test changes in scores as calculated (see 4.4) are summarised in Table 4.15. Using the Wilcoxon Sign-Rank test for Attention, Hyperactivity and Opposition and the t-test for Social skills, probability is < 0.05 confirming changes in the areas of Attention, Hyperactivity and Social skills to be statistically significant. In the area of Opposition, probability is > 0.05 and thus it can be concluded that these changes are not statistically significant.

Table 4.15 Summary of statistical significance of pre- to post-test changes in scores

Area	Relevant test	Probability	Statistically significant
Attention	Wilcoxon Sign-Rank	$p = 0.0156$	Yes
Hyperactivity	Wilcoxon Sign-Rank	$p = 0.0313$	Yes
Social Skills	t-test (Wilcoxon Sign-Rank)	$p = 0.001$ ($p = 0.0039$)	Yes
Opposition	Wilcoxon Sign-Rank	$p = 0.0625$	No

4.6 Assessment of the reliability of the CTRS-R as the instrument of measure

The Cronbach alpha value is used as an estimator of the internal consistency and reliability of a psychometric test score for a sample of examinees looking, in particular, at how the overall reliability of the test instrument could be improved by removing a specific question. A rule of thumb for the interpretation of the Cronbach alpha values is provided in Table 4.16 (Gliem & Gliem 2003:87).

Table 4.16 Interpretation of Cronbach alpha values

<i>Value</i>	<i>Reliability</i>
Greater than 0.8	Good reliability
Between 0.6 and 0.8	Acceptable reliability
Less than 0.6	Unacceptable reliability

4.6.1 Attention

The reliability of the instrument in this area of Attention is tested using questions 1 through to 6 of the CTRS-R. The multivariate correlations for these questions, calculated using the 'restricted maximum likelihood' (REML) method are listed in Table 4.17.








Table 4.17 Multivariate correlations for attention

	Q1	Q2	Q3	Q4	Q5	Q6
Q1	1.0000	0.7896	0.8904	0.7823	0.7048	0.3734
Q2	0.7896	1.0000	0.7542	0.8649	0.5630	0.3825
Q3	0.8904	0.7542	1.0000	0.8202	0.6031	0.4679
Q4	0.7823	0.8649	0.8202	1.0000	0.7227	0.5855
Q5	0.7048	0.5630	0.6031	0.7227	1.0000	0.6956
Q6	0.3734	0.3825	0.4679	0.5855	0.6956	1.0000

The overall Cronbach alpha for Attention is 0.9202. This is considered within the range of good reliability. In looking at whether excluding questions would improve the reliability,

it can be seen that only one question decreased the reliability. The reliability of the instrument would be improved from 0.9202 to 0.9364 by dropping question 6 from the assessment (as indicated in Table 4.18).

Table 4.18 Cronbach alphas for attention question set

Data set	A	Plot Alpha
Entire set	0.9202	
Ex Q1	0.8973	
Ex Q2	0.9048	
Ex Q3	0.8978	
Ex Q4	0.8893	
Ex Q5	0.9063	
Ex Q6	0.9364	

4.6.2 Hyperactivity



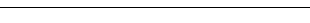
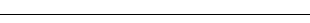

The reliability of the instrument in this area of hyperactivity is tested using questions 7 through to 11 of the CTRS-R. The multivariate correlations for these questions, calculated using the 'restricted maximum likelihood' (REML) method are listed in Table 4.19.

Table 4.19 Multivariate correlations for hyperactivity

	Q7	Q8	Q9	Q10	Q11
Q7	1.0000	0.5281	0.8741	0.6478	0.7964
Q8	0.5281	1.0000	0.5279	0.5993	0.6070
Q9	0.8741	0.5279	1.0000	0.6760	0.7872
Q10	0.6478	0.5993	0.6760	1.0000	0.7135
Q11	0.7964	0.6070	0.7872	0.7135	1.0000

The overall Cronbach alpha for Hyperactivity is 0.9118. This is considered within the range of good reliability. In looking at whether excluding questions would improve the reliability it can be seen that only one question decreased the reliability. The reliability of the instrument would be improved from 0.9118 to 0.9202 by dropping question 8 from the assessment (as indicated in Table 4.20).

Table 4.20 Cronbach alphas for hyperactivity question set

Data set	A	Plot Alpha
Entire set	0.9118	
Ex Q7	0.8818	
Ex Q8	0.9202	
Ex Q9	0.8798	
Ex Q10	0.8985	

4.6.3 Social skills

The reliability of the instrument in this area of Social skills is tested using questions 12 through to 18 of the CTRS-R. The multivariate correlations for these questions, calculated using the 'restricted maximum likelihood' (REML) method are listed in Table 4.21.

Table 4.21 Multivariate correlations for social skills

	Q12	Q13	Q14	Q15	Q16	Q17	Q18
Q12	1.0000	0.2415	0.2307	0.5421	0.0782	0.3522	-0.0962
Q13	0.2415	1.0000	0.6438	0.2082	-0.0430	0.2907	0.5658
Q14	0.2307	0.6438	1.0000	0.3045	-0.2088	0.2017	0.2616
Q15	0.5421	0.2082	0.3045	1.0000	0.0864	0.6509	0.1396
Q16	0.0782	-0.0430	-0.2088	0.0864	1.0000	-0.0255	0.2395
Q17	0.3522	0.2907	0.2017	0.6509	-0.0255	1.0000	0.5298
Q18	-0.0962	0.5658	0.2616	0.1396	0.2395	0.5298	1.0000

The overall Cronbach alpha for social skills is 0.6662. This is considered within the range of acceptable reliability. In looking at whether excluding questions would improve the reliability, it can be seen that only one question decreased the reliability. The reliability of the instrument would be improved from 0.6662 to 0.7470 by dropping question 16 from

the assessment. While improving the score, it does not move the overall reliability into the good reliability range but it makes a much bigger difference than any of the other questions in this area (as indicated in Table 4.22).

Table 4.22 Cronbach alphas for social skills question set

Data set	A	Plot Alpha
Entire set	0.6662	
Ex Q12	0.6390	
Ex Q13	0.5992	
Ex Q14	0.6402	
Ex Q15	0.5858	
Ex Q16	0.7470	
Ex Q17	0.5768	
Ex Q18	0.6055	

4.6.4 Opposition

The reliability of the instrument in this area of opposition is tested using questions 19 through to 24 of the CTRS-R. The multivariate correlations for these questions, calculated using the 'restricted maximum likelihood' (REML) method are listed in Table 4.23.








Table 4.23 Multivariate correlations for opposition

	Q19	Q20	Q21	Q22	Q23	Q24
Q19	1.0000	0.9473	0.7307	0.7324	0.6974	0.7771
Q20	0.9473	1.0000	0.7297	0.7192	0.6922	0.7760
Q21	0.7307	0.7297	1.0000	0.8117	0.9474	0.9711
Q22	0.7324	0.7192	0.8117	1.0000	0.8730	0.9020
Q23	0.6974	0.6922	0.9474	0.8730	1.0000	0.9777
Q24	0.7771	0.7760	0.9711	0.9020	0.9777	1.0000

The overall Cronbach alpha for Opposition is 0.9635. This is considered within the range of good reliability. In looking at whether excluding questions would improve the reliability, it can be seen that excluding any of the questions would result in decreased

reliability (as indicated in Table 4.24), so no changes would be recommended to the set of questions.

Table 4.24 Cronbach alphas for opposition question set

Data set	A	Plot Alpha
Entire set	0.9635	
Ex Q19	0.6390	
Ex Q20	0.9627	
Ex Q21	0.9531	
Ex Q22	0.9586	
Ex Q23	0.9538	
Ex Q24	0.9467	

4.7 Summary of Cronbach alpha test results

The reliability of the CTRS-R is assessed as an instrument of measure using the Cronbach alpha test. The set of questions for each area is tested and individual questions are identified with regard to their ability to decrease reliability of that area.

In the area of Opposition, the test reveals that excluding any of the questions would, in fact, decrease the reliability of the instrument. It must be noted, however, that in the areas of Attention, Hyperactivity and Social skills, although the reliability value is improved by excluding the questions in Table 4.25, it does not change the overall level of reliability in any of these three areas.

Table 4.25 Summary of Cronbach alpha test results

Area	Questions set tested	Questions decreasing reliability
Attention	1-6	6
Hyperactivity	7-11	8
Social Skills	12-18	16
Opposition	19-24	-

4.8 Results and discussion of results

This study investigated behaviour management strategies utilised on learners with ADHD in the classroom. The programme of behaviour management strategies targeting the areas of Attention, Hyperactivity, Social skills and Opposition was applied to an inclusive class, ten of whom were learners with ADHD. After a period of a month, the behaviour of learners with ADHD was measured and quantified, as it had been before the intervention was applied. Results measuring the effectiveness of the programme show that this intervention significantly reduced the disruptive and negative behaviour, typically associated with ADHD learners in the classroom, in the areas of Attention, Hyperactivity and Social skills.

While the study shows that the intervention did not result in a statistically significant improvement in the area of Opposition, it did result in improved scores for five of the ten learners in the sample. Consideration could be given to examining the specific elements of the intervention related to Opposition and perhaps refining teacher instructions to further counteract the effects of oppositional behaviour in the classroom.

4.8.1 Changes in scores

The intervention programme utilised the principle of reinforcement and punishment in order to increase behaviours that are desirable and decrease any problem behaviours. Changes in scores post intervention were obtained. Effects of the intervention programme are evident in the four areas as detailed below:

4.8.1.1 Attention

The area of Attention refers to the ability to work independently in the classroom setting, remaining with a task for a reasonable amount of time. It further implies the ability to stay on-task and to follow instructions, without requiring extra assistance (see 2.2). Not all learners have reacted similarly to the intervention programme in the area of Attention. Three learners showed no improvement in attention in the classroom while conversely, the positive movement in the scores of a further two learners was in double figures. Overall, the behaviour of seven out of the ten learners in the sample improved post the introduction of the intervention programme, with four learners' scores which fell below the baseline level of 16 in the pre-test increasing to above the baseline level post the intervention. The changes in score are found to be statistically significant for Attention.

Learners with ADHD display poor sustained attention, fail to attend to detail and battle to complete tasks, amongst other problems. These symptoms impact negatively upon their academic performance and, indeed, upon other learners in the classroom (see 2.3). The impact of the statistically significant changes in Attention scores is potentially far-reaching, as these results further support the previously researched findings in the literature study that behaviour modification techniques can reduce disruptive and negative behaviour of learners with ADHD in the classroom.

The statistically significant results of the programme of behaviour management strategies which formed the intervention in this study, incorporate behavioural, cognitive, educational and instructional modification that clearly improve distractibility and work towards counteracting the usual inattention associated with ADHD learners in the classroom setting. The advantage of these strategies being applied is reflected in a general improvement of classroom behaviour in terms of sustained attention, increased in-seat behaviour, as well as a reduction in talking and other inappropriate behaviour (see 2.4). This in turn, has a knock-on effect in improving academic performance for those learners with ADHD and, in fact, class-wide.

Hypothesis 1, which states that behaviour management strategies will improve the attention of learners with ADHD, has been proved correct through the statistically

significant changes in attention scores for learners with ADHD that occurred post the intervention programme.

4.8.1.2 Hyperactivity

The area of Hyperactivity refers to the learner being extremely overactive or ‘on the go’ within the class structure. It implies restless, fidgety behaviour and includes overreaction to events. Furthermore, Hyperactivity refers to talking or acting without thinking (see 2.2). Not all learners are impacted upon equally by the intervention programme. While one learner’s change in score shows regression in this area, and three learners’ scores remain unchanged, results show an overall improvement in post intervention changes in scores of six out of the ten learners in the sample. While six learners’ scores fell above the baseline score of 16, introduction of the intervention resulted in the improvement of behaviour of four of these learners, reflected in the reduction of their scores in this area. The changes in score are found to be statistically significant for Hyperactivity.

The out-of-seat behaviour and excessive motor activity exhibited by learners with ADHD are manifestations of hyperactivity which is a distinctive characteristic of the disorder. The impact of the positive results obtained in this study, in the area of Hyperactivity, is seen in the strengthening of previously researched findings that behaviour management approaches are successful in changing the excessive motor activity and impulsive behaviour of a learner with ADHD (see 2.3).

The outcome of implementing the behaviour management strategies is the statistically significant change in Hyperactivity scores. This is highly encouraging for teachers as well as learners with ADHD and clearly promotes the behavioural strategies utilised in the intervention programme. The intervention programme targeted behaviour such as talking out of turn, inappropriate motor activity and disruption of the classroom setting. This has proved to have a significant impact on the classroom management of these ADHD learners, resulting in a more appropriate and acceptable level of behaviour in the classroom (see 2.4).

Hypothesis 2, which states that behaviour management strategies will reduce the hyperactivity of learners with ADHD, has been proved correct through the statistically significant changes in hyperactivity scores for learners with ADHD that occurred post the intervention programme.

4.8.1.3 Social skills

The area of Social skills refers to the ability to interact positively with peers, demonstrating an understanding of group norms and having the ability to make and maintain new friends. It implies the skills of communication with classmates, on both a verbal and non-verbal level (see 2.2). Furthermore, it refers to an ability to act confidently amongst peers. The results of the intervention reflect the positive movement of all key metrics. Of the eight learners whose scores fell below the baseline level of 21, five learners produced improved, above-baseline scores post intervention. Overall improvements were reflected by nine out of ten learners in the sample in this area. The changes in scores are found to be statistically significant for Social skills.

Learners with ADHD are often unpopular members of a class, due to their inability to behave appropriately and pro-socially. Formation and maintenance of peer relationships are potentially stressful for learners exhibiting impulsive and disruptive behaviour, as those diagnosed with ADHD usually do, within a classroom setting (see 2.3). The impact of the statistically significant improvement in social skills scores can be understood in terms of the further credibility it lends previously documented research findings that formed the basis of the behaviour modification programme developed for use as an intervention in this study.

The statistically significant results achieved in the area of Social skills stem from the behaviour management strategies such as class-wide peer tutoring, contingent teacher attention and token economies that were included in the intervention programme. The advantages of these class-wide techniques have been visible in the improved peer relationships that learners with ADHD have experienced. This directly and positively affects the classroom dynamic and thus reduces incidences of disruptive and negative

behaviour, which is ultimately self-damaging and contributes to poor academic performance (see 2.4).

Hypothesis 3, which states that behaviour management strategies will improve the social skills of learners with ADHD, has been proved correct through the statistically significant changes in social skills scores for learners with ADHD that occurred post the intervention programme.

4.8.1.4 Opposition

The area of Opposition refers to negative classroom behaviour in the form of fighting, meanness, targeting others and deliberately making fun of classmates. It also refers to showing defiance in the face of authority (see 2.2). Results of pre- to post-test scores highlight a negative movement in the mean score in the area of opposition, which shows improvement in oppositional behaviour of the average learner with ADHD, after the intervention is introduced. The four learners who produced above baseline scores pre intervention were reduced to two learners after the intervention programme had been introduced. Results record five out of the ten learners in the sample improving their score post intervention in this area. Changes in scores in Opposition are found to be not statistically significant.

Oppositional behaviour is reflected in the non-compliant responses observed in learners with ADHD in the classroom setting (see 2.3). Although improvements were noted in the post intervention changes in score for five out of the ten learners, the magnitude of the improvement on average was insufficient at a 95% confidence level to be termed statistically significant. This is not to say that the strategies incorporated in the behavioural management programme were ineffective. Possibly the intervention programme could be improved with more specific strategies to combat oppositional behaviour.

Hypothesis 4, which states that behaviour management strategies will reduce the oppositional behaviour of learners with ADHD, has been disproved by the finding that

changes in opposition scores for learners with ADHD that occurred post intervention are not statistically significant.

4.9 Summary

The intervention programme that was developed was applied to learners with ADHD, in an inclusive class. The aim was to better manage their inattention, hyperactivity, poor social skills and the oppositional defiance frequently shown towards their teachers (authority) and their peers. Application of the programme of behaviour management strategies resulted in improved statistically significant levels of behaviour in the areas of Attention, Hyperactivity and Social skills and improved yet not statistically significant levels of behaviour in the area of Opposition, in learners with ADHD.

Chapter 5 presents the conclusions and recommendations resulting from the study.

5 Chapter 5 Conclusions and recommendations

5.1 Introduction

This chapter will present a summary of the findings of the literature as well as a summary of the findings of the empirical study, from which a conclusion will be drawn. Any limitations of the study will be discussed and recommendations will then be made.

5.2 Summary of the findings of the literature study

Documented findings that emerged from the literature study undertaken can firstly be found in chapter 1 of this investigation. Once the problem was identified (see 1.2), sketching of the background (see 1.2.2) was necessary before a formal statement of the problem was made (see 1.2.3).

Chapter 2 presented the in-depth literature study undertaken prior to the empirical investigation of behaviour management strategies on learners with ADHD in the classroom. This literature study focused on the nature of ADHD (see 2.2), the impact of the behaviour of learners with ADHD in the classroom (see 2.3) and strategies for the management thereof (see 2.4). A programme of behaviour management strategies is formulated from the literature study, outlining practical behaviour management strategies to be used by the teacher in the classroom. This programme which forms the intervention in this study, includes behavioural, cognitive, educational and instructional modification management strategies.

5.2.1 The nature of ADHD

ADHD, a neurological condition characterised by the core symptoms of inattention, hyperactivity and impulsivity, begins in early childhood and continues through adolescence. The core symptom of inattention results in learners being easily distracted from the task at hand, failing to attend to detail and being generally disorganised. It is not

that they are not attending but that they are attending to everything going on around them (see 2.2).

Hyperactivity is reflected in the excessive motor activity of learners with ADHD, leading to out-of-seat behaviour and other immature motor activity which is inappropriate for the (classroom) setting (see 2.2). Closely connected to hyperactivity is the core symptom of impulsivity or difficulty in delaying impulses. This is manifested in ways such as the inability to answer questions in an orderly way, talking out of turn and moving from task to task without completing any one task (see 2.2). For ADHD to be diagnosed, behaviours need to be age-inappropriate as well as present in at least two locations, such as at home and at school.

5.2.2 The impact of the behaviour of learners with ADHD in the classroom

It is estimated that at least three to six percent of the school-aged population is affected by ADHD, presenting with a range of symptoms at differing levels of severity. Statistics detailing the prevalence of this chronic disorder document an average of one child in every classroom. ADHD is widely associated with behavioural and academic problems in the classroom. Functions normally required by learners include, for example, sustaining focus, considering consequences, completing tasks and exhibiting pro-social behaviour in peer relationships (see 2.3).

The challenges for ADHD learners in the classroom setting are great in that these learners are at a significantly greater risk than their peers of repeating grades, being suspended or even being expelled. Disruptive behaviour, interference with peers and problems associated with short-term working memory are found in a consistent pattern in the behaviour of learners with ADHD and are correlated with their academic underachievement. Inconsistent work production and low rates of academic engagement impact on their scholastic capabilities. Learners with ADHD are at risk of significant difficulties in the school environment, as a result of their inability to cope with the demands of academic performance, study and social interactions with peers, and thus problems arise in the classroom. Difficulties experienced by these learners are rarely confined to the core symptoms themselves, with specific disabilities such as learning

disabilities and disruptive behaviour disorders such as oppositional defiant disorder, appearing to co-exist with ADHD (see 2.3).

5.2.3 Behaviour management strategies

Interventions in the classroom setting are essential in targeting problem behaviours. Behaviour management describes the use of interventions based on the principle of reinforcement and punishment, in order to increase desirable behaviour and decrease inappropriate behaviour. Behaviour management strategies focus on modifying the physical and social environment in the classroom, in order to change the behaviour of ADHD learners. These strategies attempt to meet individual learning needs by altering environmental variables and have been seen to counteract many of the problems associated with ADHD in a school environment. Certain management techniques have been efficacious in targeting traditional areas of difficulty experienced by ADHD learners and successful in altering their behaviour. A programme of such strategies forms a systematic intervention and an essential component of a comprehensive treatment for learners with ADHD (see 2.4). A typical programme of behavioural interventions includes the following types of behaviour management strategies: behavioural, cognitive, educational and instructional modification.

CM forms the basis of behavioural interventions where the application of both negative and positive consequences are contingent on specified learner behaviours. A classroom token economy system is introduced, in consultation with learners. Rewarding appropriate behaviours immediately and saliently can significantly strengthen a desired behaviour while a cost component can similarly decrease the frequency or intensity of an inappropriate behaviour (see 2.4.1).

Cognitive interventions are based on teaching cognitive-behavioural skills which address the issue of self-management for ADHD learners. The procedures of self-monitoring and problem-solving are taught and supervised by teachers in the classroom context. Outcomes of ADHD learners becoming their own behaviour change agents lead to generalisation and maintenance of appropriate behaviour, enabling learners to implement newly-learnt skills in new tasks and new settings (see 2.4.2).

Classroom academic management and the manipulation of environmental conditions are utilised as educational modifications. Antecedent interventions direct effort towards change before a problem arises. The structure of the learners' environment is geared toward accommodating their needs as learners with ADHD, in a classroom setting, with regard to factors such as classroom rules, position of seating and social interaction (see 2.4.3).

Instructional modification is a peer-mediated strategy that addresses the need for learners with ADHD to respond actively to academic material. The rate of engagement in instructional tasks correlates positively with academic performance, thus instructional strategies or activities such as peer tutoring are beneficial to learners with ADHD (see 2.4.3).

Many of these behavioural strategies are class-wide interventions which benefit all learners, not just those with ADHD and, additionally, do not stigmatise learners with ADHD within a class.

5.2.4 Programme of behaviour management strategies

The programme compiled for the empirical study forms the intervention, and includes behavioural, cognitive, educational and instructional modification management strategies. The teacher is tasked with consistently applying specific strategies outlined in the programme within the classroom setting.

By applying consequences linked to a token economy or reward system to positive and negative learner behaviour exhibited in the classroom, the teacher will attempt to bring about a change in behaviour. Self-monitoring skills and the ability to problem-solve within the classroom setting must be taught in order to encourage learners to take responsibility for their own actions. Using antecedent interventions such as classroom rules and manipulation of environmental conditions, the teacher focuses on changing the environment for the learners with ADHD, to make learners' desirable behaviours more likely and their inappropriate behaviours less likely to occur. Peer-mediated strategies

such as peer tutoring allows assistance and feedback which benefits learners in terms of academic performance as well as successful peer relationships (see 2.5).

5.3 Summary of the findings of the empirical study

Chapter 3 outlined the research design and process to be undertaken in order to carry out the investigation. Chapter 4 presented results of the empirical study.

5.3.1 Research problem and hypotheses

This study is empirically researching the following problem: **‘Will a programme of behaviour management strategies used on learners with ADHD significantly reduce their disruptive and associated negative behaviour in the classroom?’** It was hypothesised that a programme of behaviour management strategies utilised by teachers in the classroom setting would reduce disruptive and other associated negative behaviours traditionally displayed by learners with ADHD in the school environment. The hypotheses of this research was required to be confirmed or denied through an empirical investigation of a programme of practical behaviour management strategies for learners with ADHD, in the classroom.

Using the in-depth literature study to inform the subsequent process of developing a programme of efficient and successful behavioural management strategies that can be used by teachers, on a daily basis, the specific aim of the empirical investigation was to introduce the programme of practical strategies to a selected teacher of learners with ADHD. She was to conduct learning in the classroom according to the strategies outlined in the researched intervention programme (see 2.5).

The programme of behaviour management strategies was formulated on the basis of the literature study, utilising existing techniques in the classroom setting that are documented as being effective. Implemented in a mainstream school, the programme was tested to confirm whether the proposed practical behaviour management interventions significantly altered the behaviour of learners with ADHD in the classroom.

5.3.2 Data collection

Testing was done through the CTRS-R, implemented by the selected teacher. The behaviour of the learners with ADHD was measured and quantified at the beginning of the study and again after the intervention had taken place for a month. These tests were scored by the researcher and raw scores reflecting the levels of disruptive and other negative behaviour traditionally exhibited by learners with ADHD, were plotted on the ACTeRS-2 profile for each of the four areas tested, being Attention, Hyperactivity, Social skills and Opposition. Data obtained from the CTRS-R before and after the intervention programme, in the form of pre- and post-test scores, was compared. Changes in learners' scores for each of the four test scales were calculated (see 4.3).

5.3.3 Statistical techniques

Data analysis was carried out to calculate the statistical significance of the results. Appropriate analytical and statistical tests were selected and conducted. To understand the nature of the scores for each of the four areas discussed above, pre- and post-test distributions were plotted. The changes were calculated and assessed for normality of distribution, in order to choose an appropriate test for calculating the significance of the movement.

The t-test was selected for use when a normal distribution was present. The Wilcoxon Sign-Rank test was used when the population was found not to be normally distributed. The Cronbach alpha was used to confirm the reliability of the instrument.

5.3.4 Results

The programme compiled for use as the intervention, was applied to four inclusive classes containing ten learners with ADHD, and targeted the areas of Attention, Hyperactivity, Social skills and Opposition. Results of the pre- and post-tests measuring the effectiveness of the programme show that this intervention significantly reduced the disruptive and negative behaviour typically associated with ADHD learners in the

classroom, in the areas of Attention, Hyperactivity and Social skills. On average, changes post intervention reflect an improvement in on-task behaviour in the classroom in the area of Attention and seven out of the ten learners in the sample returned increased scores (see 4.4.1.1). Hyperactivity, on average, was shown to decrease and post intervention, six learners out of ten in the sample reflected an improvement, in that reduced levels of excessive motor behaviour were manifested in the classroom setting (see 4.4.1.2). Results, on average, in the area of Social skills showed positive changes in score and nine out of ten learners in the sample showed a post intervention improvement in peer interaction in the classroom (see 4.4.1.3). While results showed an improvement in scores after the intervention, these were not statistically significant in the area of Opposition. Opposition improved post intervention, on average, as revealed by the change in the mean score and five out of ten learners manifested decreased levels of non-compliant behaviour in the classroom setting (see 4.4.1.4).

5.4 Conclusion

The literature study undertaken underpins the empirical investigation, in providing documented evidence of behaviour management strategies that have been found to be efficacious with ADHD learners in the classroom setting. Results from the empirical investigation provide answers to the questions posed in Section 1.2.1, as detailed below:

- Which behaviour management strategies are found to be effective?

The behaviour management programme was developed, compiling practical strategies of behavioural management, cognitive-behavioural skills, educational strategies and instructional modification. They were all found to be effective and allowed the teacher to adopt a holistic approach to the problems experienced by the learners with ADHD in the classroom. Findings from the literature study and results of the empirical investigation show that utilisation of the programme of behaviour management strategies has significantly reduced disruptive and other associated negative behaviours traditionally displayed by learners with ADHD in a classroom setting. This is true in the areas of Attention, Hyperactivity and Social skills and to a lesser, not statistically significant extent, in Opposition.

- What aspects of the classroom situation do they improve eg academics or adaptation to norms within the classroom?

In each of these areas, the benefits of the programme of behaviour management strategies are reflected in the classroom setting by the improved behaviour manifested by learners in the sample, after the intervention was introduced. The magnitude of the improvement can be seen to vary from statistically significant results in Attention, Hyperactivity and Social skills to results that are not statistically significant in Opposition. In the area of Attention, the behaviour management strategies clearly improved distractibility and in-seat behaviour and reduced talking which shows a general improvement in classroom behaviour. Changes in Hyperactivity scores demonstrate the successful targeting of excessive motor activity and disruption of the classroom setting by the intervention programme, resulting in a more appropriate and acceptable level of behaviour, due to reduced motor activity being exhibited by learners with ADHD. The area of Social skills has shown statistically significant results, from improving peer relationships which positively impact on the classroom dynamic, to reducing incidences of disruptive and negative behaviour. Results of negative movements in the mean score in the area of Opposition demonstrates improvement in oppositional behaviour after the intervention was introduced, although the improvement was insufficient at a 95% confidence level to be termed statistically significant.

- Are teachers able to sustainably harness behaviour management strategies in a classroom setting?

One teacher in a mainstream school was selected to utilise the programme of behaviour management strategies which was run for a month, during which time the teacher was able to continuously implement the intervention strategies. To this extent, it was successful, although not conclusively proved that it is sustainable for an indefinite period (see 5.6).

In conclusion, the following can be reported in answer to the main question guiding this study: **‘Will a programme of behaviour management strategies used on learners with ADHD significantly reduce their disruptive and associated negative behaviour in the**

classroom?’ The programme of behaviour management strategies used on learners with ADHD significantly reduced their disruptive and associated negative behaviour in the classroom, in the areas of Attention, Hyperactivity and Social Skills and although results showed improvement in the area of Opposition, they were not statistically significant.

5.5 Recommendations

The following recommendations are made:

- Behaviour management strategies should form an integral part of teacher training at a tertiary educational level.
- A programme of behaviour management strategies should, as a matter of course, be espoused by all teachers in all schools.
- Teachers should be involved in regular workshops where they interface with other teachers on the behaviour management problems they encounter with ADHD learners in the classroom in a forum where possible solutions can be discussed.
- Evaluation of a behaviour management programme by learners with ADHD themselves, could be undertaken to enlighten teachers.
- Further study could centre around investigating the effect of the reduction in disruptive and associated negative behaviour on the academic performance of learners with ADHD in the classroom.
- Future research could be conducted in the area of Social skills, utilising a modified CTRS-R without the currently included Question Sixteen, based on results of the Cronbach alpha test for reliability of the instrument used.

5.6 Limitations of the study

- This study tested the programme of behaviour management strategies on ADHD boys only.
- The behaviour management intervention programme was run for a month only and may have yielded better results in terms of lowering levels of disruptive behaviour in class, had it been continued for a longer period of time.

- A relatively small number (10) of learners comprised the sample group. This raises queries regarding just how representative of the population the sample actually is, and whether inferences can be made with confidence.

5.7 Summary

This investigation examined behaviour management strategies used on learners with ADHD in mainstream education. An intervention programme of behaviour management strategies to be utilised on these learners in the classroom setting was developed and tested in this study. The aim was to reduce disruptive and other associated negative behaviours traditionally exhibited by learners with ADHD in the school environment. The efficacy of such an intervention was tested on attention skills, levels of hyperactivity, social skills and levels of opposition using the CTRS-R in a one group pre-test post-test design.

Despite the fact that one teacher utilised the programme on ten learners with ADHD in a class-wide intervention initiative for the relatively short period of one month, the significant reduction of disruptive and negative behaviour displayed by these learners when tested for attention, hyperactivity, social skills and opposition, was encouraging and has validated the need for such a study.

5.8 A final word

This study investigated behaviour management strategies on learners with ADHD in the classroom. The aim was to reduce disruptive and other associated negative behaviour commonly exhibited by learners with ADHD. Through the use of the intervention programme of selected behaviour management strategies, the core symptoms of ADHD, namely inattention and hyperactivity-impulsivity, as well as the associated poor social skills and non-compliance, were addressed.

The learners in the sample benefited, as their difficulties, as a function of their ADHD behaviour within the school setting, decreased. The teacher introducing the practical strategies in the classroom setting focussed on assisting learners with ADHD in dealing

with the issues that impacted the most on their classroom experience. This made the study worthwhile for the learners who participated.

As a school counsellor, developing a programme of effective behaviour management strategies through research methods has increased my knowledge of the nature of ADHD as well as the impact of this disorder on learners in the school context. Completing the empirical study of the effect of practical strategies utilised on learners with ADHD in the classroom has been extremely worthwhile with regard to my understanding of how best to target and reduce the disruptive and associated negative behaviours associated with ADHD.

This knowledge and understanding will be used to assist teachers in their handling of learners with ADHD and the associated behaviour problems in the classroom.

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7 Appendices

7.1 Appendix 1 – An example of the Consent Form as signed by each learner and his parent granting permission for participation

CONSENT FORM

I, _____, parent of _____,

consent to my son participating in the study. I have been informed of and clearly understand the basic nature of the project. I understand that learners taking part will remain anonymous and that I may retract my consent at any point during the study. After a discussion with my son, I confirm that he is willing to participate.

Signature of Parent

Date

Signature of Learner

Date

7.2 Appendix 2 – An explanation of the behaviour management strategies given to the learners.

INTERVENTION PROGRAMME (as explained to participants)

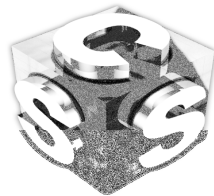
01. A set of classroom rules must be adhered to, consistent with the rules already in place in the selected teacher's teaching domain.
02. There are consequences for all behaviour – rewards for appropriate behaviour and Punishment for inappropriate behaviour – examples of each are given.
03. Rewards will be decided on by teacher and all learners classwide, together and tokens will be awarded to or removed from learners in the pursuit of rewards.
04. Learners are to be taught how to evaluate and record their own behaviour.
05. Learners are likely to be reseated in the classroom setting
06. Learners are to be paired with a peer and the method of peer tutoring will be explained to the class

7.3 Appendix 3 – Behaviour management strategies as outlined to the selected teacher.

INTERVENTION PROGRAMME (as discussed with the teacher)

01. Classroom rules must be set by the teacher and adhered to by all learners. These include basic manners like taking turns, putting hands up for attention or responding to the educator as well as remaining in-seat etc.
02. Contingency Management: Appropriate behaviour of all learners must be Reinforced and inappropriate behaviour punished in order to change behaviour. Verbal and non-verbal feedback must form the basis of contingent teacher attention.
03. Token Classroom Economy must be decided on in consultation with the class, to ensure their participation
04. Learners with ADHD are to be taught how to evaluate and record their own behaviour and teachers must compare this to their own evaluation of each learner.
05. Learners with ADHD must be reseated in the classroom setting, away from potentially distracting areas and this would then affect other class members, who may also need to be reseated as a result.
06. Learners with ADHD are to be selectively paired with a peer (without ADHD) and the method of peer tutoring will be explained to the class. Alternate turns for tutoring must be allowed.

7.4 Appendix 4 – Statistical Consulting Services



STATISTICAL
CONSULTING SERVICES

1 November 2010

To whom it may concern

I did the statistical analysis for Renee Wulfsohn for her Master's dissertation.

Regards

Hennie Gerber

Statistician

7.5 Appendix 5 – Editing Services

22 October 2010

To whom it may concern

I confirm that I completed the language editing for Renee Wulfohn for her Master's dissertation.

Yours faithfully

Clive Goodway



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