DISRUPTIVE BEHAVIOUR DISORDERS AMONG NORTHERN SOTHO SPEAKING CHILDREN

by

Lerato Dorothea Madileng

A dissertation submitted in partial
fulfilment of the requirements for the
degree of

Master of Arts in Clinical Psychology

in the

School of Social Sciences

Faculty of Humanities

at the

University of Limpopo

2006

Supervisor: Prof. JA Meyer

DECLARATION

I, Lerato Dorothea Madileng, declare that the dissertation hereby submitted to the University of Limpopo as partial fulfilment for the degree of Master of Arts in Clinical Psychology, has not been previously been submitted by me for a degree at any other university, that it is my own work in design and execution, and that all the material contained therein has been duly acknowledged.

Signature… … … … … … … … … … … … …

Date … … … … … … … … … … …

ACKNOWLEDGEMENT

The author wishes to thank the following people and institutions, which contributed to the completion of this study:

My supervisor, Prof. Anneke Meyer, for the knowledge and expertise she contributed for the completion of this project.

My lecturers during my studies in Masters Clinical Psychology programme, Prof. A Meyer, Prof. T Mashego, Dr. F Mabasa, Prof. S Madu, Mr. S Mashegoane, Prof. K Peltzer, and Mr. H Smith. I would also like to thank Dr Kabiruse from the University of Venda for helping me with this document.

Mankweng High Primary School, Motholo Primary School, Moganyaka High Primary School and the schools around the area of The University of Limpopo for allowing me to continue with this project.

I furtherwould like to thank my parents (Joseph & Festinah) for encouraging me when I lost hope.

My brothers, Sello, Tshepi, Prince and Mpho for being there for me.

I would like to thank my friends who never lost hope when I felt like the world is over me, Peter, Mokgadi, Philly, Patricia.

This thesis is dedicated to my children whom sometimes felt neglected during the process of the whole project.

TABLE OF CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

Page

ABSTRACT

Objective: The objective of this study was two fold: the first being to establish a relationship between the scales of Disruptive Behaviour Disorders rating scale, namely, Inattention, Hyperactivity/Impulsiveness, ODD, and CD. The second objective was to compare Inattention, Hyperactive/Impulsive, ODD and CD symptoms in all the DBD subtypes (ADHD-I, ADHD-H/I, ADHD-C, ODD, CD) and a Non-DBD comparison group.

Sample: Both the clinical group and the comparison group were obtained by screening using the Northern Sotho version of the Parent/Teacher Disruptive Behaviour Disorder rating scale (DBD). The sample in this study (N = 230) consisted of Northern Sotho speaking primary school children with ages ranging from 7-13.

Results: The results of this study showed significant correlations between the scales of the DBD rating scale ranging from strong to weak. The comparison study showed a strong association between symptoms of ADHD and the Aggressive Disorders, especially the ADHD-C group which seemed to be the most affected group with the possibility of developing aggressive symptoms and antisocial behaviour disorders.

Chapter 1

GENERAL INTRODUCTION AND BACKGROUND

1.1 Introduction

Attention Deficit/Hyperactivity Disorder (ADHD) is a persistent and severe impairment of psychological functioning, resulting from a high level of impulsive, overactive and inattentive behaviour (Barkley, 1997a; Sagvolden & Sergeant, 1998). ADHD often co-occurs with other disorders such as Oppositional Defiant Disorders (ODD) and Conduct Disorders (CD) (Abikoff & Klein, 1992). ADHD, ODD and CD are collectively known as Disruptive Behaviour Disorders of Childhood (American Psychiatric Association, 2000). Twin studies suggest that hyperactive behaviour may be the main genetic pathway into the development of Conduct Disorder (Barkley & Murphy, 1998). ADHD seems to be a heterogeneous group of behavioural disorders affecting between 2% and 5% of primary school children (Swanson et al.,, 1998c). The disorder is currently not well understood. It is argued that there is no focal brain damage involved but that genetic factors mainly give rise to dopamine hypofunctioning, which causes the behavioural symptoms. Other neurochemical imbalances may also be involved (Sagvolden & Sergeant, 1998). These disorders usually manifest themselves before the age of 7. ADHD is more common in boys than in girls and at least 75% will continue to suffer from the disorder after they have grown up (Swanson et al., 1998c). The proportion of females affected increases especially during adolescence and young adulthood (Biederman et al., 1994b; Meyer, Eilertsen, Sundet, Tshifularo, & Sagvolden, 2004).

1.2 Background of the study

Children with ADHD present problems associated with symptoms of impulsiveness, inattentiveness and overactivity. Although there is a considerable overlap between these

symptoms; impulsiveness is increasingly seen as the symptom of greatest significance (Taylor, 1998). Impulsiveness is an inability to withhold appropriate responses (Wigal et al., 1998) such as premature responding, overrapid responsiveness, excessive attraction to immediate reward, acting without reflecting, recklessness and impetuous behaviour. Attention problems are typically described as distractibility and trouble with sustaining attention (Douglas, 1983). Overactivity is typically seen in restlessness, fidgeting and generally unnecessary gross bodily movements (Porrino et al., 1983). ADHD correlates with aggression, Conduct Disorders, Oppositional Defiant Disorders, learning disabilities, depression, anxiety and low self-esteem (Taylor, 1998).

1.2.1 ADHD

ADHD causes clinically significant impairments in social, academic and occupational functioning (American Psychiatric Association, 2000). The core characteristics are the following:

Impulsiveness is reflected as an inability to withhold responses, such as premature responding, overrapid responsiveness, excessive attraction to immediate reward, acting without reflecting, recklessness and impetuous behaviour (Douglas, 1988).

Overactivity is commonly seen in ADHD children but there is little correlation between either frequencies of various activities or the rate of movement of the various body parts of ADHD children. Although overactivity is seen in some situations like classrooms, it might not be present in others, like play as well as being absent in novel situations (Taylor, 1998).

Deficient sustained attention: Children with ADHD tend to be easily distracted, and have difficulty in sustaining attention. The attention problems associated with ADHD are general and non-specific (Johansen, Aase, Meyer, & Sagvolden, 2002). Van der Meere

(1996) argues that problems of sustained attention only occur in situations where stimuli are widely spaced in time.

1.2.2 ODD

Oppositional Defiant Disorder (ODD), according to DSM-IV-TR (American Psychiatric Association, 2000) is a pattern of negativistic, hostile, and defiant behaviour lasting at least six months. The prevalence of ODD reported in epidemiological studies ranges from 0.3 to 22.5%, with the median being about 3.2 % (Lahey, Miller, Gordon, & Riley, 1999). Approximately 40% to 60% of children with ADHD are comorbid for ODD (Meyer & Aase, 2003). Comorbid ODD is often a precursor of CD, which is a more serious disorder with significant long-term consequences (Hechtman, 1999).

1.2.3 CD

Conduct Disorder (CD) is a persistent pattern of behaviour in which the basic rights of others or major age-appropriate societal norms or rules are violated (American Psychiatric Association, 2000). The DSM IV provides a list of symptoms grouped as aggression to people and animals, destruction of property, deceitfulness, or theft, and serious violation of rules. Two subtypes are provided based on age of onset of at least one symptom: childhood onset (prior to age 10 years) and adolescent onset (no symptoms prior to age 10 years).

A wide range of estimates of the prevalence of CD has been reported, ranging from 0.0% to 11.9% for girls and boys combined. The median is about 2.0% (Lahey, Miller, Gordon, & Riley, 1999). When symptom criteria for both ODD and CD are present, ODD is not diagnosed.

Numerous studies have documented high rates of comorbidity between ADHD and the other disruptive behaviour disorders. In research, ODD and CD are often combined and referred to as Aggressive Behaviour Disorders. Factor analysis of data obtained by

teacher and parent ratings shows that there is a high correlation (r=0,6) between ADHD and aggressive behaviour (Hinshaw, 1987). Some evidence suggest that cormobid aggression may distinguish a biologically distinct subtype of ADHD (Halperin et al., 1997). Comorbid ODD or CD is found much less frequently with the Inattentive subtype of ADHD (Eiraldi, Power, & Nezu, 1997) than with the two other subtypes that include hyperactivity and impulsiveness. Psychosocial environmental risk factors for cormobid aggression with ADHD are socio-economic disadvantage, adverse family climate and exposure to violence (McGee & Williams, 1999).

1.3 Disruptive Behaviour Disorders in Africa

Little is known about the Disruptive Behaviour Disorders on the African continent. Research among the different language groups in the Limpopo Province of South Africa indicates that ADHD is the most prevalent disorder also in South Africa and that the prevalence rates for ADHD subtypes are similar to Western rates for both genders, in all language groups (Meyer, 1998; Meyer et al., 2004). Analysis of prevalence rates for ODD and CD in the Limpopo Province of South Africa are also in line with those of Western countries (Meyer & Sagvolden, 2001).

1.4 Statement of the Problem

The Disruptive Behaviour Disorders, account for at least 75% of the combined prevalence of all psychopathological disorders of childhood and adolescence (Quay, 1999). In particular, Conduct Disorder, with its links to school failure and dropout, juvenile delinquency, criminality, antisocial personality disorders and other indices of dysfunction in adulthood, is extremely costly both to society and the individuals afflicted. An understanding of the biological and psychosocial aetiologies of these disorders, the settings that engender and maintain them, their natural history, and what may be the most effective intervention and prevention strategies for them are of primary importance to all

professionals who must deal with the troubled and troublesome youths (Meyer & Aase 2003).

1.5 Aims of the study

This research proposes to study the relationship between the symptomatology of the various subgroups of the Disruptive Behaviour Disorders, ADHD- inattentive type, ADHD-hyperactive/impulsive type, ADHD-combined type, ODD, CD, and a comparison group not classified as having Disruptive Behaviour Disorders. The quantity of the symptoms among children with the various subgroups of Disruptive Behaviour Disorders and a normal control group will also be investigated, as well as the difference in severity of the symptoms.

The aim of this investigation was therefore, two fold:

1. To establish a correlation between the symptoms of the various Disruptive Behaviour Disorders, namely, ADHD-I, ADHD-H/I, ADHD-C, ODD, CD and a control group without DBD symptoms.
2. To establish differences in symptomatology among the different Disruptive Behaviour Disorders, namely, ADHD-I, ADHD-H/I, ADHD-C, ODD, CD and the control group without DBD symptoms as a function of age and gender.

1.6 Delineation of the study

This study will cover the following areas: Chapter 2 will discuss the nature of ADHD and the areas to be discussed include the short history, symptoms, diagnostic criteria, prevalence, gender differences, co-morbid disorders subtypes, and their outcomes. Chapter 3 and 4 will concentrate on ODD and CD, their causes, symptoms, diagnostic criteria prevalence and outcome. Chapter 5 discusses diagnostic methods and treatment while

chapter 6 will state the research problem and formulate the hypotheses. Chapter 7 will describe the methodology employed to collect the data, while chapter 8 will report on the results of the study. Chapter 9 will discuss the results obtained as well as the limitations of the study, possibilities for further research in the future, and the clinical implications of the whole study.

Chapter 2

ATTENTION DEFICIT HYPERACTIVITY DISORDER (ADHD)

2.1. Introduction

Disruptive Behaviour Disorders (DBD's), as labelled in the DSM IV-TR (American Psychiatric Association, 2000) are: Attention Deficit Hyperactivity Disorder (ADHD), Oppositional Defiant Disorders (ODD) and Conduct Disorder (CD). Taken together, these disruptive disorders account for at least 75 percent of the combined prevalence of all psychopathological disorders of childhood and adolescence (Quay & Hogan, 1999). These disorders place the child at risk for school failure and dropout, juvenile delinquency, criminality, substance abuse and sexual promiscuity and as a result HIV/AIDS (Biederman, Wilens, Mick, Spencer, & Faraone, 1999; Cantwell, 1996; Meyer et al., 2003; Taylor, 1998).

It is necessary therefore to understand the biological and psychosocial aetiologies of these disorders, the assessment methods and diagnosis and the effective intervention methods, as it is understood that currently not only one method of treatment can be successful. It is further recommended that, the earlier detection of these disorders lead to better prognosis (Meyer & Aase, 2003).

The focus of this chapter will be on Attention Deficit Hyperactivity Disorder (ADHD), focusing on its clinical presentation and diagnostic criteria, aetiology, prevalence, and prognosis.

2.2 General Background of the disorder

Attention Deficit/Hyperactivity Disorder is a persistent pattern of inattention and/or hyperactivity-impulsiveness that is more severe than is typically observed in individuals, at a comparable level of development (American Psychiatric Association, 2000). ADHD manifests itself from an early age and is well established by age 7. The

disorder affects boys more often than girls, but during adolescence and young adulthood more females become affected (Biederman et al., 1994b). It is common for children to be active, energetic and exuberant; to shift from one activity to another as they explore their environment and its novelties; and to act without much forethought, responding on impulse to events that occur around them, often with their emotional reactions readily apparent. It is labelled ADHD when children present persistent problems of impulse control, inattention and hyperactivity that are inconsistent with the child's developmental level (Barkley, 2002; Meyer, 1998). ADHD is associated with a number of complicating features, including neurodevelopmental impairments, impaired intellectual development, scholastic and vocational underachievement and impaired social adjustment (Barkley, 1997a). Children with ADHD display a variety of symptoms and are likely to have other cognitive, developmental, behavioural, emotional, academic, and even medical difficulties (Barkley, 1998).

2.3 Clinical presentation of ADHD

ADHD diagnosis is confirmed when children and adults display certain characteristic /behaviour over a period of time. Burns, Boe, Walsh, Sommers-Flanagan, and Teegarden, (2001) identified two distinct behavioural dimensions underlying the various behavioural problems thought to characterize ADHD. These two dimensions have been identified across various ethnic and cultural groups, for example, Native American (Beiser, Dion, & Gotowiec, 2000), Chinese (Luk, 1990) and Icelandic children (Magnusson, Smari, Gretarsdottir, & Prandardottir, 1999). Meyer et al., (2004) did a prevalence research in the Limpopo Province of South Africa among Northern Sotho, Afrikaans, Tsonga, Tswana and Venda speaking primary school children. The results thereof are in line with those found in Western countries.

Inattention and hyperactive/impulsive behaviour are presently regarded as the main symptoms of ADHD (Barkley, 1998). There is an overlap between these symptoms although impulsiveness is increasingly regarded as the symptom of greatest significance in children with ADHD (Sagvolden & Sergeant, 1998).

2.3.1 Impulsiveness

Impulsiveness is defined as a deficiency in inhibiting behaviour in response to situational demands (APA, 2000; Sagvolden & Sergeant, 1998). Impulsiveness is an inability to withhold inappropriate responses, such as premature responding, over rapid responsiveness, excessive attraction to immediate reward, acting without reflecting, recklessness and impetuous behaviour. These children make careless errors because they often respond too quickly, before the instructions are fully given; they fail to plan ahead (Johansen et al., 2002). Quay (1988) argues that ADHD is a failure of the behavioural activation system. People who are overly impulsive seem unable to curb their immediate reactions or think before they act. Their impulsiveness may make it hard for them to wait for things they want or to take their turn in games. It is suggested that impulsiveness is due to altered reactivity to reinforcers and not vice-versa (Barkley, 1998; Sagvolden & Sergeant, 1998).

Impulsiveness can be referred to as poor sustained inhibition of responding, poor delay of gratification, or impaired adherence to commands to regulate or to inhibit behaviour in a social context (Barkley, 1997a).

2.3.2 Hyperactivity

Restlessness, fidgeting, and generally unnecessary gross bodily movements are often observed in ADHD children. Hyperactivity is mostly seen in some situations, like the classroom, and it might not be present in other situations like in play. Hyperactivity may be absent in novel situations (Porrino et al., 1983; Taylor, 1998). Children who are overactive

always seem to be in motion. They cannot sit still; they may dash around or talk incessantly; they squirm in their seat or roam around the room; they may be fidgety or they may try to do several things at once, bouncing around from one activity to the next. Children with ADHD are observed to be more active than others but are less mature in controlling motor overflow movements (Barkley, 1997a; Johansen et al., 2002).

2.3.3 Inattention

Attention difficulties in children with ADHD can be seen in play activities where the child fails to play with one toy for a long period. Children who are inattentive have difficulty keeping their mind on one thing and may get bored with a task after only a few minutes. They may give effortless, automatic attention to activities and things they enjoy (Taylor, 1998). Difficulties with attention can also be noticed in situations requiring the child to sustain attention to dull, boring, repetitive tasks such as independent school work (Barkley, 1998). When distracted, from their task, such children take considerable time to return to the main task (Barkley, 1998).

2.3.4 DSM IV-TR Diagnostic Criteria for ADHD

A. Either (1) or (2):

1. six (or more) of the following symptoms of **inattention** have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:

Inattention

(a) often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities.

(b) often has difficulty sustaining attention in tasks or play activities.

(c) often does not seem to listen when spoken to directly.

(d) often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behaviour or failure to understand instructions).

(e) often has difficulty organising tasks and activities.

(f) often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework).

(g) often loses things necessary for tasks or activities (e.g. toys, school assignments, pencils, books, or tools).

(h) is often easily distracted by extraneous stimuli.

(i) is often forgetful in daily activities.

2. six (or more of the following symptoms of **hyperactivity-impulsiveness** have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:

Hyperactivity

(a) often fidgets with hands and feet or squirms in seat.

(b) often leaves seat in classroom or in other situations in which remaining seated is expected

(c) often runs about or climbs excessively in situations in which it is inappropriate (In adolescents or adults, may be limited to subjective feelings of restlessness)

(d) often has difficulty playing or engaging in leisure activities quietly.

(e) is often "on the go" or often acts as if driven by a motor"

(f) often talks excessively

Impulsiveness

(g) often blurts out answers before questions have been completed

(h) often has difficulty awaiting turn

(i) often interrupts or intrudes on others (e.g. butts into conversations or games)

B. Some hyperactive-impulsive or inattentive symptoms that caused impairments were present before age 7 years.

C. Some impairments from the symptom is present in two or more settings (e.g. at school [or work] and at home)

D. There must be evidence of clinically significant impairment in social, academic, or occupational functioning.

E. The symptoms do not occur exclusively during the course of a Pervasive Developmental Disorders, Schizophrenia, or other Psychotic Disorder and are not better accounted for another mental disorder (e.g. Mood Disorder, Anxiety disorder, Dissociative Disorders or a Personality Disorder (American Psychiatric Association, 2000)

2.4 Aetiology of ADHD

The causes of ADHD are yet unknown, but the literature indicates multiple contributors. Most of the literature supports a biological basis. This disorder is also known to have direct effect on brain development and functioning (Faraone, Biederman, & Monuteaux, 2002; Mehl-Medronna, 2000; Sagvolden and Sergeant, 1998; Sonuga-Barke, Saxton, & Hall, 1998).

2.4.1 Genetic factors

Genetic factors are the principal factors in the aetiology of ADHD. The risk for ADHD is higher for the probands if the condition is generic to his/her biological rather than to adoptive parents. Researchers discovered a high risk for the disorder in monozygotic twins and dizygotic twins, although in dizygotic twins it was less (37,9%) than in monozygotic twins (82,7 %) (Bradley & Golden, 2001; Levy, Hay, McStephen, Wood, & Waldman, 1997). Research shows that most parents and relatives of children with ADHD have a high prevalence of psychopathology (Biederman et al., 1992). Research shows that if one parent has ADHD, the child has a high risk of suffering from ADHD. The dopamine type-2 gene was found to be associated with Tourette syndrome and ADHD. Another gene related to dopamine, is the DRD 4, also called the repeating allele, which was found to be over represented in the 7-repetition form of an allele in children with ADHD. Bradley et al., (2001); Cook et al.,(1995); Swanson et al., (1998d) indicated that genetic problems related to the dopamine transporters gene (DAT-1) could be traced from parent to child. Studies are still on to check how the disorder is transmitted from one generation to the next. It is also necessary to establish whether it is a single gene or many genes that are involved (Faraone, 2000).

2.4.2 Neurological factors

ADHD is typically viewed as a neurological disorder caused by abnormality in the brain, either structural, or chemical or both (Castellanos & Swanson, 2002; Swanson, Castellanos, Murias, LaHoste, & Kennedy, 1998b).

In the past, scientists suspected that either abnormal development or injury of the brain caused ADHD. They realised the similarities between children with ADHD and people who suffered injuries to the front part of the brain, known as the orbital-frontal region. This brain region is found to be responsible for inhibiting behaviour, sustaining

attention, employing self-control, and planning for the future. Earlier in this century scientists realised that injuries to the brain, and infections such as encephalitis, meningitis, and trauma caused by fall or blow to the head or complications of pregnancy or delivery were chief causes of ADHD symptoms. The right prefrontal-striatal is contributory in displaying the characteristics of ADHD (Barkley, 1997a; Barkley, 1995a). ADHD is also associated with frontal lobe dysfunction (Castellanos, 1997; Castellanos & Tannock, 2002). It has been observed that there are structural differences in the brain size and symmetry in people diagnosed with ADHD (Castellanos et al., 1996; Nopoulos et al., 2000; Schweitzer et al., 2000; Swanson et al., 1998b). The differences in brain size (i.e., basal ganglia and frontal lobe) and the functioning of the neurotransmitters are associated with motor activity, language processing, planning, organising, problem solving, selective attention and higher cognitive functions (Swanson et al., 1998b).

2.4.3 Biochemical factors

There are neurochemical differences which shows an imbalance in neurotransmitters (particularly, dopamine and serotonin) as a result of low metabolic rates in the cortical lobes which is influenced by brain size (Gainetdinov et al., 1999; Teicher et al., 2000).

Dopamine plays a pivotal role in the neurobiology of ADHD. ADHD-like symptoms may be produced not only by genetic factors but also by agents altering dopaminergic functioning. Chronic intake of the dopamine agonists like cocaine, crack and amphetamines will produce a down-regulation of dopamine synthesis (Johansen et al., 2002; Sagvolden, Aase, Zeiner, & Berger, 1998). The biochemical theory of ADHD proposes that two different abnormalities exist in dopamine regions:

- Under-activity in a cortical region this is anterior cingulated, and results in cognitive deficits and over-activity in the sub-cortical region; resulting in motor excess.

- Different sites of dopamine receptors classified as D1-like (D1 and D5) and D2-like (D2, D3 and D4), each receptor type has genetic variants (polymorphisms) that complicate the dopamine pathways. Genetic polymorphisms on the dopamine receptor may reduce dopamine activity and change normal development of the meso-cortical and nigro-striatal dopamine systems, which in turn modulate activity in these networks (Sonuga-Barke, 2002; Swanson et al., 1998d).

2.4.4 Environmental Pollutants

Polychlorinated biphenyl's (PCBs) constitute a group of halogenated aromatic hydrocarbons that are lipophyllic and bioaccumulating. The lipophyllic nature of PCBs makes organs, like the brain, vulnerable. Intake of these pollutants causes developmental abnormalities in humans, including low birth weight, disruptive behaviour and hyperactivity (Holene, Nafstad, Skaare, Krogh, & Sagvolden, 1999). A series of studies of effects of PCBs exposure on behaviour and brain chemistry showed that normal male rats exposed to subtoxic doses of PCB congener 153, through mothers milk, when pups, were hyperactive and impulsive when they grow up. PCB 153 produces a hyperactivity and impulsiveness route via the monoaminergic pathways (Johansen, Aase, Meyer, & Sagvolden, 2002). Environmental factors also known to cause ADHD include the effects of foetal exposure to alcohol and benzodiazepines and other adverse factors during pregnancy or at birth (Meyer, 1998).

2.5 Epidemiology

2.5.1 Prevalence of ADHD

ADHD, which is the most commonly diagnosed behavioural disorder of childhood (Curran et al., 2003; Rietveld, Hudziak, Bartels, van Beijsterveldt, & Boomsma, 2003), occurs in 3 to 5 percent of school-age children (American Psychiatric Association, 2000).

Boys are four times more likely to have ADHD than girls are, but during adolescence and young adulthood, the proportion of females affected increases (Biederman et al., 1994). The disorder is found in all cultures, although prevalences differ, differences are thought to stem more from differences in diagnostic criteria than from differences in presentation (Mental Health Division of Western Australia, 2000).

The prevalence of ADHD varies, across studies, due to different methods of selecting samples and the nature of the populations from which the samples are drawn (Altfas, 2002). According to other researchers, the prevalence rate is higher in children at the school entering ages, and declines with ages among teenagers (Biederman, Mick, & Faraone, 2000a). Szatmari (1992) in his reviewed findings of six epidemiological studies identified that the prevalences ranged from a low of 2 % to a high of 6.3 %, with most falling studies within the range 4.2% to 6.3%. Other studies have found similar prevalence rates in the elementary school-age children (3-12%) of primary school children (American Academy of Pediatrics, 2004; Biederman & Faraone, 2005; Taylor et al., 2004). Lower rates results from using complete DSM IV criteria and parents reports and higher rates if just a cut off on teacher ratings is used (Nolan, Gadow, & Sprafkin, 2001). For instance, prevalence rates may be 4% in girls and 8% in boys in the preschool age group (Nolan et al., 2001), yet range between 2-4 % in girls and 6-9% in boys during the 6-12 year old age period based on parent's report (Breton et al., 1999). The prevalence decreases again to 0.9-2 % in girls and 1-5.6% in boys in adolescence (Breton et al., 1999; Romano, Tremblay, Vitaro, Zoccolillo, & Pagani, 2001).

If both the symptom threshold and the requirement for impairment are used, the prevalence may decrease by 20-60% from the figure based on symptom thresholds alone (Breton et al., 1999; Romano et al., 2001). Prevalence rates are higher (sometimes more

than double) when teacher reports are used in comparison to parents' reports (Nolan et al., 2001).

Health problems, developmental impairment, young age, and urban living however, remains significantly associated with prevalence. The declining prevalence of ADHD with age is partly artifactual and could result from the use of items in the diagnostic symptom lists that are chiefly applicable to young children. This could create a situation where individuals remain impaired in the fundamental constructs of ADHD as they mature, while outgrowing the symptom list for the disorder which then results in an illusory decline in prevalence (Barkley, Fischer, Smallish, & Fletcher, 2002a).

The symptomatic prevalence of hyperactivity and impulsiveness tend to decline at a higher rate than inattention symptoms. Inattention tends to persist through childhood and adolescence into adulthood, while the symptoms of motor hyperactivity and impulsiveness tend to diminish with age (Biederman et al., 2000a).

Table 2.1 Prevalences obtained in school/community populations of various cultures using DSM-IV criteria

Country	Prevalence %	Age group	Study
Australia	6.8	6 -17	Graetz, Sawyer, Hazell, Arney, and Baghurst (2001)
Brazil	18.0	6 - 8	Guardiola, Fuchs, and Rotta (2000)
Brazil	5.8	12 - 14	Rohde et al., (1999)
China	5.3	6 - 11	Liu et al., (2000)
Columbia	16.0	4 - 17	Pineda et al., (1999)
Iceland	5.7	6 - 8	Magnusson, Smari, Gretarsdottir, and Prandardottir (1999b)
South Africa	5.4	6 - 15	Meyer et al., (2004)
United Arab Emirates	14.9	6 - 12	Bu-Haroon, Eapen, and Bener (1999)

The conclusion was drawn that 5-7% of the primary school population in South Africa is at risk of academic underachievement and abnormalities in personality development, if early diagnosis and intervention do not occur (Meyer et al., 2004).

2.5.2 Sex Differences

Sex appears to play a significant role in determining the prevalence of ADHD within a population. On average, male children are between 2.5 and 5.6 times more likely than female children to be diagnosed as having ADHD within epidemiological samples, with the average being roughly 3:1 (Breton et al., 1999). Within clinic-referred samples, the sex ratio can be considerably higher, suggesting that boys with ADHD are far more likely to be referred to clinics than girls. This is probably because boys are more likely to have comorbid ODD or CD (Barkley et al., 2002a). Studies of clinic-referred girls often find that they are as impaired as clinic-referred boys with ADHD; they have as much comorbidity, and may even have greater deficits in intelligence, according to meta-analytic reviews of sex differences in ADHD (Gershon, 2002). Some studies suggest that these clinic-referred girls, at least as adolescents, may have more internalizing symptoms (e.g., depression, anxiety, and stress), greater problems with teacher relationships, and poorer verbal abilities (vocabulary) than boys with ADHD (Rucklidge & Tannock, 2001). Like boys, girls with ADHD also manifest more CD, mood disorders, and have greater academic deficits than do control samples (Biederman et al., 1999; Rucklidge & Tannock, 2001). Males with ADHD had greater problems with cognitive processing speed than females in one study, but these differences were no longer significant after the severity of ADHD was controlled (Rucklidge & Tannock, 2001).

In contrast, studies drawing their ADHD samples from the community find that girls are significantly less likely to have cormobid ODD and CD than boys with ADHD,

and do not show greater intellectual deficits than these boys; however, these girls may be as socially and academically impaired as boys with the disorder (Gershon, 2002).

Meyer (1998) and Meyer et al., (2004) studied Northern Sotho speaking primary school children of the Limpopo Province, South Africa. The prevalence rate was found to be 5,5% in the total Northern Sotho speaking primary school population with prevalence among boys being 7% and among girls being 4% (Meyer & Sagvolden, 2001).

2.5.3 Socio-economic Differences

Few studies have examined the relationship of ADHD to socioeconomic status, and those that have, are not especially consistent. Some researchers (American Academy of Pediatrics, 2004; Taylor et al.,, 2004) found only slight differences in the differences in the prevalence of hyperactivity across SES (Socioeconomic Status) when sources like parent, teacher, and physicians all agreed on the diagnosis. However, SES differences in prevalence did arise when only two of these three sources had to agree; in this instance, there were generally more children with ADHD from lower rather than the higher SES backgrounds (Barkley, 2003). Epidemiological studies show that ADHD occurs across all socioeconomic levels (American Academy of Pediatrics, 2004; Taylor et al., 2004).

2.6. Culture and ADHD

Culture does influence the expression of psychiatric symptoms (Rohde et al., 2005; Timimi & Taylor, 2004). Cultural differences in the interpretations of the symptoms of ADHD by teachers or parents and in expectations of child behaviour exist, and may probably contribute to the varying rates of the disorder reported in different countries (Barkley, 2003; Livingston, 1999). Culture also plays an important role in structuring the environment in which the child with ADHD functions, and in the way he or she is understood and treated (Dwivedi & Banhatti, 2005; Gingerich, Turnock, Litfin, & Rosen, 1998).

2.7 Prognosis

Gelder, Mayou, and Geddes (1999) stated that, as the child grows older the over-activity generally lessens especially when it is mild and had not been present in every situation. Usually it ceases by puberty. Taylor (1998) argues that ADHD often persists into adolescence and adulthood and puts sufferers at risk of a range of abnormalities in personality development. The adverse outcomes include delinquency, other antisocial behaviour and underachievement in school. Meyer (1998) adds that ADHD is a debilitating and prevalent psychopathological condition with poor prognosis. Associated with learning difficulties children with ADHD are less likely to improve, and antisocial behaviour has the worst prognosis. When over-activity is severe or accompanied by major learning difficulties, or associated with low intelligence, it may persist into adult life. It has been observed (Kratzer & Hodgins, 1997) that, children and adolescents with DBD's had a higher incidence of antisocial personality disorder, substance abuse, poor educational and occupational status, more frequent job changes and inferior job status as compared with control groups. It has been noted that when children at risk for the DBD's are identified at an early stage, clinicians can focus on the most intensive treatment. This is helpful in altering negative life course followed by many children and adolescents with other untreated debilitating disorders (Meyer & Aase, 2003).

Chapter 3

OPPOSITIONAL DEFIANT DISORDER

3.1 Introduction

Oppositional Defiant Disorder (ODD) is classified as one of the Disruptive Disorders together with ADHD and Conduct Disorder (CD) (American Psychiatric Association, 2000). They represent a broad range of behaviours in pre-adolescent (3-12 years old) and adolescent children (13-18 years old). The behaviours, which distinguish these disorders, range from relatively minor behaviours such as yelling, whining, and temper tantrums to aggression, physical destructiveness and stealing. Conduct and Oppositional Defiant Disorders are considered behavioural disorders. These disorders do not occur in isolation but reflect a pattern or class of behaviours (Conner, 2003; Rey, Sawyer, & Prior, 2005). This chapter will provide a discussion of Oppositional Defiant Disorder (ODD).

Although there is considerable overlap between the symptoms of ODD and Conduct Disorder (CD), there are several arguments that can be put forward to consider ODD a separate diagnostic category (Wiener & Dulcan, 2004). They are:

1. Patients with ODD function better and the disorder has a better prognosis (Rey, 1993);
2. ODD symptoms peak at age 8, while CD symptoms only emerge at older ages (Loeber, Burke, Lahey, Winters, & Zera, 2000a);
3. Children with ODD improve with treatment, while treatment is mostly unsuccessful in CD (Kruesi & Lelio, 1996).

Keeping the above arguments in mind it was decided to treat ODD and CD as separate disorders for the purpose of this study.

3.2 General Background of ODD

According to the DSM IV-TR (American Psychiatric Association, 2000), ODD is a recurrent pattern of negativistic, defiant, disobedient and hostile behaviour toward authority figures. ODD is characterised by irritability, argumentativeness and non-compliance early in childhood (Holmes, Slaughter, & Kashani, 2001). ODD is characterised by two different sets of problems, these are aggressiveness and a tendency to purposefully bother and irritate others. To warrant a diagnosis of ODD, the child must show frequent occurrence of at least four behaviours such as losing temper, arguing with and defying adults, and deliberately doing things that will annoy other people. Children and adolescents with ODD are usually angry and resentful and quick to blame others for their misbehaviour. Stubbornness and testing of other people's limits of tolerance are common (Mental Health Division of Western Australia, 2000). The latter mentioned symptoms are found to be developmentally inappropriate (American Psychiatric Association, 2000; Goodman & Gurian, 2002). Anger, stubbornness, defiance, and related behaviour, are often the reasons why people seek treatment. ODD is commonly co-presented with ADHD. When ODD is present with either ADHD, Depression, Tourette's Syndrome, Anxiety disorders, or other neuropsychiatric disorders, its prognosis becomes poor.

3.3 Diagnostic Criteria According to the DSM IV-TR

A. A pattern of negativistic, hostile, and defiant behaviour lasting at least 6 months, during which four (or more) of the following are present:

(1) often loses temper

(2) often argues with adults

(3) often actively defies or refuses to comply with adults requests or rules

(4) often deliberately annoys people

(5) often blames others for his/her mistakes or misbehaviour

(6) is often touchy or easily annoyed by others

(7) is often angry and resentful

(8) is often spiteful or vindictive

Note: Consider a criterion is met only if the behaviour occurs more frequently than is typically observed in individuals of comparable age and developmental level.

B. The disturbance in behaviour causes clinically significant impairment in social, academic or occupational functioning.

C. The behaviours do not occur exclusively during the course of a Psychotic or Mood Disorder.

D. Criteria are not met for Conduct Disorder, and, if the individual is age 18 years or older, criteria are not met for Anti social Personality Disorder.

3.4 Aetiology of ODD

ODD has a complex and multifactorial aetiology. Biological, psychological, social, and developmental factors each contribute in differing degrees to the development and clinical course of the disorder (Lewis, Pincus, Lovely, Spitzer, & Moy, 1987; Wiener & Dulcan, 2004).

3.4.1 Biological factors

Biological factors, such as, the make-up of a child's temperament and neurological imbalance in the brain seems to have effect in the development of ODD and lower levels of dopamine may also lead to a child being ODD. Children who later develop antisocial personalities/disorders have lower levels of physiological arousal (i.e. lower heart rate and blood pressure (Coghill, 2004).

3.4.2 Environmental factors

Persistent oppositional behaviour is strongly predicted by problems in preschool children such as excesses in aggression/restlessness as well as motor and cognitive deficits (Moffitt & Caspi, 2001). These behaviours may therefore occur in a broader context of

family and societal adversities (Bor & Sanders, 2004). Dawson, Ashman, and Carver (2000), state that early negative experiences can have effects in shaping brain development. Parental coercive behaviour (hitting, shouting and scolding), serve as one of the risk factors for future psychopathology, including the emergence of antisocial behaviour (Bor & Sanders, 2004).

3.4.3 Developmental Factors

Developmental factors testifies that ODD is really a result of incomplete child development. These children never complete developmental tasks that normal children learn to master during the toddler years.

Pre-natal factors may also affect ODD and CD. Foetal exposure to alcohol and other drugs have been correlated with the development of attention problems and hyperactivity as well (Holmes et al., 2001). The second cause of pre-natal predispositions is exposure to a toxic or diseased pre-natal environment. Foetuses exposed to opiates or methadozone are at heightened risk of deviant behaviour in their early teen years (10-13 years), as are foetuses exposed to alcohol, marijuana, and cigarette by-products during pregnancy (Day, Richardson, Goldschmidt, & Cornelius, 2000; Goldschmidt, Day, & Richardson, 2000). Both before and after birth, lead poisoning can lead to long-term conduct problems, in adolescence (Dodge & Pettit, 2003).

3.5 Prevalence and sex ratios

The prevalence of Oppositional Defiant Disorder is estimated to range within 1% to more than 20%, with the median prevalence estimate of about 3% (Lahey et al.,, 1999). The DSM IV-TR cites rates of 6-16% for males and 2-9% for females (American Psychiatric Association, 2000). Varying definitional criteria and sampling methods might have an influence on the results (Hinshaw & Lee, 2003). These disorders may have their onset early, before age 10, or in adolescence. Children who display early onset are at greater

risk of persistent disorders difficulties, however, and they are also more likely to have troubled peer relationships and academic problems (Meyer & Aase, 2003; Meyer & Sagvolden, 2001).

3.6 Comorbidity

Oppositional Defiant Disorders, like other psychiatric disorders, co-occur with other childhood disorders like Attention Deficit Hyperactivity Disorders, and Mood Disorders. Other cormobidities will be discussed in the upcoming chapter on CD.

3.6.1 ODD and ADHD

If a child comes to a clinic with ADHD diagnosis, there is a probability of 30 to 40% that the child will present symptoms of ODD (Newcorn, Spencer, Biederman, Milton, & Michelson, 2005). Children with ADHD and cormobid ODD but who present a greater number of ADHD symptoms have poor prognosis (MTA-Cooperative Group, 1999).

Some children with major social problems but relatively little academic problems are also common (Lahey, McBurnett, & Loeber, 2000).

3.6.2 ODD and Mood Disorders

15 to 20 % of children with ODD combined with mood disorders are more anxious. A family of children with ODD and mood disorders are mostly seen in difficult situations of handling children with these disorders. Depression often gets confused in the midst of dealing with aggression and defiance especially in children less than 14 years. These disorders often run in families (Barkley, 2003).

3.7 Prognosis

Many children with ODD tend to outgrow it. ODD may turn into Conduct Disorder (CD), mainly when a parent has a history of severe ODD. At some stage, children with ODD outgrow it, and other cormobidities, like ADHD, Mood Disorders or

Anxiety problems. Even though they might outgrow ODD, the tendency to irritate others often leads to a lonely life for such children. Children with ODD and ADHD, with a greater number of ADHD symptoms, are associated with increased severity of these disorders and a poorer prognosis (Greene et al., 2002).

Treatment of oppositional defiant disorder has poor outcome, whilst (Conner, 2003) states that the treatment of ODD has successful outcome when early intervention is made. The treatment will be discussed in Chapter 5.

Chapter 4

CONDUCT DISORDER

4.1 Introduction

Children with Conduct Disorder (CD) form a varied group because of the many manifestations of antisocial behaviours and numerous complex factors that contribute to the development of these antisocial behaviour (Hendren & Mullen, 2003). In the first place, the classification of CD is controversial and not definite (Frick, Lahey, Applegate, Kerdyck, Ollendick, Hynd et al., 1994; Lahey, Applegate, Barkley, Garfinkel, McBurnett, Kerdyk, et al., 1994) and secondly, the relationship between CD and ODD is often indistinct (Moeller & Dougherty, 2001).

4.2 Background of CD

DSM IV-TR (American Psychiatric Association, 2000) defines Conduct Disorder as a repetitive and persistent pattern of behaviour in which basic rights of others or major age-appropriate societal norms or rules are violated. In general CD is considered a more severe and clinical form of antisocial behaviour than that displayed by the average adolescent (Gelhorn , Stallings, Young, Corley, Rhee, & Hewitt, 2005).

CD is typified by a variety of persistent antisocial behaviours including acts of aggression, destruction of property, deceitfulness, theft and violation of commonly adhered to rules (Kutcher, Aman, Brooks, Buitelaar, van Daalen, Fegert, et al., 2004). CD is more common among adolescents than pre-adolescents and more prevalent among boys than girls (Boyle, Offord, Racine, Sanford. Szatmari, Fleming, et al., 1993). Youngsters with CD are at high risk of delinquency, having persistent and aggressive antisocial behaviours, and developing substance abuse in adulthood (Scott, Knapp, Henderson, & Maughan, 2001).

CD has a high comorbidity with the ADHD hyperactive/impulsive and combined types (Hendren& Mullen, 2003). Hyperactivity is not the only cause of CD, but it does seem to be the main cause of the early onset of Conduct Disorder (Taylor, Dopfner, Sergeant, Asherson, Banaschewski, Buitelaar, 2004).

Physical aggression is common in all forms of CD (Hinshaw & Lee, 2003).

4.3. Diagnostic criteria for Conduct Disorder

DSM-IV-TR (American Psychiatric Association, 2000) provides a list of 15 symptoms grouped under the sections of aggression to people and animals, destruction of property, deceitfulness or theft, and serious violation of rules. Diagnosis requires the presence of three or more symptoms in the past 12 months with at least one symptom present in the past 6 months. In addition, there must be present clinically significant impairment in social, academic, or occupational functioning.

The following are the operational criteria for Conduct Disorder:

Aggression to people and animals

a) Bullies, threatens or intimidates

b) Initiates physical fights

c) Has used a weapon

d) Physically cruel to people

e) Physically cruel to animals

f) Has stolen while confronting the victim

g) Forced sexual activity

Destruction to property

h) Fire-setting with intend to damage

i) Destroys others' property

Deceitfulness or theft

j) Breaking into house, building, or car

k) Often lies to obtain goods or favours

l) Stealing without confrontation

Serious violation of rules

m) Stays out at night beginning before age 13

n) Runs away from home overnight at least twice

o) Truant from school before age 13

Abridged from (American Psychiatric Association, 2000)

4.4 Subtypes of CD

Many of the symptoms of CD are age-related and are more likely to occur at an earlier or later age. Therefore two subtypes are provided based on age of onset of at least one symptom (American Psychiatric Association, 2000):

1. Childhood onset CD (prior to age 10 years)
2. Adolescent onset CD (no symptoms prior to 10 years)

4.5 Aetiology

4.5.1 Neurological dysregulation

The high comorbidity rate of Conduct Disorder with ADHD, Tourettes syndrome and other disorders are known to be due to neurological dysregulation. Quay (1999) suggests that Conduct Disorder may be a co-manifestation of the same underlying dysregulation. Although there are a few studies, which have directly investigated (Hendren & Mullen, 2003) the neurological basis for Conduct Disorder; there is ample clinical evidence indicating that when treating ADHD with pharmaceutical agents, Conduct Disorder abates. It appears that psychopharmacological treatment may address the underlying dysregulation and facilitate clinical treatment using cognitive and behavioural interventions. More research is needed in this area to determine whether neuro-therapy is directly responsible for this abatement or whether the resultant improvement in attention, and reduction in hyperactivity promotes better self-image, which in turn improves

behaviour. A recent molecular genetic study found an association between the tryptophan hydroxylase gene, which codes for the enzyme involved in serotonin biosynthesis and measures of aggression and anger (Manuck, Flory, Ferrell, Dent, Mann & Muldoon, 1999).

Another study has found an association between the gene monoamine oxidase-A (MAO-A) and aggression (Foley, Eaves, Wormley, Silberg, Maes, Kuhn, et al., 2004; Manuck, Flory, Ferrell, Mann, & Muldoon, 2000).

4.5.2 Child Biological Factors

Considerable research has been carried out into the role of child temperament- the tendency to respond in predictable ways to events- as a predictor of conduct problems. Aspects of personality, such as, activity levels displayed by a child, emotional responsiveness, quality of mood, and social adaptability are part of his or her temperament. Longitudinal studies have found that although there is a relationship between early patterns of temperament, and adjustment during adulthood, the longer the time span, the weaker this relationship becomes (Burke, Loeber, & Birmaher, 2002).

A more important determinant of whether or not temperamental qualities persist has been shown to be the manner in which parents respond to their children. "Difficult" infants have been shown to be especially likely to display behaviour problems later in life if their parents are impatient, inconsistent, and demanding. On the other hand "difficult" infants, whose parents give them time to adjust to new experiences, learn to master new situations effectively. In a favourable family context a "difficult" infant is not at risk of displaying disruptive behaviour disorder at 4 years old. An individual's temperament, which becomes evident in the early ages of development, serve as a predisposing factor to CD (Hirshfeld-Becker, Biederman, Faraone, Violette, Wrightsman & Rosenbaum, 2002; Holmes, Slaughter, & Kashani, 2001).

Cognitions may also influence the development of Conduct Disorder. Children with Conduct Disorder have been found to misinterpret or distort social cues during interactions with peers. For example, a neutral situation may be construed as having hostile intent. Further, children who are aggressive have been shown to seek fewer cues or facts when interpreting the intent of others. Children with Conduct Disorder experience deficits in social problem solving skills. As a result they generate fewer alternate solutions to social problems, seek less information, see problems as having a hostile basis, and anticipate fewer consequences than children who do not have Conduct Disorder (Dulcan, 1997; Webster-Stratton, 1996).

4.5.3 School-Related Factors

A bi-directional relationship exists between academic performance and Conduct Disorder. Frequently children with Conduct Disorder exhibit low intellectual functioning and low academic achievement from the outset of their school years. In particular, reading disabilities have been associated with this disorder, with one study finding that children with Conduct Disorder were at a reading level 28 months behind their normal peers. In addition, delinquency rates and academic performance have been shown to be related also to characteristics of the school setting itself. Such factors as physical attributes of the school, teacher availability, teacher use of reinforcers such as praise, the amount of emphasis placed on individual responsibility, emphasis on academic work, and the student-teacher ratio have been implicated (Adler & Barrington, 2003; Webster-Stratton, 1996).

4.5.4 Parent Psychological Factors

It is known that a child's risk of developing Conduct Disorder is increased in the event of parent psychopathology. Maternal depression, paternal alcoholism and/or criminality, and antisocial behaviour in either parent have been specifically linked to the disorder (American Psychiatric Association, 1994; Rutter, Giller, & Hagell, 1998).

There are two views as to why maternal depression has this effect. The first assumption is that mothers who are depressed misperceive their child's behaviour as maladjusted or inappropriate. The second assumption considers the influence depression can have on the way a parent reacts toward misbehaviour. Depressed mothers have been shown to direct a higher number of commands and criticisms towards their children, who in turn respond with increased non-compliance and deviant child behaviour. Webster-Stratton (1996) suggests that depressed and irritable mothers indirectly cause behaviour problems in their children through inconsistent limit setting, emotional unavailability, and reinforcement of inappropriate behaviours through negative attention (Webster-Stratton, 1996).

4.5.5 Familial Contributions

The inter-parental conflicts surrounding divorce have been associated with the development of Conduct Disorder. However, it has been noted that although some single parents and their children become chronically depressed and report increased stress levels after separation, others do relatively well. Webster-Stratton (1996) suggested that for some single parents, the events surrounding separation and divorce set off a period of increased depression and irritability which leads to loss of support and friendship, setting in place the risk of more irritability, ineffective discipline, and poor problem-solving outcomes. The ineffective problem-solving can result in more depression, while the increase in irritable behaviour may simultaneously lead the child to become antisocial (Goodman & Kohlsdorf, 1994).

More detailed studies into the effects of parental separation and divorce on child behaviour have revealed that the intensity of conflict and discord between the parents, rather than the divorce itself, is the significant factor. Children of divorced parents whose homes are free from conflict have been found to be less likely to have problems than

children whose parents remained together but engaged in a great deal of conflict, or those who continued to have conflict after divorce. Webster-Stratton (1996) note that half of all those children referred to their clinic with conduct problems were from families with a history of marital spouse abuse and violence.

In addition to the effect of marital conflict on the child, conflict can also influence parenting behaviours. Marital conflict has been associated with inconsistent parenting, higher levels of punishment with a concurrent reduction in reasoning and rewards, as well as with parents taking a negative perception of their child's adjustment (Hirshfeld-Becker et al., 2002; Webster-Stratton, 1996).

Birth order and size of the family have both been implicated in the development of Conduct Disorder. Middle children, and male children from large families have been found to be at an increased risk of delinquency and antisocial behaviours (Webster-Stratton, 1996).

4.5.6 Psychophysiological and genetic Influences

Studies have found that neurological abnormalities are inconsistently correlated with Conduct Disorder (Pliszka, Carlson, & Swanson, 1999). While there has been interest in the implication of the frontal lobe limbic system partnership on the deficits of aggressive children, these problems may be the consequence of the increased likelihood of children with Conduct Disorder experiencing abuse and subsequent head injuries (Goodman & Gurian, 2002; Webster-Stratton, 1996).

While twin studies have found greater concordance of antisocial behaviour among monozygotic rather than dizygotic twins, and adoption studies have shown that criminality in the biological parent increases the likelihood of antisocial behaviour in the child, genetic factors alone do not account for the development of the disorder (Webster-Stratton, 1996).

Studies using either computerized tomography (CT) or magnetic resonance imaging (MRI) found some evidence of structural brain abnormalities among ADHD patients. The most common findings are smaller volumes for the frontal cortex, cerebellum, and subcortical structures. The three subcortical structures implicated by imaging studies (caudate, putamen, and globus pallidus) are part of the neural circuitry underlying motor control, executive functions, inhibition of behaviour, and the modulation of reward pathways (Sonuga-Barke, Saxton, & Hall, 1998; Swanson, Castellanos, Murias, LaHoste, & Kennedy, 1998).

4.6 Cormobid Disorders

Conduct Disorder and Oppositional Defiant Disorder like other childhood disorders are not present in isolation. Thus, they do present with other disorders like ADHD, Learning Disabilities, and mood disorders.

4.6.1 ADHD and CD

ADHD commonly present together with CD (Hinshaw, Lahey, & Hart, 1993; Loeber et al., 2000a; Mannuzza, Klein, Bessler, Malloy, & LaPadula, 1993; Moffitt, 1990). The hyperactive-impulsiveness sub-dimension of ADHD is more strongly associated with aggression and antisocial behaviour than is the inattention dimension (Vance & Luk, 2000). ADHD is viewed to overlap between ODD and CD (Waschbusch, 2002). ADHD and conduct problems/aggression are partially independent aspects of child and adolescent psychopathology (Barkley, 2003; Hinshaw & Lee, 2003).

The presence of ADHD serves to propel an earlier onset of CD symptomatology (Loeber, Green, Keenan, & Lahey, 1995; Rutter et al., 1998). Behaviour patterns associated with ADHD like irritability, impulsiveness, high activity level, sensation seeking; eliciting negative reactions from the environment, with aggressive behaviour are highly likely to result from stress (Lahey et al., 1999; Patterson, DeGarmo, & Knutson, 2000).

Genetic, familial, peer related, academic, cognitive, neuropsychological, and socio-economic backgrounds of these cormobid subgroups set the stage for complex, interactional and transactional models related to their high risk for later psychopathology (Hinshaw & Nigg, 1999).

4.6.2 Learning Disability and CD

There is cormobidity between disruptive behaviour disorders and learning disability. Most of the children with these disorders also experience learning problems. Most of the children with these disorders, have poor performance in drawing and copying skills, digit span, right left discrimination, written language expression, simple word attack skills, in reading, language and art (Barkley, 1998; Pliszka et al., 1999). The other problem that might be associated with learning disabilities in disruptive behaviour is inability to concentrate. It is believed that the concentration and attention span for disruptive behaviour disordered children is less than 30 minutes (Barkley, Shelton, Crosswait, Moorehouse, Fletcher, Barrett, et al., 2002b; Holmes et al., 2001).

4.6.3 Mood Disorders and CD

There is an overlap between CD and depression. Children suffering from depression do not display depression in a similar way to an adult. Children either act awkwardly, some may be withdrawn from other activities that they are normally used to. Mainly, in clinical setting, most children do admit feelings of guilt, having trouble sleeping, and deny some signs of depression. Since parents are involved mainly during the intake interview for collateral information, parents may deny that the child is depressed but report concentration difficulties and loss of appetite (Pliszka et al., 1999).

Depression and CD are positively correlated cormobid disorders (Mandel, 1997). CD may occur secondary to depression and treatment may resolve symptoms of a CD

nature. Recurrent CD symptoms may ensue with subsequent episodes of depression (Holmes, et al., 2001).

Furthermore, depression, anxiety and Conduct Disorder are positively correlated cormobid disorders. CD may occur secondary to depression or anxiety and treatment may resolve symptoms of a CD nature (Holmes et al., 2001). Some children seem to develop low self-esteem and insecurity as a result of failures at school and interpersonal relationships (Taylor et al.,, 2004). Young children who are at risk of CD are commonly presenting with panic disorders and depression (Biederman et al., 2001).

4.7 Prevalence

Several studies have found that males are three to four times more likely to manifest CD than females (Biederman et al., 2002). A wide range of prevalence of CD has been reported, ranging from 0.0% to 11.9% for girls and boys combined. The median is about 2.0% (Lahey et al., 1999a; Meyer et al., 2003). Monuteaux, Fitzmaurice, Blacker, Buka, and Biederman (2004), state that in a longitudinal cohort study of children in New Zealand, the prevalence rates of CD in males and females at age 15 years were very similar (7.2% for males, 7.4% for females). However, McGee and Stanton, (1990) state that the rates of aggression CD was high for males (3.1% for males) and less for females (0%) and non aggressive CD was lesser for males (4.1%) and higher for females (7.4%). Meyer et al., (2001) in their study in Limpopo, South Africa, state that the prevalence rate for boys displaying Disruptive Behaviour Disorders is 9%, while it is lesser for females (5%). The prevalence rates of the latter mentioned study appear to be in line with studies in the Western Countries (Lahey et al., 1999).

4.8 Prognosis

Children with Conduct Disorder continue with similar problems into adulthood, especially males. Females with CD more often end up with mood disorders and anxiety

disorders as adults. Most children with CD end up abusing alcohol at their early adulthood. Even though females seem to outgrow the disorder when they grow older, they are almost 6 times more likely to abuse drugs or alcohol, smoke cigarette, have STD's, have several sexual partners when compared to persons without the disorder (Moffitt et al., 2001).

The high degree of comorbidity between ADHD and CD has been extensively documented in several studies, as well as the poor long-term prognosis for children with both disorders (Loeber, Green, Lahey, Frick, & McBurnett, 2000b). Youngsters with both ADHD and CD display a greater amount of physical aggression, a greater range and a greater persistence of antisocial activity, more severe academic underachievement, and higher rates of peer rejection (Hinshaw & Park, 1999).

A childhood combinations of ADHD and aggression yield the strongest risk of later delinquency (Lahey et al., 2000). ADHD features constitute a risk for Antisocial Behaviour largely through their fuelling of an early onset of conduct problems (Nagin & Tremblay, 1999; Loeber et al., 2000a). CD is a childhood disorder associated with a severity of substance abuse (Jang, Vernon, & Livesley, 2000; Slutske, Heath, Madden, Bucholz, Statham & Martin, 2002) and adult antisocial behaviour (Myers, Stewart, & Brown, 1998; Newcorn, Halperin, Jensen, Abikoff, Arnold, Cantwell, et al., 2001).

Chapter 5

ASSESSMENT, DIAGNOSIS AND TREATMENT OF DISRUPTIVE BEHAVIOUR DISORDERS

5.1 Introduction

Assessment and diagnosis of Disruptive Behaviour Disorders should be done by a mental health professional, preferably one who is trained in children's mental health. Any diagnosis must be made in consultation with the child's family (Conners & Jett, 1999). The assessment and differential diagnosis of Disruptive Behaviour Disorders require careful consideration. Diagnosis of the condition requires both medical and psychosocial expertise and is usually made by an interdisciplinary team. Knowledge about a child's family circumstances and school environment should be taken into account when considering the diagnoses of ADHD, ODD and CD, making use of information from more than one source. When assessing and diagnosing any childhood behavioural disorder, the health professional should consider the social and economic context in which the child's behaviour occurs (National Institute of Mental Health, 2002). This is to rule out any other conditions that solely can account for the problems observed, and to evaluate the pervasiveness of the problems. In addition, the presence of comorbidity should be carefully investigated (Meyer & Aase, 2003).

There are different psychosocial methods to be used when assessing children with Disruptive Behaviour Disorders. These methods should be reliable and valid for assessment across different cultures (Oesterheld & Haber, 1997).

5.2 Clinical Interview

Ideally, a child should be examined from multiple perspectives, including biological, sociocultural and behavioural dimensions. From the clinical interview one

can generate a set of clinical data containing sufficient information to fulfil the requirements of the currently mandated multiaxial psychiatric diagnostic system (American Psychiatric Association, 2000; Burns et al., 2001). Such data serve as a common foundation for adherents of different theories and practices (Swanson, Lerner, March, & Gresham, 1999). The clinical interview is always with the parents. Patients past psychiatric illnesses need also to be recorded. Such information includes the type of disorder, precipitating factors and steps taken in order to alleviate it (Weller, Rowan, Elia, & Weller, 1999). The clinical interview is involves the parents, the child and the teacher.

5.2.1 Parent interview

Structured interviewing for the child's family is essential for three reasons. First, obtaining a family history can help to clarify whether the child's attention or behaviours are developmental or actually a reaction to stressful events that has taken place. Secondly, a history of certain disorders in the extended family might influence diagnostic impression and treatment recommendations. Thirdly, to establish rapport amongst the clinician, parent and the child (Barkley, 1995a; Mehl-Medronna, 2000; Taylor et al., 2004). This method of obtaining data is often criticized for its unreliability and subjectivity (Barkley, 1998).

5.2.2. Child interview

Interview with a child is often semi-structured and it covers general questions, such as asking a child's view of the reason for referral and evaluation, how well he/she is performing at school, any additional problems he/she may have, if they do have a problem, what type of disciplinary action they get for their misconduct (Barkley, 1995a). It has been found that children below the age of 9 to 12 years are not reliable in reporting their own disruptive behaviour. Another problem is that

many children with ADHD would not misbehave in the clinician's office and observation at such times may lead to false negative diagnosis. Additional information may be obtained by contacting the parents or teachers (Barkley, 1998).

5.2.3 Teacher interview

The teacher interview is structured and should focus on the specific nature of the child's problem in the school environment. Children with Disruptive Disorders are more likely to have problems with sloppy handwriting, careless approach to tasks, poor organization of their work materials, and academic underachievement relative to their tested abilities. Time should be taken with the teachers to explore the existence of such problems. Given the greater likelihood of the occurrence of learning disabilities in Disruptive Disorders, children's teachers should be questioned about those potential disorders (Barkley, 1998; Barkley & Murphy, 1998).

5.3 Behavioural Assessment

The development and evaluation of efficacious treatment procedures depend on the development of sound assessment devices (Frick et al., 1994). The child's behavioural assessment can be viewed as an exploratory hypothesis testing process in which a range of specific procedures is used in order to understand a given child and formulate and evaluate specific intervention strategies. Assessment procedures are used like behavioural interviews, self-monitoring, and behavioural observations (Conners & Jett, 1999).

There are two primary conditions for child behaviour assessment procedures:

(i) They must be sensitive to developmental changes in children;

(ii) They must be empirically validated.

There are several checklists available for screening DBD's. These checklists are completed by teachers or parents but preferably by both. The Self Report Scales are available for adolescents and youths. These rating scales are commonly used by professionals in both assessment and treatment monitoring of disruptive behaviour (Conners & Jett, 1999; Meyer et al., 2003; Swanson et al., 1998c).

Rating scales which are frequently used to diagnose disruptive behaviour include the Conners Rating scales, Conners Abbreviated Symptoms Questionnaire (ASQ), Home and School Situations Questionnaire (Barkley, 1997b; Barkley et al., 1998) and the DBD rating scale (Pelham, Gnay, Greenslade, & Milich, 1992; Pillow, Pelham, Jr., Hoza, Molina, & Stultz, 1998). The DBD rating scale assesses the presence and degree of ADHD-related symptoms; ODD and CD as formulated in the DSM IV (Meyer & Aase, 2003).

5.3.1 Disruptive Behaviour Disorder Rating Scale

The Disruptive Behaviour Disorders screening questionnaire is based on the DSM-IV and was compiled by Pelham et al., (Pelham, Jr., Gnagy, Greenslade, & Milich, 1992; Pillow et al., 1998). This questionnaire is used for screening the disorders ADHD, ODD and CD. It consists of 42 items with specific items for ADHD, ODD and CD. It is also used to categorise children according to inattentive, hyperactive/impulsive, and combined subtypes. The parents and/or teachers administer this questionnaire. The child is rated according to four ratings: "not at all", "just a little", "pretty much", and "very much" (Meyer et al., 2004).

The rating scale has been translated into the six languages spoken in the Limpopo Province of South Africa and norms have been established (Meyer et al., 2004).

5.3.2 The Home and School Situations Questionnaire

The Home and School Situations Questionnaire is a form given to parents to evaluate the pervasiveness and the severity of children's behaviour problems across 16 different home and public situations, whereas the school situation questionnaire is a form that is to be completed by teachers to evaluate the pervasiveness and the severity of the children's behaviour problems across 12 different school situations (Barkley, 1997b; Barkley et al., 1998).

5.3.3 Conner's Teacher Rating Scale Revised

The Conner's Teacher's Rating Scale Revised was developed by Keith Conners in 1969, and has been used extensively since its publication (Mehl-Medronna, 2000). This scale consists of 28 items. This scale assesses factors such as conduct problems, inattentiveness-passiveness and hyperactivity. The older version of the teacher's rating scale consists of 38 items. The revised version can be used to assess behavioural changes in hyperactive children after being given medications. This scale might not be useful in the initial assessment since it has fewer items concerning hyperactive and inattentive factors (Conners,1997; 1999; Conners et al., 1999).

5.3.4 The Child Behaviour Checklist

The Child Behaviour Checklist (Achenbach & Edelbrock, 1983) consists of 138 items. From 138 items, 20 assess social competence, and 118 items assess behaviour problems. The social competence generates three scores: Activities (sports, hobbies, etc), social (organisations, friendships, etc.) and school (performance, problems, etc.). The completion time is 15- 20 minutes. It has test–retest reliability, inter-rater reliability, as well as internal consistency. This scale is used for assessment of psychopathology and social competence in children (Achenbach & Ruffle, 2000).

5.3.5. Conners Abbreviated Symptoms Questionnaire

The Conners Abbreviated Symptoms Questionnaire (ASQ) often referred to as the Hyperactivity Index (Conners, Sitarenios, Parker, & Epstein, 1998). The use of ASQ has mainly been to diagnose children with hyperactivity and to assess changes in hyperactivity and conduct problems, particularly on the children who are on stimulant drug therapy. It consists of a 10-item rating scale for screening purpose to identify hyperactive children. The analysis of teachers responses to the AQS by Barkley (1998) concluded that the AQS over-identifies normal children and disproportionately identifies children who are hyperactive and aggressive, and under-identifies distractible children.

5.4 Neuropsychological Assessment

Neuropsychological testing is recommended in evaluating the child's intellectual level and in getting information about comorbid conditions (Meyer & Aase, 2003). A neuropsychological evaluation may rule out a diagnosis of disruptive behaviours as other neurological conditions may be identified that better describe the observed symptoms (Meyer & Aase, 2003). According to Barkley (1998), neuropsychological deficits are part of some disruptive disorders.

Tests that can significantly differentiate between children with Disruptive Behaviour Disorders (DBD) and normal comparisons on a group basis include Stroop Interference Test (impulse control), Continuous Performance Test (attention), and KABC-Hand Movement Test (Grodzinsky & Barkley, 1999; Meyer & Aase, 2003).

5.4.1 Tower of London

The TOL developed by Krikorian, Bartok, and Gay (1994) is a task that measures the ability to plan. The Tower of London consists of three pegs of different

lengths mounted on a strip, and three coloured balls (red, blue and yellow). The longest peg can hold three balls, the middle peg can hold two balls and the smallest peg can hold one ball (Krikorian et al., 1994). The child is required to construct a design using the coloured balls and the three upright pegs. The patient should be able to mentally represent and test out various ways of removing and replacing balls on a set of pegs to match the designs presented by the assessor. This test assesses mental planning that must occur before and while performing the actual motor execution of the rearrangement.

5.4.2 Continuous Performance Test

The Continuous Performance Test takes about fourteen (14) minutes to complete and can be administered from the computer at school or in an office environment. It is used to measure sustained attention, while errors of commission also measure impulsivity. The test provides one of the few direct measures of attention and impulsivity without reliance on observer ratings alone (Conners & Jett, 1999).

The CPT was found to be the most reliable of the neuropsychological test batteries in distinguishing ADHD from normal children. It is directly used to assess symptoms of the disorder, which are impulsiveness and inattention (Barkley, 1991).

5.4.3. Tests for the frontal lobe

These tests differentiate between groups of children with ADHD and normal children and groups with other disorders like learning disabilities, depression, anxiety, schizophrenia, and diabetes. Inattention is a characteristic of most psychiatric disorders, except mania. Therefore, ADHD cannot be defined by symptoms of inattention unless it is specifically described how ADHD inattention can be differentiated from that in the other disorders (Johansen et al., 2002).

5.4.3.1 Stroop Word Colour Test

The Stroop Word Colour (Stroop, 1935) test is a speed test measuring the ability to suppress or inhibit habitual responses in the presence of salient conflicting information. The subjects first reads a repeating list of colour names ("red, blue, green ") printed in black; then names the colours of a repeating series of blocks of "X"s printed in those colours; finally, the colour of the ink must be named when it conflicts with the colour name printed. This last condition, the interference task, is assumed to be sensitive to failure to inhibit habitual responses (i.e., to read the colour name) and to maintain task focus (Grodzinsky & Diamond, 1992).

5.4.3.2 The Wisconsin Card Sorting Test (WCST)

The WCST was first described by Grant and Berg (Grant & Berg, 1948). The WCST measures frontal lobe (executive) functioning, originally designed to study " abstract behaviour " and " shift of set" (Lezak, Howieson, & Loring, 2004). The tasks consist of 128 cards that differ in colour, form, and number. The subject is presented with "abstract" stimulus cards and is asked to sort cards into piles in front of or on another of the stimulus cards.

5.4.3.3 The Multiple VI/VI Test

The Multi VI/VI is a computerised test developed by Hall, Sonuga-Barke, & Sagvolden (1997). The test measures shorter delay reinforcement and deficient extinction in the mesolimbic branch of the dopamine system. The child is requested to solve a task by pointing at one of the two targets presented on the screen of the computer. The child is not given the instructions on how to solve the problem, but to find the solution to the problem by himself or herself. The child receives a reward or reinforcer after getting correct solution on the average every 15 seconds or every 45 seconds. Children with a shorter delay of reinforcement gradient will

react impulsively when the reinforcement of a correct response is delayed. Children with ADHD are interested in immediate rewards because their delay-of-reinforcement gradient is shorter (Barkley, 1998; Johansen et al., 2002).

5.5 Treatment of Disruptive Behaviour Disorders (ADHD, ODD and CD)

5.5.1 Pharmacological Treatment

Treatment can include the use of medications, special educational programs to help the child keep up academically, and psychotherapy. Between 70% and 80% of children with ADHD respond to medications, which allow them a chance to improve their attention span, perform tasks better, and control impulsive behaviour. As a result, children get along better with their teachers, classmates, and parents, which, in turn, improve their self-esteem (Meyer & Aase, 2003; Swanson et al., 1998b). Medication that is mostly involved in treating ADHD includes stimulants, antidepressants, clonidine, and atomoxetine. Medication that is used for Disruptive Disorders like ODD and CD, is not commonly tested for these specific disorders, but it was found to be useful for reducing aggression and life- expectancy changes (Biederman & Spencer, 2000b; Newcorn, et al., 2005).

5.5.1.1. Stimulants

Stimulants are so named because of their ability to increase the level of activity or arousal of the brain. Three of the involved stimulants d-amphetamine (Dexedrine®), methylphenidate (Ritalin®), and pemoline (Cylert®) have been found to improve the core symptoms of inattentiveness, impulsiveness and hyperactivity (Barkley, 1995a; Greenhill, Halperin, & Abikoff, 1999).

Stimulants are known for increasing the action of certain chemicals that occur naturally in the brain. The way the brain handles information is based on how these chemicals are produced in the brain cell (neurons). The most active chemicals in the

brain cells are dopamine and norepinephrine. Stimulant drugs stimulate the release of dopamine and block the re-uptake of dopamine in the synaptic cleft. This leads to the reduction of inattention, and impulsiveness (Swanson et al., 2000).

Methylphenidate is the drug of choice. It was shown that methylphenidate releases dopamine from vesicles stores only and is believed to be less potent than d-amphetamine. These drugs, according to Solanto (2000), have been shown to ameliorate the core symptoms of ADHD.

Low doses of d-amphetamine (0.25 mg/kg or less) stimulated presynaptic inhibitory autoreceptors in the nigro-striataland ventral tegmental pathways; reducing dopamine cell firing rate (Solanto, 2000; Wilens, Spencer, Biederman, Wozniak, & Connor, 1995).

Side effects of stimulants:

- The most common side effects of any stimulant are nervousness and sleeplessness, although parents have reported improved sleep patterns in their children after children have taken stimulants,
- Other side effects include irritability, withdrawal, depression, hallucinations, and lack of spontaneity;
- Tics or jerky, disordered movements occur in about 9% of children. Low doses of Ritalin are effective in controlling impulsivity without causing tics, even in some children with mild to moderate Tourettes syndrome (Barkley, 1998);
- Lack of appetite, stunting of growth (Lisska & Rivkees, 2003).

5.5.1.2 Clonidine

This drug was originally developed for treating blood pressure and it is safe. It turns out to be useful for lots of disorders like tics, ADHD, heroin addicts, menopausal flushing and others. It is preferred because most researchers believe that

it does not aggravate tics, it can work even when autism is present. Its side effects include depression, which becomes visible after 3-4 days of taking the pill and stops 3-4 days after the treatment is discarded. It has effect on the heart. It can lower the blood pressure and the pulse rate. It also has a sedation effect (Barkley, 1998; Connor, Barkley, & Davis, 2000).

5.5.1.3 Trycyclic Antidepressants

Trycyclic antidepressants (TCAs) have a wide range of neurochemical effects on neurotransmitters. However, it is assumed that antidepressant activity in ADHD comes from their actions on catecholamine (norepinephrine and dopamine) re-uptake. Advantages of this class of drugs are that they have a relatively long half life (approximately 12 hours) reducing the necessity of being administered during the school hours, the absence of potential abuse, and the positive effects on mood and anxiety, sleep, and tics (Spencer, Biederman, Wilens, & Faraone, 2002). Research findings by Wilens et al., (1995) indicate that desipramine has a strong beneficial effect on ADHD and tic symptoms. According to Kupfer et al., (2000) in some cases, antihistamines may be tried to help control accompanying depression or anxiety. Although TCAs appear to be effective in individuals with comorbid disorders for treating ADHD, they have side effects such as, a dry mouth or anorexia and some serious cardiac effects (Spencer & Biederman, 2002; Wilens et al., 1995).

Parents need to know that new behaviours might crop up when a child is under stress. The challenges that all children face, like changing schools or entering puberty, may be more stressful for a child with ADHD. Some doctors recommend that children be taken off medication frequently to see if they still need it. They also recommend temporarily stopping the drugs during breaks and summer vacations, when focused attention and behaviour are usually not as crucial. These "drug holidays" (weekends/summer vacations) work well if the child can still participate in

other activities without medication (MTA-Cooperative Group, 1999; National Institute of Mental Health, 2002).

5.5.2. Atomoxetine (Strattera®)

Atomoxetine is a nonstimulant agent approved by the U.S. Food and Drug Administration for treatment of ADHD in children, adolescents and adults. Atomoxetine is a norepinephrine reuptake inhibitor and works differently from other ADHD medication (Newcorn et al., 2005). It increases the dopamine and norepinephrine in the prefrontal cortex, similarly to methylphenidate, but, does not increase dopamine in the striatum or nucleus accumbens, as methylphenidate does (Bymaster et al., 2002). Atomoxetine further indicates the improvement in quality-of-life measures of social and family functioning (Biederman et al., 2000b; Michelson et al., 2001). Like other medications it has got side effects which includes: upset stomach, decreased appetite, nausea or vomiting, dizziness, tiredness, and mood swings (Connor, 2002; Eiland & Guest, 2004).

5.5.3. Psychosocial intervention

5.5.3.1 Psychotherapy

The therapist helps the persons with ADHD to acknowledge and accept themselves despite their disorder. In psychotherapy, patients talk with the therapist about upsetting thoughts and feelings, explore self-defeating patterns of behaviour, and learn alternative ways to handle their emotions. As they talk, the therapist tries to help understand how the patients can change (Barkley, 1998; National Institute of Mental Health, 2002; Swanson et al., 1998c).

5.5.3.2 Cognitive-Behavioural therapy

This therapy helps children work on immediate issues. Rather than helping them to understand their feelings and actions, it supports them directly in changing

their behaviour. The support might be practical assistance, like helping a child to learn to think through tasks and organize his work. Other supports might be to encourage new behaviours by giving praise or rewards each time the person acts in the desired way (National Institute of Mental Health, 2002; Swanson et al.,, 1998c). This intervention method is appropriate for older and more intelligent children.

5.5.3.3 Social skills training

In social skills training, the therapist discusses and models appropriate behaviours, like waiting for a turn, sharing toys, asking for help, or responding to teasing, then gives the children a chance to practise new behaviours. For example, a child might learn to read other people's facial expression and tone of voice, in order to respond more appropriately (National Institute of Mental Health, 2002; Swanson et al., 1998c).

5.5.3.4 Support groups

Many adults with ADHD and parents of children with DBDs may find it useful to join a support group. Members of a support group share frustrations and successes, assistance on referral to qualified specialists, and information about what works, as well as their hopes for themselves and their children. There is strength in numbers and sharing experiences with others who have similar problems helps people know that they are not alone (National Institute of Mental Health, 2002; Swanson et al., 1998c).

5.5.3.5 Parenting skills training:

When offered by the therapist or in special classes, it gives parents tools and techniques for managing their child's behaviour. One such technique is the use of 'time out' when the child becomes unruly or out of control. During time outs, the child is removed from the agitating situation and sits alone quietly for a short time to

calm down. Parents may also be taught to give the child quality time each day, in which they share a pleasurable or relaxed activity. During this time together, the parent looks for opportunities to point out what the child does well, and praise his or her strengths and abilities (National Institute of Mental Health, 2002).

This method is used on the assumption that a parenting skill deficit is responsible for developing and maintaining Conduct Disordered behaviour. Techniques used include modelling, behavioural rehearsal, shaping (selective use of reinforcement), and homework exercises to instruct the parent(s) (Barrickman, 2003; Conners, Epstein, Angold, & Klaric, 2003).

5.5.4 Behavioural Techniques at Home

Behaviour techniques is an attempt to set up contingencies that make desirable behaviour more likely and attempts to eliminate undesirable behaviours. These techniques provide a high level of structure, which is generally needed by children with Disruptive Disorders. Behavioural techniques help the child make crucial cause and effect connections that he or she has not been able to do previously, either through lack of experience or inherit lack of capability. Behavioural plans are coordinated between school and home for maximum effectiveness (Goodman & Gurian, 2002).

5.5.4.1 Setting Priorities for the Parent

Parents must first establish their own levels of tolerance. Some parents are easy going and accept a wide range of behaviours, while others are not able to do this. To help a child achieve self-discipline requires empathy, patience, affection, energy, and toughness.

- Parents should prepare a list giving priority to those behaviours they think are most negative, such as fighting with other children or refusing to get up

in the morning. The least negative behaviours on the bottom of the list should be ignored temporarily or even permanently.

- Certain odd behaviours that are not harmful to the child or to others may be an indication of creative or humorous attempts to adapt. These should be accepted as part of the child's unique and positive development, even if they seem peculiar to the parent.
- It is important to keep in mind that no one is a saint. Loving parents who occasionally lose their tempers will not damage their children forever. Non-abusive open disapproval or dismay is far less destructive to both parent and child than harbouring resentment beneath a false calm (adapted from Webster-Stratton, 1996).

5.5.5 Community Based Residential Program

This involves children, and sometimes parents, in a home or residential setting. Some programme utilise facilitators who assume a role of "teaching parent". Treatments emphasis is on self-government procedures, social skills training, and academic tutoring, and home based reinforcement procedure for monitoring school behaviour (Conner, 2003).

5.6 Conclusion

Assessment and treatment of disruptive disorders need not only be a single intervention but also multi-approach. This is especially the case in the assessment of children with these disorders, since they present a great number of cormobid disorders. If the therapist is not extra careful, it is possible to treat comorbid symptoms rather than the disorder itself.

Chapter 6

PROBLEM DELINEATION

6.1 Introduction

Little is known about the Disruptive Behaviour Disorders (DBD's) on the African continent. DBD's such as Attention Deficit/Hyperactivity Disorder (ADHD), Oppositional Defiant Disorders (ODD) and Conduct Disorder (CD) are characterised by antisocial behaviour and as such seem to be collection of behaviours rather than a coherent pattern of mental dysfunction. Despite the ever-increasing amount of research on DBD's the need for scientific efforts directed towards understanding the roots, classification, assessment, underlying mechanisms and treatment of antisocial behaviour has never been greater (Barkley, 2003; Connor et al., 2003; National Mental Health Association, 2001).

Problems with the Disruptive Behaviour Disorders include deficits in self-regulation, self-initiation and inhibition, strategic planning, cognitive flexibility, and impulse control. These functions are commonly known as 'executive functions' (Barkley et al., 2002).

6.2. Problem Statement

The Disruptive Behaviour Disorders, account for at least 75% of the combined prevalence of all psychopathological disorders of childhood and adolescence (Quay et al., 1999). In particular, Conduct Disorder, with its links to school failure and dropout, juvenile delinquency, criminality, antisocial personality disorders and other indices of dysfunction in adulthood, is extremely costly both to society and the individuals afflicted. An understanding of the biological and psychosocial aetiologies of these disorders, the settings that engender and maintain them, their natural history, and what may be the most effective

intervention and prevention strategies for them are prime importance to all professional who must deal with the troubled and troublesome youths.

6.3. Aims of the study

The aim of this investigation was two fold:

1. To establish a correlation between the core symptoms of the various Disruptive Behaviour Disorders, namely, Inattention, Hyperactivity/Impulsiveness, ODD and CD.
2. To establish differences in core symptomatology among the different Disruptive Behaviour Disorders, namely, ADHD-PI, ADHD-HI, ADHD-C, ODD and CD as a possible function of age and gender.

6.4 Research Hypotheses

6.4.1 Research Hypothesis 1

There is a relationship between the core symptoms of the Disruptive Behaviour Disorders, namely, Inattention, Hyperactivity/Impulsiveness, ODD and CD, as shown on the scores on the different scales of the DBD rating scale.

6.4.1.1 Null Hypothesis 1

There will be no significant correlation between the scores on the different scales for Disruptive Behaviour Disorders, namely, Inattentiveness, Hyperactivity/Impulsiveness, ODD and CD.

6.4.2 Research hypothesis 2

There will be differences in the core symptomatology of DBD's as shown on the different scales of the Disruptive Behaviour Disorders rating scale, Inattentiveness, Hyperactivity/Impulsiveness, ODD and CD between the children screened for DBD's (ADHD-PI, ADHD-HI, ADHD-C, ODD and CD) and a control group without DBD's

6.4.2.1 Null Hypothesis 2

There will be no differences between the core symptoms of DBD's as measured by the scales, Inattention, Hyperactivity/Impulsiveness, ODD and CD, on the DBD rating scale between the DBD groups ADHD-PI, ADHD-HI, ADHD-C, ODD and CD) and a control group without DBD's.

Specific hypotheses derived from Null hypothesis 2:

Null Hypothesis 2.1

There will be no difference in scores on the Inattention scale for the ADHD-PI, ADHD-HI, ADHD-C, ODD and CD groups and a control group without symptoms.

Null Hypothesis 2.2

There will be no difference in scores on the Hyperactive/Impulsive scale for the ADHD-PI, ADHD-HI, ADHD-C, ODD and CD groups and a control group without symptoms.

Null Hypothesis 2.3

There will be no difference in scores on the ODD scale for the ADHD-PI, ADHD-HI, ADHD-C, ODD and CD groups and a control group without symptoms.

Null Hypothesis 2.4

There will be no difference in scores on the CD scale for the ADHD-PI, ADHD-HI, ADHD-C, ODD and CD groups and a control group without symptoms.

A description of the statistical tests employed to accept or reject the hypotheses formulated here will be supplied in the next chapter. Information about accepting and rejecting the formulated hypothesis will follow in the next chapter 8.

Chapter 7

METHODOLOGY

7.1 Introduction

The Disruptive Behaviour Disorders (DBD's) as currently labelled in the DSM-IV–TR (American Psychiatric Association, 2000), are Attention Deficit/Hyperactivity Disorder (ADHD), Oppositional Defiant Disorder (ODD) and Conduct Disorder (CD). The disorders place the child at risk for school failure and dropout, juvenile delinquency, criminality, substance abuse, and sexual promiscuity and as a consequence HIV/AIDS (Barkley, Fischer, Smallish, & Fletcher, 2004; Kahn, Kaplowitz, Goodman, & Emans, 2002; Molina, Bukstein, & Lynch, 2002). In this way, the disorder is extremely costly, both to the afflicted individuals and their families and to the society (Birnbaum et al., 2005; Matza, Paramore, & Prasad, 2005). Therefore research in this field is crucial.

The purpose of this study was (1) to establish a relationship between the symptoms of the Disruptive Behaviour Disorders: Inattention, Hyperactivity/Impulsiveness, ODD, and CD and (2) to determine whether there are differences in Hyperactive/Impulsive, Inattentive, ODD and CD symptoms among children with ADHD-PI, ADHD-HI, ADHD-C, ODD and CD and a comparison group without any of the disorders.

This chapter will be reporting on the research design applied, sampling, measurements used, the procedure employed and the methods of analysis.

7.2 Research Design

A correlation and comparative study was undertaken. First, the scores on the DBD scale (ADHD-Inattentive, ADHD-Hyperactive/Impulsive, ODD and CD scales) were correlated with each other to establish a relationship between the symptoms of ADHD, ODD and CD.

Secondly, the children with ADHD (all three subtypes), ODD and CD were compared for symptoms of the disorders with each other and a comparison group of children without ADHD, ODD or CD symptomatology as a possible function of gender and age. This is a quasi-experimental design, as the subjects for the study could not be randomly assigned to conditions of the independent variable as they already exhibited the variable.

7.3 Sample

The sample was drawn from Northern Sotho speaking primary school children aged 7 - 13 who were screened for both ADHD (hyperactive/impulsiveness; inattentiveness), ODD and CD using the Disruptive Behaviour Rating scale (DBD) (Meyer et al., 2004; Pelham et al., 1992; Pillow et al., 1998). The sample was drawn from the rural and semi-urban schools. Two age groups were created: 7-9, and 10-13 years. These children were from different socio-economic status or background. The table below represents composition of the sample (Table 7.1). The control group was matched with the experimental group for age and gender.

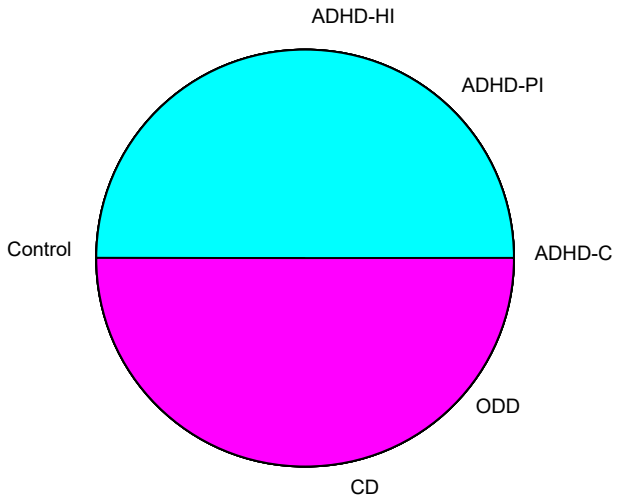
Based on the scores obtained, the children were divided into six groups: ADHD-HI, ADHD-PI, ADHD-C, ODD, CD and a comparison group without symptomatology of any of the disorders. If more than one disorder was diagnosed (e.g. ADHD + ODD, ADHD + CD, or ODD + CD) the most severe of the disorders was taken as the final diagnosis according to the DSM-IV-TR guidelines (American Psychiatric Association, 2000). The final sample consisted of 260 children, 130 with Disruptive Behaviour Disorders and 130 controls without DBD symptoms (Fig. 7.1)

Table 7.1. Characteristics of the sample (age in months)

Gender	Group	N	Age (in months)
Boys	ADHD-HI	11	128.27 ± 21.26
	ADHD-PI	15	123.20 ± 24.19
	ADHD-C	32	117.75 ± 26.12
	ODD	13	135.76 ± 19.15
	CD	18	128.11 ± 22.12
	Non-DBD	87	119.03 ± 20.56
Girls	ADHD-HI	6	120.00 ± 18.59
	ADHD-PI	12	131.00 ± 18.77
	ADHD-C	9	121.33 ± 18.44
	ODD	8	123.00 ± 17.86
	CD	7	126.86 ± 11.72
	Non-DBD	42	128.28 ± 22.87
	All groups	260	123.45 ± 21.79

The difference in age was statistically not significant (p = 0,1706)

Fig 7.1 Distribution of the DBD subtypes of the sample



7.4 Measurement instrument

The DBD rating scale (Pelham et al., 1992; Pillow et al., 1998) was used for screening children to form five groups of Disruptive Behaviours subdivided as ADHD Hyperactive/Impulsive, ADHD Inattentive and ADHD Combined subtypes as well as an ODD and CD group. This instrument has been translated into different South African languages (Northern Sotho, Venda, Tsonga, Afrikaans, English and Tswana), and standardized for all the language groups in Limpopo Province (Meyer et al., 2004). The Northern Sotho version was used for the present study.

The questionnaire consists of 42 items with 18 items being for ADHD, 10 for ODD and 14 for CD. The categories for ADHD are further categorised into Inattentiveness and Hyperactive/Impulsiveness, as formulated in the DSM-IV-TR (Pelham et al., 1992; Pillow et al., 1998; American Psychiatric Association, 2000).

The questionnaire was completed by the class teachers to rate the child according to specific items of ADHD, ODD and CD. The child was rated according to the following : "not at all" (0) ;"just a little" (1); "pretty much" (2); "very much" (3).

The total score is added up for ADHD-related symptoms, ODD and CD, and compared to the cut-off point of the 95th percentile, which has previously identified as clinically significant (Barkley, 1997b; Barkley et al., 1998b).

The differences in scores between the clinical group and the controls on both the inattention and hyperactive/impulsive scales, ODD and CD of the DBD were statistically significant at (p = 0,000).

7.5 Procedure

Written permission was obtained from the Department of Education in Limpopo Province, as well as the principals of the selected schools. A meeting with the parents of all the children together with the school governing body was called to explain the reason for the research project and to obtain written consent. The consent forms were distributed together with the letters describing the study to all parents. Prior to conducting the research, firstly the University of Limpopo Ethics Committee approved the study.

The DBD questionnaire was distributed to the primary schools within the University of Limpopo area and at Moganyaka close to the researcher's home. Teachers completed the Disruptive Behaviour Disorders rating scales on the children in their register class. Only children from 6 – 13 years were selected. The completed questionnaires were collected, marked, and analysed.

7.6 Method of Data Analysis

The statistical programmes, SPSS 11 (SPSS, 2003) and STATISTICA 6 (StatSoft, 2003), were used. A correlational study (Pearson-*r*) was carried out to show the relationship between DBD scores, while MANOVA models were used to assess between-group differences (age, gender and subtypes) in raw scores.

Chapter 8

RESULTS

8.1 Introduction

The aim of this investigation was two fold:

1. To establish a relationship between the symptoms of the various Disruptive Behaviour Disorders, namely, ADHD-Inattention, ADHD-Hyperactive/Impulsive, ODD and CD.
2. To establish significant differences in symptomatology among the different Disruptive Behaviour Disorders, namely, ADHD-HI, ADHD-PI, ADHD-C, ODD and CD and a Non-DBD group, when compared with each other.

This chapter will report on the results obtained when the collected data were analysed for testing the postulated hypotheses.

8.2 Results of the study

The results for the analyses of the scores obtained on the subscales of the DBD rating scale are presented as follows:

- Descriptive statistics (in table and graph form)
- Results of the correlations to establish the relationship between the symptoms of the Disruptive Behaviour Disorders (Hyperactivity/Impulsiveness, Inattention, ODD and CD) as scored on the DBD scales.
- .MANOVA results investigating possible between-group differences
- *Post-hoc* testing (Bonferroni) to establish statistical significance in differences between the groups.

8.2.1 Descriptive statistics

Table 8.1 represents the results for the DBD rating scale for Hyperactive/Impulsive, Inattentive, ODD and CD symptoms for the six groups.

Table 8.1 DBD ratings: H/I, Inattention, ODD and CD scales

			Hyp/Imp	Inattention	CD	ODD
Gender	Group	N	Means	Means	Means	Means
Boys 7 - 9	ADHD-HI	2	18.00 ± 4.24	13.00±0.00	12.50 ± 7.78	9.50± 2.12
	ADHD-PI	3	8.00 ± 3.00	20.00 ± 2.64	3.00 ± 2.00	2.67± 1.15
	ADHD-C	18	22.05 ± 3.64	22.88 ± 3.10	28.33± 11.34	18.17± 5.86
	ODD	3	21.66± 2.30	21.67± 2.89	29.00± 6.08	23.00± 10.14
	CD	3	15.33± 5.85	15.33± 2.89	25.33± 7.64	13.00± 2.64
	Non-DBD	30	4.56± 3.63	4.73± 5.52	2.96±2.85	2.53±2.75
Girls 7 - 9	ADHD-HI	2	22.00± 1.41	7.50± 3.53	11.00±12.73	11.00± 12.73
	ADHD-PI	1	11.00± 0.00	19.00± 0.00	12.00± 0.00	10.00± 0.00
	ADHD-C	5	21.40 ± 2.19	21.80± 3.56	32.20± 4.76	21.20± 4.86
	ODD	4	17.50 ± 3.31	15.75 ± 5.68	19.75±11.18	18.00± 6.53
	CD	4	15.25± 1.50	17.00± 4.69	23.25± 6.18	18.50± 3.00
	Non-DBD	9	5.66 ± 4.63	6.0 ± 4.95	3.44± 0.88	3.33± 3.31
Boys 10-13	ADHD-HI	10	17.20± 2.89	11.20 ± 4.10	11.30± 4.11	10.50± 3.20
	ADHD-PI	10	10.50± 3.66	21.30± 8.36	10.50± 6.22	12.80± 11.14
	ADHD-C	14	21.85± 3.11	20.64±3.07	18.07± 8.46	17.21± 5.93
	ODD	11	12.81± 2.18	11.81 ± 2.71	11.81 ± 4.97	14.82± 3.02
	CD	14	14.85± 4.75	12.00± 5.33	20.28 ± 10.50	11.92± 6.25
	Non-DBD	59	3.64± 3.31	3.37± 3.76	3.02 ± 2.35	2.79± 2.67
Girls 10 - 13	ADHD-HI	3	18.33± 2.88	13.66± 2.30	14.00± 3.46	7.00± 1.73
	ADHD-PI	3	9.66± 2.30	18.66± 4.72	8.00± 2.64	13.33± 4.04
	ADHD-C	5	20.80± 3.70	26.60±3.43	20.40± 9.99	16.80± 2.86
	ODD	8	12.00± 4.72	11.12± 3.23	9.87± 5.91	15.12± 3.27
	CD	7	11.71± 3.98	13.57± 6.78	19.43± 8.58	12.00± 5.77
	Non-DBD	31	6.35±3.10	6.58± 3.78	2.48± 2.03	6.09± 3.30

Figure 8.1 illustrates the mean scores obtained by the various groups on the Hyperactive/Impulsive scale of the DBD rating scale

Figure 8.1

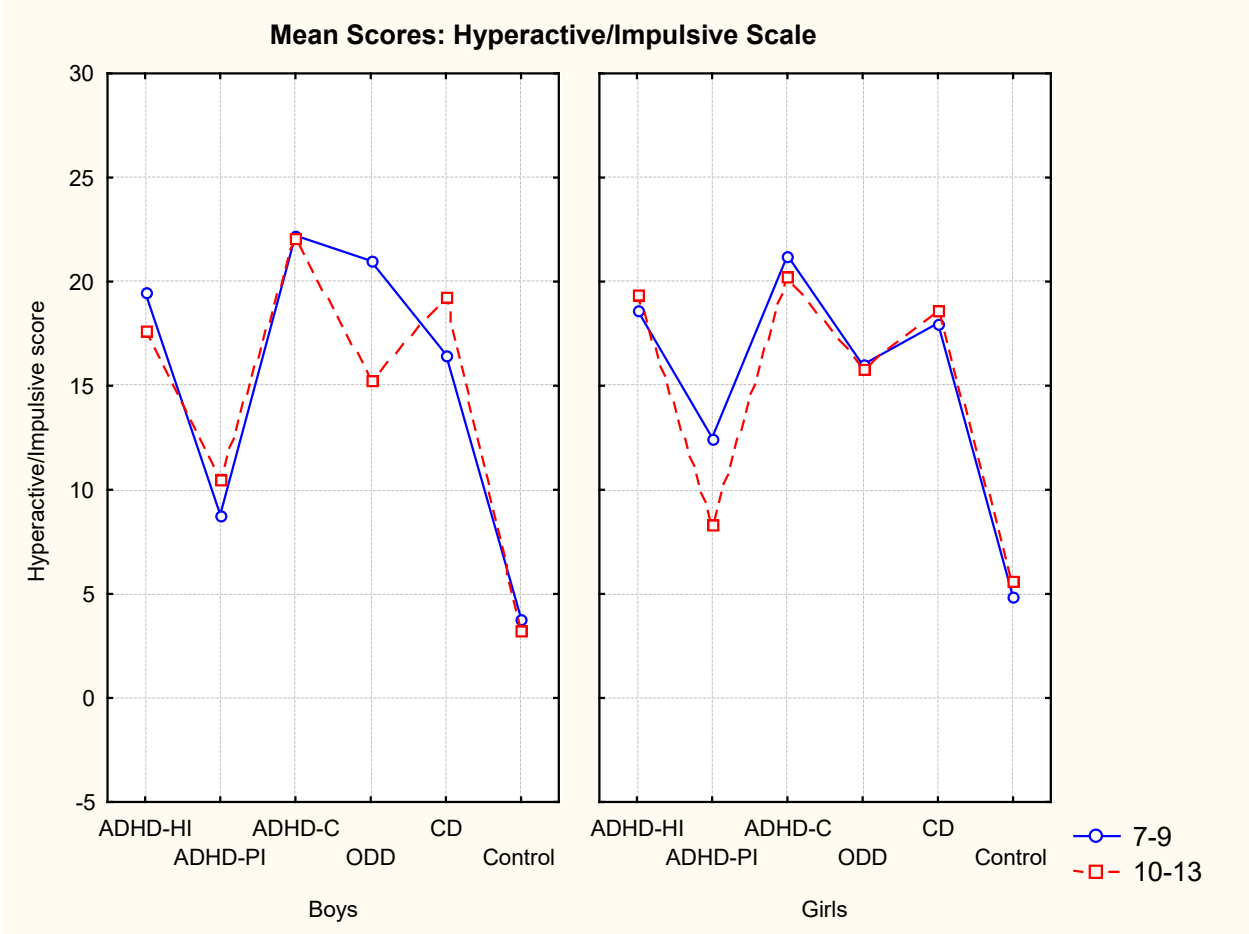


Figure 8.2 illustrates the mean scores obtained by the various groups on the Inattentive scale of the DBD rating scale

Figure 8.2

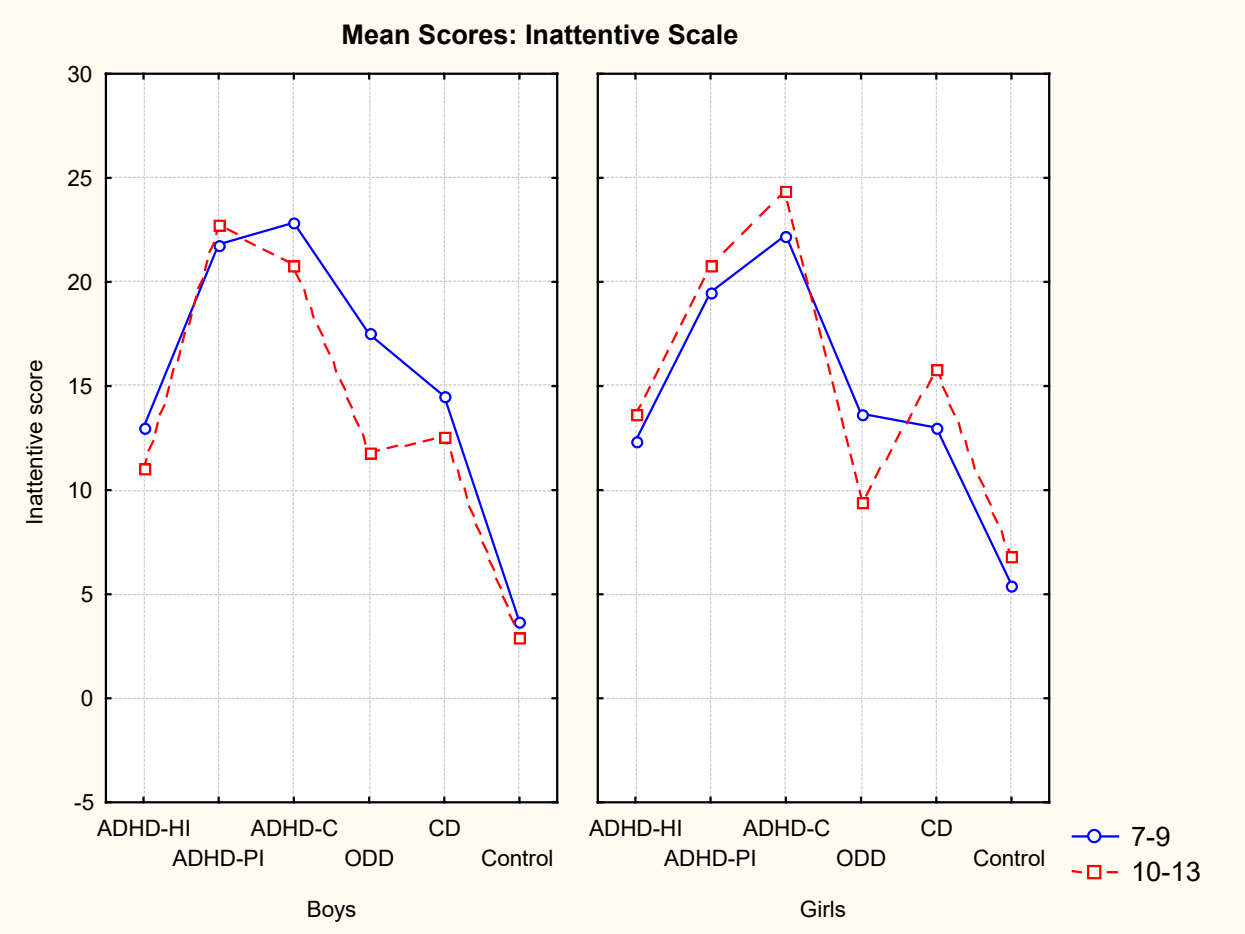


Figure 8.3 illustrates the mean scores obtained by the various groups on the ODD scale of the DBD rating scale.

Figure 8.3

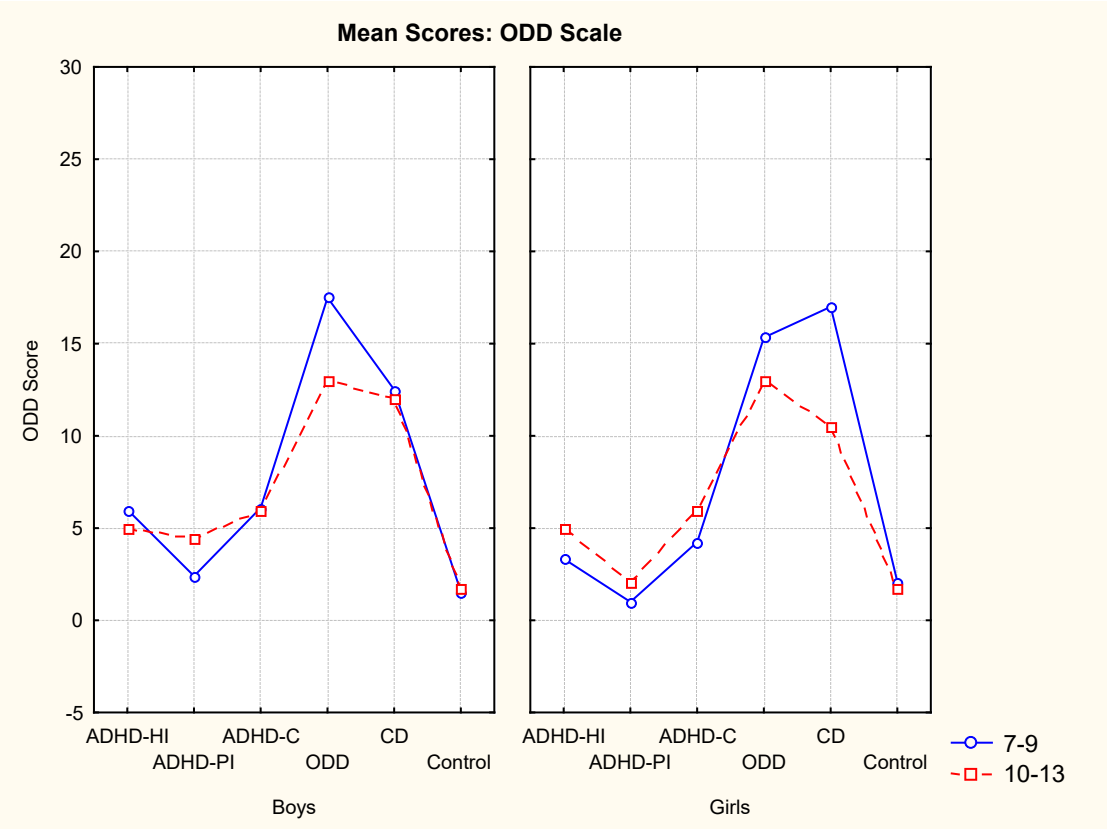
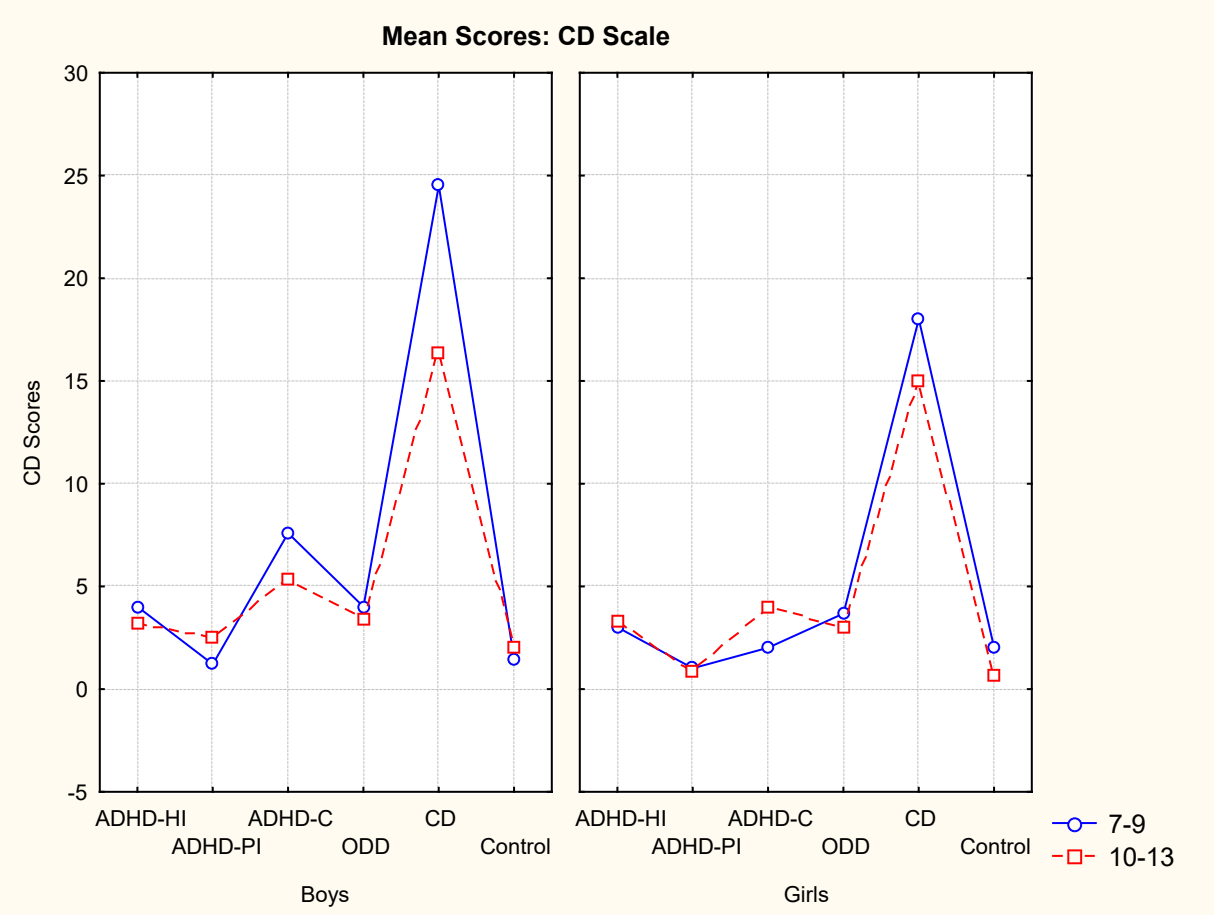


Figure 8.4 illustrates the mean scores obtained by the various groups on the CD scale of the DBD rating scale.

Figure 8.4



8.2.2 Correlations among the four DBD scales.

In order to investigate whether the symptoms of Hyperactivity/Impulsiveness, Inattention, ODD and CD are related to each other, the scores obtained were correlated with each other, using Pearson's product-moment. Table 8.2 shows the correlations obtained.

Table 8.2 Correlation (Pearson-r) among the DBD symptoms

	Hyp/Imp	Inattention	CD	ODD
Hyp/Imp	-	0.71*	0.43*	0.60*
Inattention	0.71*	-	0.22*	0.36*
CD	0.43*	0.22*	-	0.66*
ODD	0.60*	0.36*	0.66*	-

*p < 0.01

Figure 8.5 illustrates the correlation between Hyperactive/Impulsive symptoms and Inattentive symptoms on the DBD scale

Figure 8.5

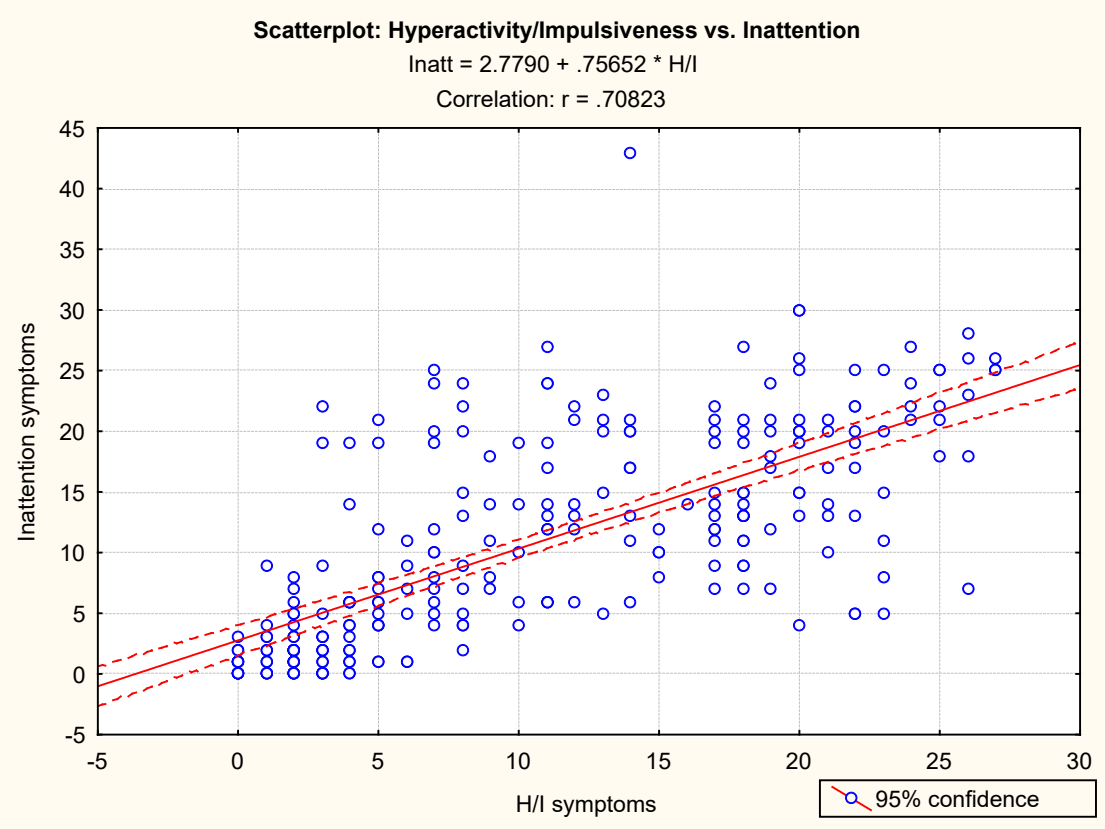


Figure 8.6 illustrates the correlation between Hyperactive/Impulsive symptoms and ODD symptoms on the DBD scale

Figure 8.6

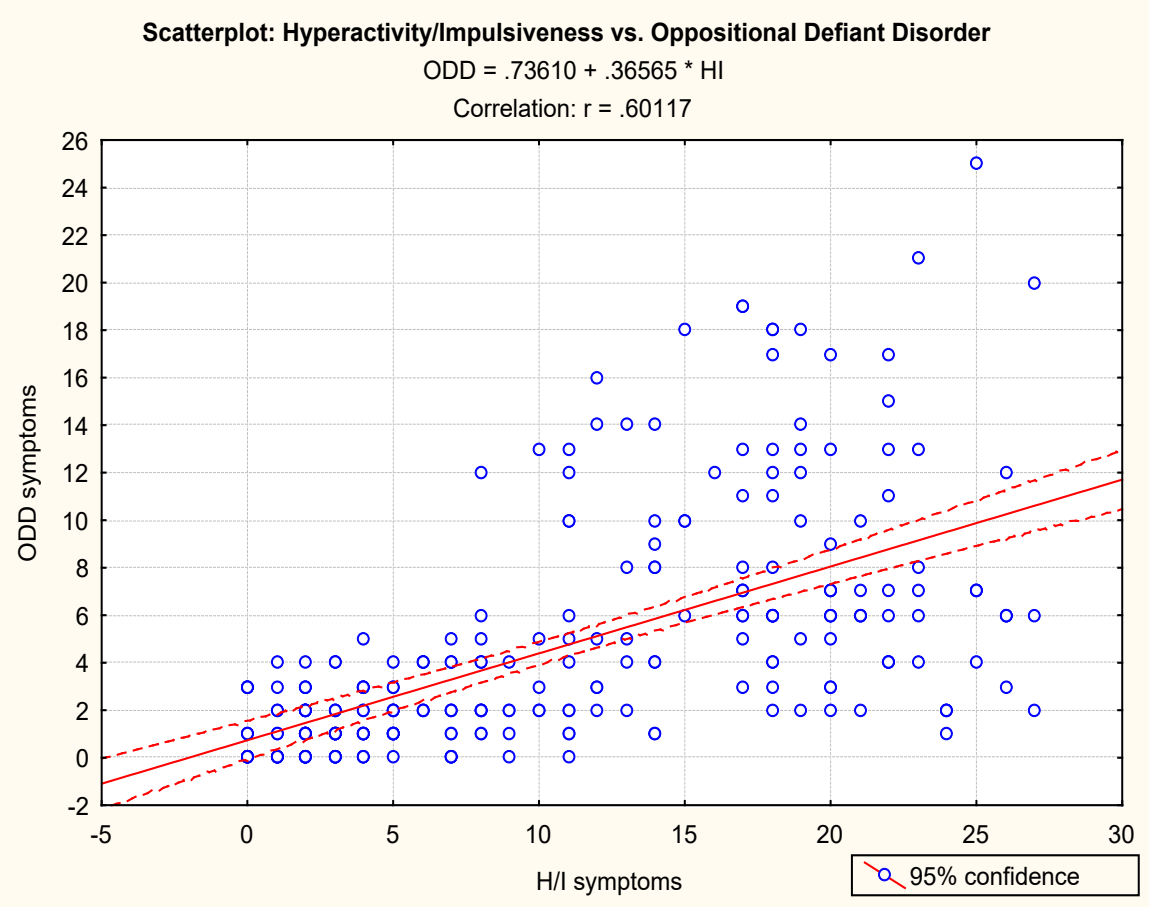


Figure 8.7 illustrates the correlation between Hyperactive/Impulsive symptoms and CD symptoms on the DBD scale

Figure 8.7

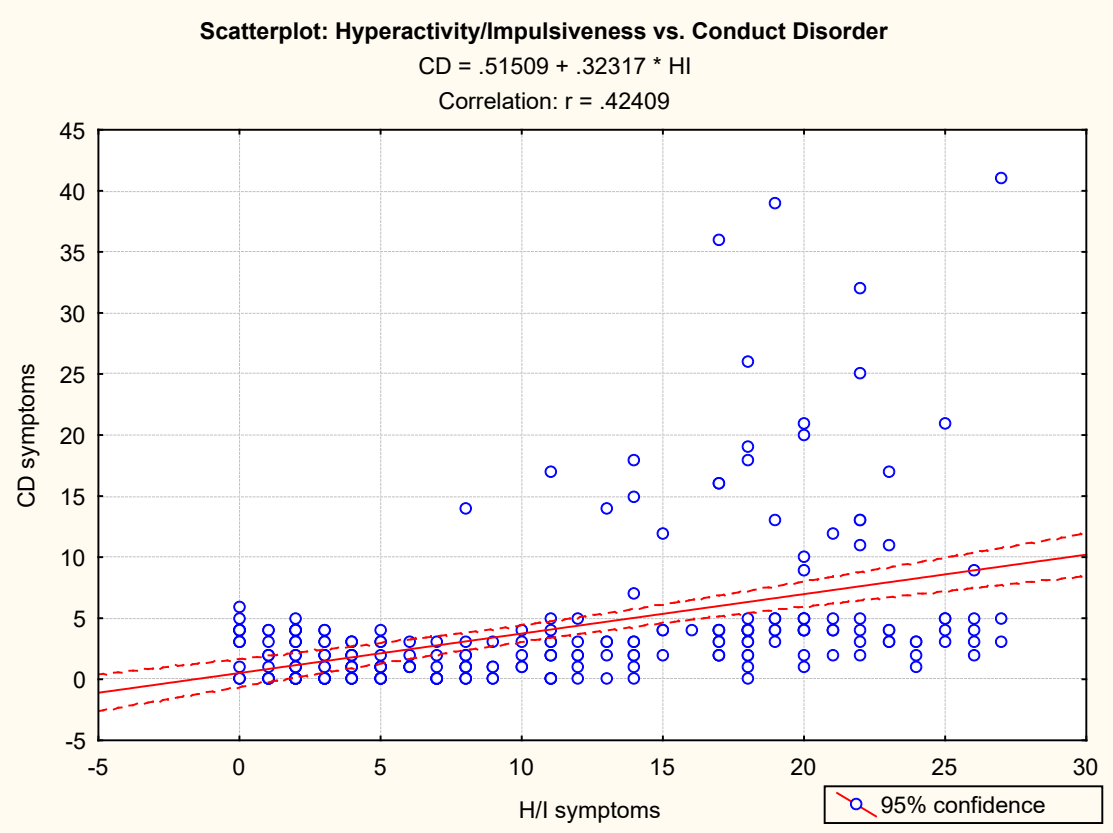


Figure 8.8 illustrates the correlation between Inattentive symptoms and ODD symptoms on the DBD scale

Figure 8.8

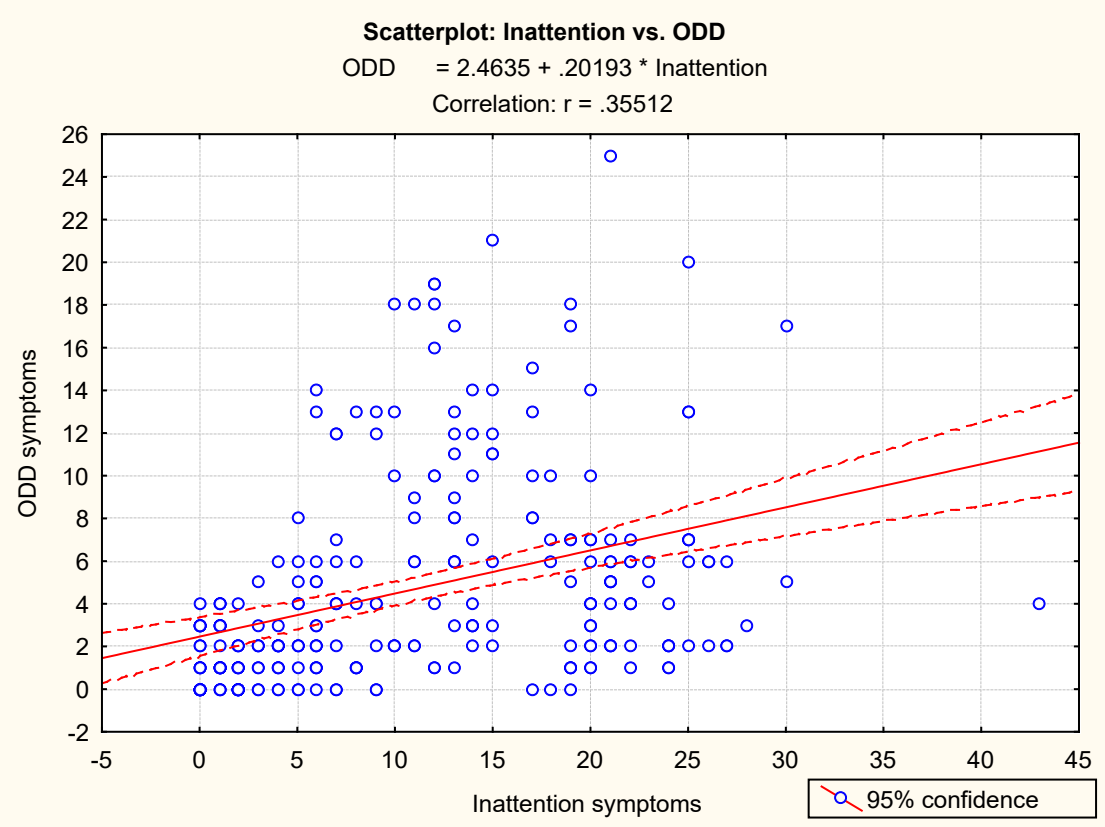


Figure 8.9 illustrates the correlation between Inattentive symptoms and CD symptoms on the DBD scale

Figure 8.9

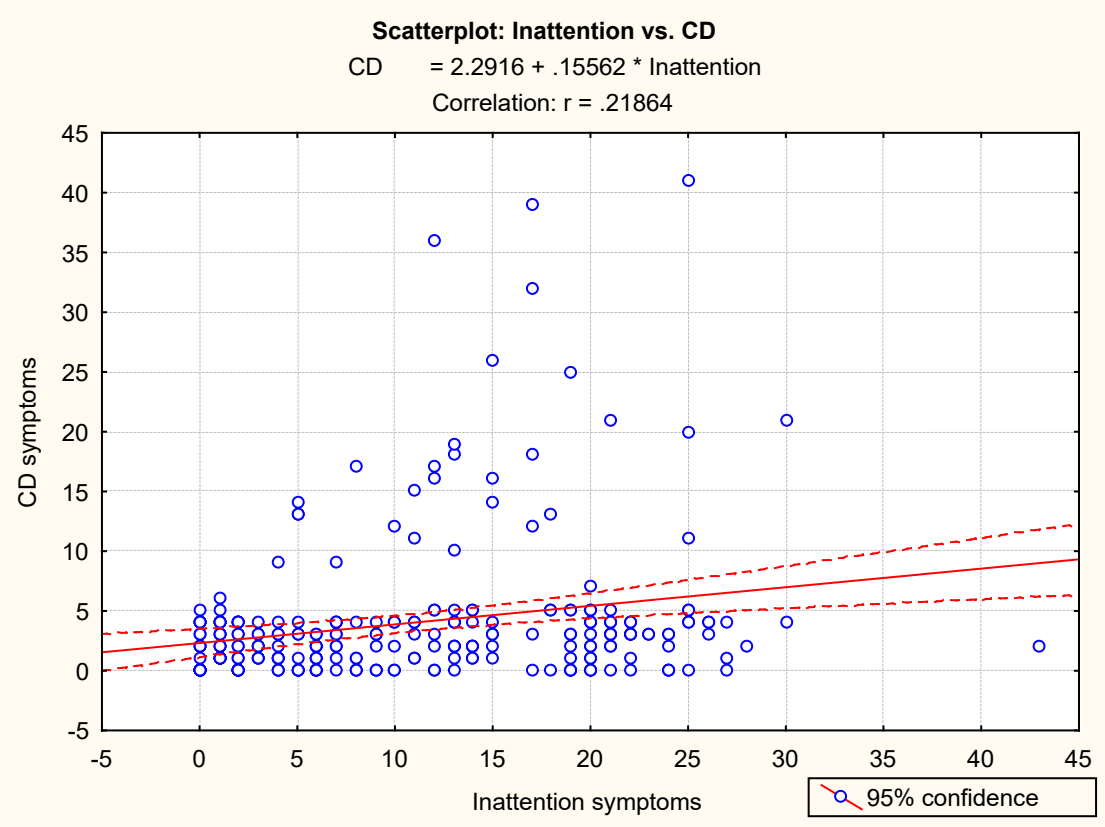
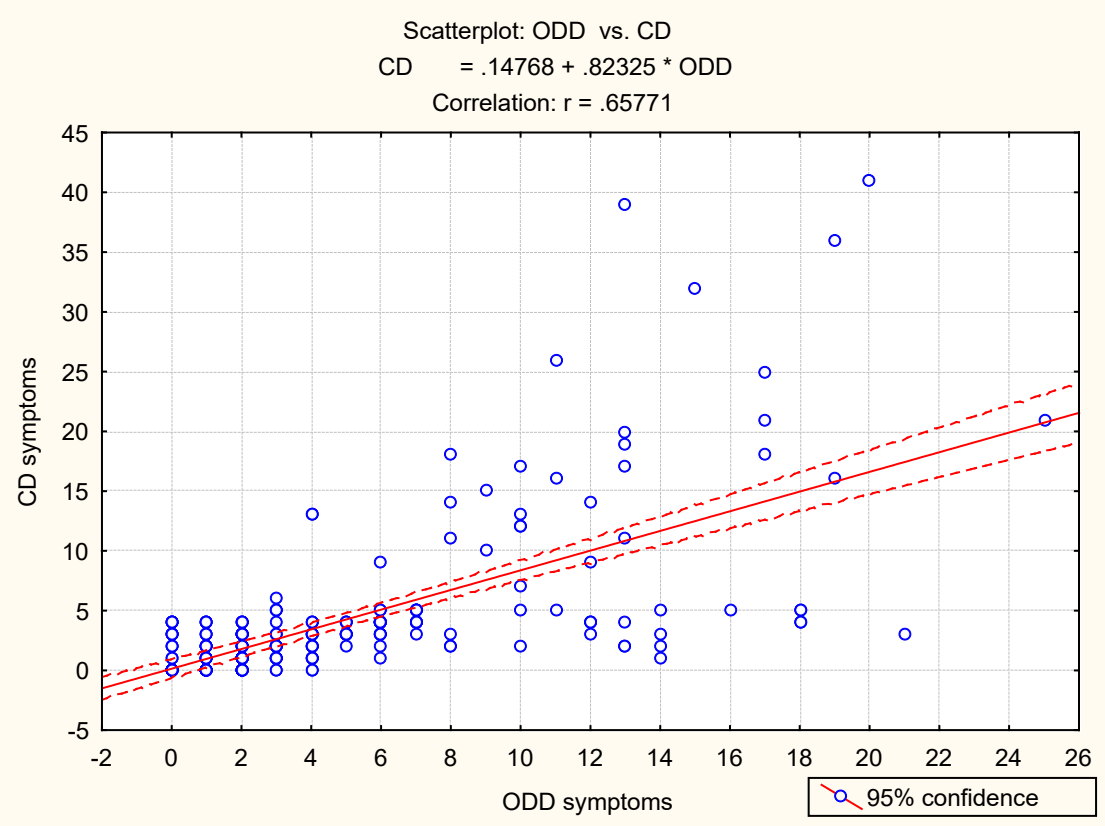


Figure 8.10 illustrates the correlation between ODD symptoms and CD symptoms on the DBD scale

Figure 8.10



8.2.3 Analysis of Variance

Multivariate (MANOVA) analysis for repeated measures was used. A multivariate approach to repeated measures of more than two levels is recommended because it bypasses the assumption of compound symmetry (StatSoft Inc., 2003).

Analyses relevant for the primary aim were performed first, with Group (5: ADHD-HI, ADHD-PI, ADHD-C, ODD and CD) as the between-group variable; and DBD scales (4: H/I, Inatt, ODD and CD scales) as within-group variables. The results are depicted in Table 8.

Table 8.3 Results of MANOVA for repeated measures (DBD scores)

	Test	F	df	p
DBD score	Wilks	165.9826	3, 234	0.000*
DBD score*Age group	Wilks	0.0952	3, 234	0.963
DBD score*Clinical group	Wilks	49.8720	15, 646	0.000*
DBD score*Gender	Wilks	0.9085	3, 234	0.438
DBD score*Age group*Clinical group	Wilks	0.8794	15, 646	0.588
DBD score*Age group*Gender	Wilks	1.3960	3, 234	0.245
DBD score*Cinical group*Gender	Wilks	1.2895	15, 646	0.203
DBD score*Age group*Clinical group*Gender	Wilks	1.2642	15, 646	0.220

*p = 0.000

As there were no effects of Gender and Age group, neither main effects nor interaction effects, the analysis combined boys and girls of both age groups.

8.2.4 Post-hoc analysis

Because there was a statistically difference in the scores on the DBD scales among the clinical groups, results were followed up with post hoc tests, using the Bonferroni correction factor to adjust the multiple comparisons. The results are depicted in Tables 8.4, 8.5, 8.6 and 8.7.

Table 8.4 Post-hoc results for the DBD-Inattention scale scores (Bonferroni)

Clinical Group	ADHD-HI	ADHD-PI	ADHD-C	ODD	CD	Non-DBD
ADHD-HI	-	0.000*	0.000*	n/s	n/s	0.000*
ADHD-PI	0.000*	-	n/s	0.000*	0.008*	0.000*
ADHD-C	0.000*	n/s	-	0.000*	0.000*	0.000*
ODD	n/s	0.000*	0.000*	-	n/s	0.000*
CD	n/s	0.000*	0.000*	n/s	-	0.000*
Non-DBD	0.000*	0.000*	0.000*	0.000*	0.000*	-

*p < 0.001

Table 8.5 Post-hoc results for the DBD-Hyperactivity/Impulsive scale scores (Bonferroni)

Clinical Group	ADHD-HI	ADHD-PI	ADHD-C	ODD	CD	Non-DBD
ADHD-HI	-	0.000**	0.005*	n/s	n/s	0.000**
ADHD-PI	0.000**	-	0.000**	0.000**	0.000**	0.000**
ADHD-C	0.005*	0.000**	-	0.000**	0.007*	0.000*
ODD	n/s	0.000**	0.000**	-	n/s	0.000**
CD	n/s	0.000**	0.007*	n/s	-	0.000**
Non-DBD	0.000**	0.000**	0.000**	0.000**	0.000**	-

* p < 0.05; ** p < 0.001

Table 8.6 Post-hoc results for the DBD-ODD scale scores (Bonferroni)

Clinical Group	ADHD-HI	ADHD-PI	ADHD-C	ODD	CD	Non-DBD
ADHD-HI	-	n/s	n/s	0.000*	0.000*	0.000*
ADHD-PI	n/s	-	0.000*	0.000*	0.000*	n/s
ADHD-C	n/s	0.000*	-	0.000*	0.000*	0.000*
ODD	0.000*	0.000*	0.000*	-	n/s	0.000*
CD	0.000*	0.000*	0.000*	n/s	-	0.000*
Non-DBD	0.000*	n/s	0.000*	0.000*	0.000*	-

*p < 0.001

Table 8.7 Post-hoc results for the DBD-CD scale scores (Bonferroni)

Clinical Group	ADHD-HI	ADHD-PI	ADHD-C	ODD	CD	Non-DBD
ADHD-HI	-	n/s	n/s	n/s	0.000*	n/s
ADHD-PI	n/s	-	0.001*	n/s	0.000*	n/s
ADHD-C	n/s	0.001*	-	n/s	0.000*	0.001*
ODD	n/s	n/s	n/s	-	0.000*	n/s
CD	0.000*	0.000*	0.000*	0.000*	-	0.000*
Non-DBD	n/s	n/s	0.000*	n/s	0.000*	-

*p ≤ 0.001

The obtained results will be fully discussed in the next chapter (Chapter 9).

8.3 Hypotheses testing

Based on the presented research results, the following can be conclusions about the research hypotheses can be made:

Null Hypothesis 1 must be rejected, as there are significant correlations between scores of different scales for the Disruptive Behaviour Disorders namely: Inattentiveness, Hyperactivity/Impulsiveness, ODD and CD.

Null hypothesis 2.1 must be rejected, as there are statistically significant differences in scores on the Inattention scale for ADHD-HI, ADHD-PI, ADHD-C, ODD, and CD symptoms as compared to the non-DBD groups.

Null hypothesis 2.2 must be rejected, as there is a significant difference in scores on the Hyperactive/Impulsive scale for the ADHD-PI, ADHD-HI, and ADHD-C, ODD and CD groups as compared to the Non-DBD group.

Null hypothesis 2.3 must be partially rejected, as there is a statistical difference in scores on the ODD scale for the ADHD-HI, ADHD-C, ODD and CD, furthermore there is no statistical significance for the ADHD-PI as compared to the Non-DBD groups.

Null hypothesis 2.4 must be partially rejected, as there is a statistical difference in scores on the CD scale for ADHD-C and CD groups as compared to non-DBD group. There is no significant difference in scores on the CD scale for ADHD-PI, ADHD-HI, and ODD as compared to their non-DBD group.

Chapter 9

DISCUSSION OF RESULTS

9.1 Introduction

The aim of this investigation was twofold:

1. To establish a relationship between the core symptoms of the various Disruptive Behaviour Disorders, namely, Inattention, Hyperactivity/ Impulsiveness, ODD and CD.
2. To establish differences in core symptomatology among the different Disruptive Behaviour Disorder subtypes, namely, ADHD-PI, ADHD-HI, ADHD-C, ODD and CD as a possible function of age and gender.

9.2 Results of the correlation study

The obtained results can be summarised as follows (Table 9.1):

Table 9.1 Correlations among the scales of the DBD rating scale

	Inattention	Hyp/Imp	ODD	CD
Inattention	-	strong	weak	weak
Hyp/Imp	strong	-	moderate to strong	moderate
ODD	weak	moderate to strong	-	strong
CD	weak	moderate	strong	-

9.2.1 Relationships among four DBD rating scales

9.2.1.1 Inattention Scale

Inattention vs. Hyperactivity:

There was a strong relationship between the Inattention scale and the Hyperactive/Impulsivity scale of the DBD rating scale. This relationship was expected, as the two scales are both dimensions of the same disorder, ADHD (Barkley, 2003; Schachar & Sergeant, 2002). This high correlation between the two scales was also found by Meyer et al., (2004) in a study among primary school children with ADHD in the Limpopo Province. The correlations ranged from 0.65 (Northern Sotho) to 0.77 (Afrikaans).

Inattention vs. Aggressive Disorders (ODD and CD):

A weak correlation was observed between the Inattention scale and the aggressive disorders (ODD and CD). These results were also expected as most studies report that the aggressive disorders, ODD and CD are more frequent in children with the ADHD-HI and ADHD-C subtype while Inattention is more frequent in children with Learning Disorders (American Academy of Pediatrics, 2004; Barkley, 2003; Eiraldi, Power, & Nezu, 1997a; Hinshaw, 1987b; Pliszka, 1999b; Taylor, 1998b; Taylor et al., 2004; Volk, Neuman, & Todd, 2005). Compared to children with ADHD-HI and ADHD-C, children with a diagnosis of ADHD-PI are more sluggish, drowsy and anxious. They have lower IQ, more abnormalities in attention and delayed language development. They are also less

impulsive, aggressive, distractible, and socially disinhibited (Cantwell & Baker, 1992; Eiraldi et al., 1997a; Lahey & Carlson, 1991; Schachar et al., 2002).

9.2.1.2 Hyperactivity Scale

Hyperactivity vs. Inattention

This has already been discussed under section 9.2.1.1

Hyperactivity vs. Aggressive Disorders (ODD and CD):

There was a moderate to strong correlation between the Hyperactive/Impulsive scale and the Aggressive Disorders (ODD and CD). This outcome was also expected as oppositional behaviour, aggression, and antisocial behaviour are the psychiatric symptoms associated with ADHD-HI and ADHD-C (American Academy of Pediatrics, 2004; Barkley, 2003; Meyer et al., 2003; Pliszka et al., 1999; Schachar et al., 2002; Taylor et al., 2004; Volk et al., 2005). According to Babinski, Hartsough, and Lambert (1999) Hyperactivity / Impulsiveness, but not Inattention predict later criminal behaviour. It has been suggested by Taylor, Chadwick, Heptinstall, and Danckaerts (1996) that CD is a consequence of hyperactivity sustained over a period of time.

9.2.1.3 ODD scales

ODD vs. Inattention

There was a weak correlation between the ODD and Inattention scale. This can be explained by the fact that ODD usually is comorbid with ADHD, and some researchers state that it develops from ADHD (Barkley, 2003; Hinshaw et al., 2003; Sagvolden, Johansen, Aase, & Russell, 2005), while others regard it as

a separate entity (Banaschewski et al., 2003; Faraone, Biederman, Mennin, Russell, & Tsuang, 1998). ODD is mainly associated with ADHD-HI and ADHD-C. The latter subtype, of course, displays the diagnostic criteria for Inattenion, which may explain the relationship.

ODD vs. Hyperactivity

There was a moderate to strong relationship between the Hyperactive/Impulsive scale and the ODD scale. This has been explained in 9.2.1.2 above.

ODD vs. CD

There was a strong correlation between ODD and CD. This strong relationship was also expected as in research findings ODD are often combined and referred to as Aggressive Behaviour Disorders (Meyer & Aase, 2003). There is an ongoing debate regarding the viability of ODD as a separate diagnostic category (Hinshaw & Lee, 2003). ODD is often regarded as a milder form of CD, and in many instances, ODD is seen as a developmental precursor of CD, as the behaviours characteristic of ODD emerge 2 – 3 years earlier than do CD symptoms (Loeber et al., 2000b). Also, key risk factors (poverty and a family history of antisocial activity) influence the development of both ODD and CD (Hinshaw et al., 2003; Lahey et al., 1999b). The conclusion can be made that ODD is a milder and earlier variant of CD, hence the strong relationship.

9.2.1.4 CD Scale

The relationship between the CD scale of the DBD rating scale and the other scales (Inattention, Hyperactivity/Impulsiveness, and ODD) have already been discussed in the above sections. To summarise: there was a weak relationship between the Inattention scale and CD symptoms, a moderate relationship between Hyperactivity/Impulsiveness and CD symptoms, and a strong relationship between the ODD and CD scales. The possible explanations have been given above.

9.3 Results of the Comparison study

9.3.1 Gender differences

There was no effect of Gender on all four scales, neither in the main effects nor in interaction effects. Consequently, the reported findings combine boys and girls.

9.3.2 Age differences

There was no effect of age on all four scales, neither in the main effects nor in interaction effects. Consequently, the reported findings combined all ages.

The results of the Comparison study (MANOVA) between the subtypes for the symptomatology of the Disruptive Behaviour Disorders is summarised in Table 9.2

Table 9.2 Summary of results for the MANOVA analysis (Bonferroni correction) among the clinical groups (p levels)

	ADHD-PI	ADHD-HI	ADHD-C	ODD	CD	Non-DBD
vs. Non-DBD						
Inattention	0.000	0.000	0.000	0.000	0.000	-
Hyp/Imp	0.000	0.000	0.000	0.000	0.000	-
ODD	n/s	0.000	0.000	0.000	0.000	-
CD	n/s	n/s	0.001	n/s	0.000	-
vs. ADHD-PI						
Inattention	-	0.000	n/s	0.000	0.000	0.000
Hyp/Imp	-	0.000	0.000	0.000	0.000	0.000
ODD	-	n/s	0.000	0.000	0.000	n/s
CD	-	n/s	0.001	n/s	0.000	n/s
vs. ADHD-HI						
Inattention	0.000	-	0.000	n/s	n/s	0.000
Hyp/Imp	0.000	-	0.005	n/s	n/s	0.000
ODD	n/s	-	n/s	0.000	0.000	0.000
CD	n/s	-	n/s	n/s	0.000	n/s

vs. ADHD-C						
Inattention	n/s	0.000	-	0.000	0.000	0.000
Hyp/Imp	0.005	0.000	-	0.000	0.007	0.000
ODD	n/s	0.000	-	0.000	0.000	0.000
CD	0.000	0.001	-	n/s	0.000	n/s
vs. ODD						
Inattention	0.000	n/s	0.000	-	n/s	0.000
Hyp/Imp	n/s	0.000	0.000	-	n/s	0.000
ODD	0.000	0.000	0.000	-	n/s	0.000
CD	n/s	n/s	n/s	-	0.000	n/s
vs. CD						
Inattention	0.008	n/s	0.000	n/s	-	0.000
Hyp/Imp	0.000	n/s	0.007	n/s	-	0.000
ODD	0.000	0.000	0.001	n/s	-	0.001
CD	0.000	0.000	0.000	0.000	-	0.000

9.3.3 Comparison between Disruptive Behaviour Disorders (DBD) scales and Non DBD

9.3.3.1 ADHD-PI

Inattention scale

The ADHD-PI group differed significantly on the scores of this scale from not only the non-ADHD group ($p = 0.00$) but also from the ADHD-HI, ODD, and CD groups (all $p = 0.000$). The only group, for which no difference in score was found, was the ADHD-C group.

From these results the conclusion may be drawn that children with ADHD of the predominantly Inattentive subtype have not only more symptoms of Inattention than a normal comparison group, but also more than children who have been classified as having one of the other Disruptive Behaviour Disorders. The exception is the ADHD-C group, from which they did not differ significantly on Inattention symptoms. These results were expected as they are in line with the diagnostic criteria of the DSM-IV (American Psychiatric Association, 2000).

Hyperactivity/Impulsiveness scale

The ADHD-PI subtype had significantly more symptoms of Hyperactivity/Impulsiveness than the Non-DBD comparison group. Although they are classified as being predominantly Inattentive, they also display symptoms of Hyperactivity and Impulsiveness. As Hyperactivity/Impulsiveness and

Inattention are categories/dimensions of the same disorder (ADHD) (American Psychiatric Association, 2000), this is not a surprising finding.

This subtype (PI) had significantly less symptoms of hyperactivity and impulsiveness when compared with the ADHD-HI subtype. This was also a result which was expected; as the HI subtype is classified according to the number of hyperactive and impulsive symptoms it displays (American Psychiatric Association, 2000).

When compared with the Combined subtype, the PI group displayed significantly less symptoms of Hyperactivity/Impulsiveness. This is also an expected finding because the ADHD-C group, is classified as having an equal number of criteria of Inattentiveness and Hyperactivity/Impulsiveness, and therefore should display more of the symptoms than children who are classified as predominantly Inattentive.

When compared with the ODD group, there were no significant differences on the Hyperactive/Impulsive scale, from which the conclusion can be drawn that symptoms of hyperactivity and impulsiveness are more or less equal in the ADHD-PI and ODD groups. This result was not expected as the literature shows that the symptoms of hyperactivity and impulsiveness are more associated with Aggressive Disorders than the symptoms of Inattention (Hinshaw et al., 2003; Pliszka et al., 1999). An explanation may be that, as most of the children came from poor communities, that environmental factors may have

played a role in the development of ADHD, even the Predominantly Inattentive subtype into ODD (Lahey et al., 1999; Loeber et al., 2000b).

ODD Scale

The ADHD-PI group did not differ significantly on ODD symptoms from the Non-DBD comparison group, as well as from the ADHD-HI and ADHD-C groups. This means that children classified as having the Predominantly Inattentive subtype of ADHD do not display more oppositional defiant symptoms than children without Disruptive Behaviour Disorders. Such children also do not show more ODD symptoms than the other ADHD subtypes. This finding supports other findings which state that Inattention can not positively be linked to Aggressive Behaviour Disorders (Hinshaw et al., 2003; Lahey et al., 1999; Pliszka, 1999b).

There were significant differences in scores on the ODD scale between the ODD and CD groups and the ADHD-PI subtype. This is also a result that could be expected, as the ODD group is diagnosed according to ODD symptoms and CD is regarded as a later and more severe form of ODD (American Psychiatric Association, 2000; Hendren et al., 2003; Pliszka et al., 1999; Quay, 1999). It is again a confirmation of research findings that ODD symptoms are not associated with Inattention (Hinshaw & Lee, 2003, Loeber et al., 2000).

CD Scale

There were no significant differences found on the CD scale of the DBD rating scale between the ADHD-PI group and the ADHD-HI and ODD groups. This can be explained that the groups mentioned have more or less equal numbers of CD symptomatology. There were however, differences in CD symptoms between the ADHD-PI group and the ADHD-C subtype and the CD group.

A surprising finding was that there were significantly more CD symptoms when the ADHD-PI subtype was compared with the ADHD-C subtype, but not when the ADHD-PI subtype was compared with the ODD group. This partially explains the findings reported in the literature, that hyperactivity and impulsiveness are associated with Aggressive Behaviour Disorders like CD, but the fact that the ODD group, does not differ significantly on the ODD scale from the ADHD-PI group was a surprise finding, as ODD is often regarded as a precursor of CD. A replication of the present study with a larger sample may perhaps show different results. Study of the relevant literature shows that children diagnosed with Conduct Disorder, are usually also positive for the symptoms of hyperactivity and impulsiveness. (American Academy of Pediatrics, 2004; Barkley, 2003; Eiraldi et al., 1997; Hinshaw, 1987; Pliszka, 1999; Taylor, 1998; Taylor et al., 2004; Volk et al., 2005). This study confirms these findings, although the ADHD-HI group did not differ from the ADHD-PI in this respect.

9.3.3.2 ADHD-HI subtype

Inattention Scale

There was a significant difference in the score on the DBD Inattention scale between the ADHD-HI subtype and the Non-DBD comparison group, with the HI subtype having more symptoms of Inattention. Although the ADHD-HI subtype is diagnosed as such, on the criteria of hyperactivity and impulsiveness, according to these results, they have also significantly more symptoms of inattentiveness than a comparison group without DBD symptomatology. This may be explained by the fact that both Hyperactivity/Impulsiveness and Inattention are symptoms of the same disorder, ADHD, and as such strongly related as the results of the first study and the correlation study also has shown. The subtypes are also not static and the classification may change as the child develops (Biederman et al., 2000a).

When compared to the other ADHD subtypes, ADHD-PI and ADHD-C, the ADHD-HI subtype had significantly less symptoms of Inattention. This was an expected result, because the subtypes are classified according to the predominance of the criteria of Hyperactivity/Impulsiveness (American Psychiatric Association, 2000).

There were no significant differences in scores on the Inattention scale when the ADHD-HI subtype was compared with the ODD and CD groups,

which means that the deficiencies in Inattention are the more or less the same in these groups.

Hyperactivity/Impulsiveness Scale

The ADHD-HI group had significantly more symptoms of hyperactivity and impulsiveness than the Non-DBD comparison group, the ADHD-PI group, and the ODD group. They scored however; significantly lower on this scale than the combined group. This is also in line with the DSM-IV-TR criteria (American Psychiatric Association, 2000).

There were no significant differences in scores on the hyperactivity/impulsiveness scales when the ADHD-HI and CD groups were compared. This again confirms the findings of many researchers that hyperactivity and impulsiveness are also part of the symptomatology of Conduct Disorder (Babinski et al., 1999; Barkley, 1997b; Burke, Loeber, Lahey, & Rathouz, 2005; Pliszka, 1999).

ODD Scale

When compared with the Non-DBD comparison group, the scores of the ADHD-HI group on the ODD scale were significant higher. However, the ADHD-HI group had significantly less symptoms of ODD than the ADHD-C, ODD and CD groups. There were no significant differences between the ADHD-HI and ADHD-PI subtypes on the ODD scale. The latter is a somewhat surprising finding, as the Aggressive Behaviour Disorders are usually associated

with hyperactivity and impulsiveness, and not with Inattention (Hinshaw & Lee, 2003; Loeber, et al, 2000). These authors also mentioned that the severity of hyperactive/impulsive symptoms serves as a predictor of whether a child may possibly develop ODD and CD. The fact that the ADHD-HI group had less ODD symptoms than the ADHD-C group can be interpreted as that, the combined type is a more severe form of ADHD, and that the children classified as such are more at risk for developing the Aggressive Behaviour Disorders.

CD Scale

When the ADHD-HI subtype was compared with the other groups, the results showed that they differed significantly from the ADHD-C and CD groups in that respect the latter two groups had more symptoms of Conduct Disorder than the ADHD-HI subtype. The fact that the CD group had more symptomatology of CD than the ADHD-HI subtype was expected, as the CD group is classified as such on the basis of the CD symptomatology. The significantly more CD symptoms of the ADHD-C group again showed that this group is more severely affected and they are at a greater risk than the ADHD-HI subtype, to develop symptoms of Conduct Disorder.

The ADHD-HI subtype did not differ significantly in their CD symptoms from the Non-DBD, ADHD-PI and ODD group. This was not entirely expected, as the literature shows that symptoms of hyperactivity and

impulsiveness are an indicator of the development of aggressive disorders (Mangus, Bergman, Zieger, & Coleman, 2004; Rey et al., 2005).

9.3.3.3 ADHD-C

Inattention scale

The ADHD-C subtype differed significantly from all the other groups, except the ADHD-PI subtype in the scores on the Inattention scale. They had more symptoms of Inattention than, not only the Non-DBD group, but also more than the ADHD-HI, ODD, and CD groups. There were no significant differences in Inattention symptoms between the ADHD-C and ADHD-PI groups.

The ADHD-C group differed significantly on the scores of this scale from not only the non-ADHD group ($p = 0.00$) but also from the ADHD-HI, ODD, and CD groups (all $p = 0.000$). The only group, for which no difference in score was found, was the ADHD-PI group.

These results were expected, as both the ADHD-C and ADHD-PI subtypes are classified according to their symptoms of Inattention (American Psychiatric Association, 2000) and the literature also does not associate Inattentiveness with Aggressive Disorders (American Academy of Pediatrics, 2004; Barkley, 2003; Meyer et al.,, 2003; Pliszka et al., 1999; Schachar et al., 2002; Taylor et al., 2004; Volk et al., 2005).

Hyperactivity/Impulsiveness scale

The ADHD-C group had significantly more symptoms of hyperactivity and impulsiveness than not only the Non-DBD comparison group, but also than all the other groups, including the ADHD-HI subtype. From these results, it is clear that the ADHD-C subtype is severely affected and displays even more symptoms of hyperactivity and impulsiveness that the predominantly Hyperactive/Impulsive subtype. This subtype is therefore greatly at risk for developing Aggressive Disorders, as these disorders are associated with a high degree of hyperactivity and especially impulsiveness (Connor et al., 2003; Holmes et al., 2001; Rey et al., 2005).

ODD Scale

The ADHD-C subtype had significantly more symptoms of ODD than the Non-DBD comparison group and the ADHD-PI subtype. They had significantly less ODD symptoms than the ODD and CD groups. There were no significant differences in ODD scores between the ADHD-C and ADHD-HI subtypes.

Again, these results show that ODD symptoms are positively associated with the groups that are high in hyperactive and impulsive symptomatology, as described by other research findings (American Academy of Pediatrics, 2000; Mangus et al., 2004; Snyder, Prichard, Schrepferman, Patrick, & Stoolmiller, 2004).

CD Scale

On the CD scale, the ADHD-C subtype scored significantly higher than the Non-DBD comparison group, and the ADHD-PI subtype. They scored significantly lower on this scale than the CD group, while there were no significant differences in CD symptoms between the ADHD-C, ADHD-HI, and ODD groups.

Once again, it is clear from these findings that when there are more symptoms of hyperactivity and impulsiveness present, the higher the score on the CD scale, like in the case of the ADHD-C and ADHD-HI groups (Connor et al., 2003; Holmes et al., 2001; Rey et al., 2005).

9.3.3.4 ODD

Inattention scale

The ODD group had a significantly higher score on the Inattention scale than the Non-DBD comparison group, but had more significant symptoms of Inattention than the ADHD-PI and ADHD-C subtypes. There were no significant differences in the Inattention scores of the ODD group and the ADHD-HI and CD groups.

This confirms the fact that although children with ODD have more symptoms of Inattention than children without Disruptive Behaviour Disorders, they have less than the subtypes that are classified according to their symptoms of Inattention (ADHD-PI and ADHD-C). As Inattention is closely related to

Hyperactivity, being two dimensions of the same disorder, it is not unexpected that children with ODD, like the ADHD-HI and CD groups, also should have some symptoms of Inattention, although not to the same degree as the ADHD-PI and ADHD-C subtypes (Holmes et al., 2002; Tremblay & Schultz, 2000).

Hyperactivity/Impulsiveness scale

The ODD group had significantly not more symptoms of hyperactivity and impulsiveness than the Non-DBD comparison group and the ADHD-PI subtype, while they scored significantly lower on this scale than the ADHD-C subtype. There were no differences in Hyperactive/Impulsiveness scores between the ODD group and the ADHD-HI and CD groups. This again illustrates the strong relationship between symptoms of hyperactivity and impulsiveness and the symptoms of Oppositional Defiant Behaviour as reported in other research findings (Hinshaw et al., 2003; Loeber et al., 2000a; Waschbusch et al., 2002).

ODD Scale

The ODD group scored significantly higher on the ODD scale, than the other groups, with the exception of the CD group, from which they did not differ significantly on ODD symptomatology. These results do not come as a surprise, as there is a strong association between the Aggressive Disorders, ODD and CD, and CD is often regarded as a later and more severe form of ODD (American Psychiatric Association, 2000; Hendren et al., 2003; Pliszka et al., 1999; Quay, 1999).

CD Scale

The ODD group only differed significantly from the CD group on this scale, while there were no significant differences in CD symptoms between the ODD and the non-DBD comparison group and the ADHD subtypes, ADHD-PI, ADHD-HI and ADHD-C. This is in line with the literature which states that CD is a more severe form of ODD, which develops at a later stage in the child's life (American Academy of Pediatrics, 2000; Connor et al., 2003; Holmes et al., 2001; Pliszka, 1998).

9.3.3.5 CD

Inattention scale

The CD group displayed significantly more symptoms of Inattention when compared to the Non-DBD comparison group, but significantly less than the ADHD-PI and ADHD-C subtypes. When the CD group was compared with the ADHD-HI and ODD groups, no significant differences in Inattention symptoms were found.

These findings again confirm that children with CD have more symptoms of Inattention than children without Disruptive Behaviour Disorders, although they do not display as much symptoms of Inattention as the ADHD-PI and ADHD-C subtypes. This once again is a confirmation for the findings that Conduct Disorder is less associated with Inattention than with hyperactivity and impulsiveness (Holmes et al., 2001; Johansen et al., 2002; Pliszka, 1999a).

Hyperactivity/Impulsiveness scale

The CD group had a significantly higher score on the Hyperactive/Impulsiveness scale than the Non-DBD comparison group and the ADHD-PI subtype. However, this group scored significantly lower on the Hyperactive/Impulsive scale than the ADHD-C subtype. There were no significant differences between the scores on the scale for hyperactivity and impulsiveness between the CD group and the ADHD-HI and ODD group.

This shows again that the ADHD-HI, ODD and CD children have a considerable number of symptoms of hyperactivity and impulsiveness, which is not the case with the ADHD-PI group. Surprisingly, according to this study, children with CD have fewer symptoms of hyperactivity and impulsiveness than children with the combined type of ADHD. The relationship between hyperactive/impulsive symptomatology and Conduct Disorder has been mentioned before (Burke et al., 2005; Connor et al., 2003; Kutcher et al., 2004; Quay, 1999; Rey et al., 2005).

ODD Scale

There were significant differences in ODD symptomatology between the CD group and the Non-DBD, ADHD-PI, ADHD-ADHD-HI, and ADHD-C groups, who all had less ODD symptoms than the CD group. There were no significant differences in scores on the ODD scale between the CD and ODD groups.

The findings have already been explained in previous sections, were it was stated that CD is a later and more severe form of ODD. In other words, ODD may develop into CD, as the child gets older. The child will therefore not lose ODD symptoms but acquire CD symptoms with time, hence no differences on the ODD scale could be found between the CD and ODD groups (American Psychiatric Association, 2000; Hendren et al., 2003; Pliszka et al., 1999; Quay, 1999).

CD Scale

The CD group differed significantly in CD symptoms from all the other groups (Non-DBD, ADHD-PI, ADHD-HI, ADHD-C, and ODD) in that they had more symptoms of CD than the other groups.

This finding was expected; as a child is diagnosed as having CD on the number of criteria for CD s/he displays (American Psychiatric Association, 2000). The findings are also in line with the postulation that CD is the more severe of the Disruptive Behaviour Disorder, and that it develops according to the following pathway:

ADHD (HI or C) → ODD → CD (American Academy of Pediatrics, 2004; Kutcher et al., 2004; Taylor et al., 2004).

9.4 Summary of the results

The results of the present study can therefore be summarized as follows:

1. There are relationships between the four scales of the DBD rating scale:
    a. The relationship between the Inattention scale and Hyperactivity/Impulsiveness scale is strong;
    b. The relationship between the ODD scale and CD scale is strong;
    c. The relationship between the Hyperactivity/Impulsiveness scale and the ODD and CD scales is moderately strong;
    d. A relationship between the Inattention scale and ODD and CD scales exists, but is weak.
2. Although it is a well-known fact that the prevalence of DBD's is higher among boys than among girls (Lahey et al., 1999) there were no significant differences in the symptoms of Inattention, Hyperactivity/ Impulsiveness, ODD and CD displayed by boys and girls.
3. No effect of age could be found on the symptoms of Inattention, Hyperactivity/ Impulsiveness, ODD and CD.
4. When the six groups (ADHD-PI, ADHD-HI, ADHD-C, ODD, CD and Non-DBD) were compared, there were strong associations of Hyperactivity and Impulsiveness symptoms with Aggressive Behaviour Disorders (ODD and CD).

5. Although the Aggressive Behaviour Disorders group did display more severe symptomatology of Hyperactivity/Impulsiveness, they also had more symptoms of Inattention than the non-DBD comparison group.

6. The ADHD-C group had more symptoms of Hyperactivity/Impulsiveness than the ADHD-HI subtype. They also displayed more symptoms of Aggressive Behaviour Disorders than the other ADHD subtypes. This puts this group at a high risk for later delinquency, substance abuse, school failure and drop-out (Barkley et al., 2004; Molina et al., 2002).

9.4 Limitations of the study

The sample was homogeneous, as only Northern Sotho speaking children from a small geographical area were selected. This may not represent the populations of South Africa and therefore generalisation of the results may be affected.

Only teacher ratings were used, as parents were in most instances not available, therefore, the children could only be assessed in one setting only, which may bias the reporting (Meyer & Aase, 2003). However, teachers' ratings are considered as one of the most accurate methods of screening for ADHD and more reliable than the information obtained from parents (Crystal, Ostrander, Chen, & August, 2001).

The DBD alone cannot be used in the diagnosis of ADHD but it needs to be coupled with other instruments, like a structured or semi-structured interview (Barkley, 1998). The children were only screened, not clinically diagnosed, as only teacher ratings were used.

9.6 Possibilities for Further Research

The study should be replicated using a more heterogeneous and diverse sample. The contribution of the environment, like SES, family stability could be part of the investigation.

The association of Inattention symptoms with Aggression symptoms should also be further investigated, as this study's findings contradict most of the results found in the literature.

9.7 Clinical Implications

Assessment and diagnosis of Disruptive Behaviour Disorders should be done by a mental health professional, preferably one who is trained in children's mental health. Any diagnosis must be made in consultation with the child's family (Conners et al., 1999). The assessment and differential diagnosis of Disruptive Behaviour Disorders require careful consideration. Diagnosis of the condition requires both medical and psychosocial expertise and is usually made by multi-/inter-disciplinary team.

The DBD alone cannot help in diagnosing children therefore; it will be necessary to couple it with other psychometric tests and assessment methods. The parents and the class teacher need to be interviewed using a structured or semi-structured interview, in order not to be misled by the information from one source. From this study, it was observed that most of the information might be clinically useful, especially when treating children presenting with predominantly ADHD-HI, when the clinician should consider the possibility of the disorder developing further into aggressive disorders. Children presenting with ADHD-C are severely affected and thus should be treated with the expectation that they will develop CD and antisocial disorders at a later stage.

9.8 Concluding Remarks

This study confirms that there is a possibility of ADHD-HI and ADHD-C and aggressive disorders (ODD and CD) to co-occur, especially the ADHD-C subtype is at risk for developing antisocial behaviour/disorders and substance use disorders. Thus early intervention is of utmost importance.

In general, the findings of this study confirm the research findings in the USA and Europe, despite the differences in culture. It is hoped that continuous research on the Disruptive Behaviour Disorders and their relation to delinquency, substance abuse and promiscuous sexual behaviour, will contribute to the early identification and treatment of children with these disorders and in this way help in solving the country's social problems.

Reference List

Abikoff, H. & Klein, R. G. (1992). Attention-deficit hyperactivity and conduct disorder: comorbidity and implications for treatment. *Journal of Consulting and Clinical Psychology, 60,* 881-892.

Achenbach, T. & Edelbrock, C. (1983). *Manual for the Child Behavior Checklist and Revised Child Behavior Profile*. University of Vermont, Department of Psychiatry: Burlington, VT.

Achenbach, T. M. & Ruffle, T. M. (2000). The Child Behavior Checklist and related forms for assessing behavioral/emotional problems and competencies. *Pediatric Reviews, 21,* 265-271.

Adler, R. & Barrington, J. (2003). Conduct Disorder and associated challenging behaviours in children. Fact sheet for health. [On-line].

Altfas, J. R. (2002). Prevalence of attention deficit/hyperactivity disorder among adults in obesity treatment. *Biological and Medical Centre of Psychiatry, 2,* 9.

American Academy of Pediatrics (2004). Clinical practice guideline: Diagnosis and evaluation of the child with Attention-Deficit/Hyperactivity Disorder. *Pediatrics, 105,* 1158-1170.

American Academy of Pediatrics (2000). Clinical practice guideline: diagnosis and evaluation of the child with attention-deficit/hyperactivity disorder. *Pediatrics, 105,* 1158-1170.

American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders: DSM-IV-TR*. Washington DC: Author.

Babinski, L. M., Hartsough, C. S., & Lambert, N. M. (1999). Childhood conduct problems, hyperactivity-impulsivity, and inattention as predictors of adult criminal activity. *Journal of Child Psychology and Psychiatry and Allied Disciplines, 40,* 347-355.

Banaschewski, T., Brandeis, D., Heinrich, H., Albrecht, B., Brunner, E., & Rothenberger, A. (2003). Association of ADHD and conduct disorder--brain electrical evidence for the existence of a distinct subtype. *Journal of Child Psychology and Psychiatry and Allied Disciplines, 44,* 356-376.

Barkley, R. A. (1995a). *Taking charge of ADHD: The complete authoritarian guide for parents.* New York: Guilford Press.

Barkley, R. A. (2002). Issues in the diagnosis of attention-deficit/hyperactivity disorder in children: Review article. *Brain & Development, xx,* 1289-1295.

Barkley, R. A. (2003). Attention-Deficit/Hyperactivity Disorder. In E.J. Mash & R. A. Barkley (Eds.), *Child Psychopathology* (2nd ed., pp. 75-143). New York: The Guilford Press.

Barkley, R. A. (1997a). *ADHD and the nature of self-control.* New York: Guilford Press.

Barkley, R. A. (1998). *Attention-deficit hyperactivity disorder: A handbook for diagnosis and treatment.* (2 ed.) New York: The Guilford Press.

Barkley, R. A. (1997b). *Defiant Children: A clinician's manual for assessment and parent training.* (2 ed.) New York: Guilford Press.

Barkley, R. A. (1991). Diagnosis and assessment of attention deficit-hyperactivity disorder. *Comprehensive Mental Health Care, 1,* 27-43.

Barkley, R. A., Fischer, M., Smallish, L., & Fletcher, K. (2002a). The persistence of attention-deficit/hyperactivity disorder into young adulthood as a function of reporting source and definition of disorder. *Journal of Abnormal Psychology, 111,* 279-289.

Barkley, R. A., Fischer, M., Smallish, L., & Fletcher, K. (2004). Young adult follow-up of hyperactive children: antisocial activities and drug use. *Journal of Child Psychology and Psychiatry and Allied Disciplines, 45,* 195-211.

Barkley, R. A. & Murphy, K. R. (1998). *Attention-Deficit Hyperactivity Disorder: A Clinical Workbook.* (2 ed.) New York: Guilford Press.

Barkley, R. A., Shelton, T. L., Crosswait, C., Moorehouse, M., Fletcher, K., Barrett, S. et al., (2002b). Preschool children with disruptive behavior: three-year outcome as a function of adaptive disability. *Development and Psychopathology, 14,* 45-67.

Barrickman, L. (2003). Disruptive behavioral disorders. *Pediatric Clinics of North America, 50,* 1005-1017.

Beiser, M., Dion, R., & Gotowiec, A. (2000). The structure of attention-deficit and hyperactivity symptoms among native and non-native elementary school children. *Journal of Abnormal Child Psychology, 28,* 425-437.

Biederman, J., Faraone, S., Spencer, C., Wilens, T., Mick, E., & Lapey, K. (1994a). Gender differences in a sample of adults with attention deficit hyperactive disorder. *Psychiatric Research, 53,* 13-29.

Biederman, J. & Faraone, S. V. (2005). Attention-deficit hyperactivity disorder. *Lancet, 366,* 237-248.

Biederman, J., Faraone, S. V., Keenan, K., Benjamin, J., Krifcher, B., Moore, C. et al., (1992). Further evidence for family-genetic risk factors in attention deficit hyperactivity disorder. Patterns of comorbidity in probands and relatives psychiatrically and pediatrically referred samples. *Archives of General Psychiatry, 49,* 728-738.

Biederman, J., Faraone, S. V., Mick, E., Williamson, S., Wilens, T. E., Spencer, T. J. et al., (1999). Clinical correlates of ADHD in females: findings from a large group of girls ascertained from pediatric and psychiatric referral sources. *Journal of the American Academy of Child and Adolescent Psychiatry, 38,* 966-975.

Biederman, J., Faraone, S. V., Spencer, C., Wilens, T., Mick, E., & Lapey, K. A. (1994b). Gender differences in a sample of adults with attention deficit hypearctive disorder. *Psychiatric Research, 53,* 13-29.

Biederman, J., Hirshfeld-Becker, D. R., Rosenbaum, J. F., Herot, C., Friedman, D., Snidman, N. et al., (2001). Further evidence of association between behavioral inhibition and social anxiety in children. *American Journal of Psychiatry, 158,* 1673-1679.

Biederman, J., Mick, E., & Faraone, S. V. (2000a). Age-dependent decline of symptoms of attention deficit hyperactivity disorder: impact of remission definition and symptom type. *American Journal of Psychiatry, 157,* 816-818.

Biederman, J., Mick, E., Faraone, S. V., Braaten, E., Doyle, A., Spencer, T. et al., (2002). Influence of gender on attention deficit hyperactivity disorder in children referred to a psychiatric clinic. *American Journal of Psychiatry, 159,* 36-42.

Biederman, J. & Spencer, T. (2000b). Non-stimulant treatments for ADHD. *European Child & Adolescent Psychiatry, 9,* 51-59.

Biederman, J., Wilens, T., Mick, E., Spencer, T., & Faraone, S. V. (1999). Pharmacotherapy of attention-deficit/hyperactivity disorder reduces risk for substance use disorder. *Pediatrics, 104,* E201-E205.

Birnbaum, H. G., Kessler, R. C., Lowe, S. W., Secnik, K., Greenberg, P. E., Leong, S. A. et al., (2005). Costs of attention deficit-hyperactivity disorder (ADHD) in the US: excess costs of persons with ADHD and their family members in 2000. *Current Medical Research and Opinion, 21,* 195-206.

Bor, W. & Sanders, M. R. (2004). Correlates of self-reported coercive parenting of preschool-aged children at high risk for the development of conduct problems. *Australian and New Zealand Journal of Psychiatry, 38,* 738-745.

Boyle, M. H., Offord, D. R., Racine, Y., Sanford, M., Szatmari, P., Fleming, J. E. et al., (1993). Evaluation of the Diagnostic Interview for Children and Adolescents for use in general population samples. *Journal of Abnormal Child Psychology, 21,* 663-681.

Bradley, J. D. & Golden, C. J. (2001). Biological contributions to the presentation and understanding of attention-deficit/hyperactivity disorder: a review. *Clinical Psychology Review, 21,* 907-929.

Breton, J. J., Bergeron, L., Valla, J. P., Berthiaume, C., Gaudet, N., Lambert, J. et al., (1999). Quebec child mental health survey: prevalence of DSM-III-R mental health disorders. *Journal of Child Psychology and Psychiatry and Allied Disciplines, 40,* 375-384.

Bu-Haroon, A., Eapen, V., & Bener, A. (1999). The prevalence of hyperactivity symptoms in the United Arab Emirates. *Nordic Journal of Psychiatry, 53,* 841-849.

Burke, J. D., Loeber, R., & Birmaher, B. (2002). Oppositional defiant disorder and conduct disorder: a review of the past 10 years, part II. *Journal of the American Academy of Child and Adolescent Psychiatry, 41,* 1275-1293.

Burke, J. D., Loeber, R., Lahey, B. B., & Rathouz, P. J. (2005). Developmental transitions among affective and behavioral disorders in adolescent boys. *Journal of Child Psychology and Psychiatry and Allied Disciplines, 46,* 1200-1210.

Burns, G. L., Boe, B., Walsh, J. A., Sommers-Flanagan, R., & Teegarden, L. A. (2001). A confirmatory factor analysis on the DSM-IV ADHD and ODD symptoms: what is the best model for the organization of these symptoms? *Journal of Abnormal Child Psychology, 29,* 339-349.

Burns, G. L., Walsh, J. A., Patterson, D. R., Holte, C. S., Sommers-Flanagan, R., & Parker, C. M. (2001). Attention Deficit and Disruptive Behaviour Disorder symptoms: Usefulness of a frequency count rating procedure to measure these symptoms. *European Journal of Psychological Assessment, 17,* 1.

Bymaster, F. P., Katner, J. S., Nelson, D. L., Hemrick-Luecke, S. K., Threlkeld, P. G., Heiligenstein, J. H. et al., (2002). Atomoxetine increases extracellular levels of norepinephrine and dopamine in prefrontal cortex of rat: a potential mechanism for efficacy in attention deficit/hyperactivity disorder. *Neuropsychopharmacology, 27,* 699-711.

Cantwell, D. P. (1996). Attention deficit disorder: a review of the past 10 years. *Journal of the American Academy of Child and Adolescent Psychiatry, 35,* 978-987.

Cantwell, D. P. & Baker, L. (1992). Attention deficit disorder with and without hyperactivity: a review and comparison of matched groups. *Journal of the American Academy of Child Psychiatry, 31,* 432-438.

Castellanos, F. X. (1997). Toward a pathophysiology of attention-deficit/hyperactivity disorder. *Clinical Pediatrics, 36,* 381-393.

Castellanos, F. X., Giedd, J. N., Marsh, W. L., Hamburger, S. D., Vaituzis, A. C., Dickstein, D. P. et al., (1996). Quantitative brain magnetic resonance imaging in attention-deficit/hyperactivity disorder. *Archives of General Psychiatry, 53,* 607-616.

Castellanos, F. X. & Swanson, J. (2002). Biological underpinnings of ADHD. In S.Sandberg (Ed.), *Hyperactivity and attention disorders in childhood* (2 ed., pp. 336-366). Cambridge, UK: Cambridge University Press.

Castellanos, F. X. & Tannock, R. (2002). Neuroscience of attention-deficit/hyperactivity disorder: the search for endophenotypes. *Nature Reviews of Neuroscience, 3,* 617-628.

Coghill, D. (2004). Use of stimulants for attention deficit hyperactivity disorder: FOR. *BMJ, 329,* 907-908.

Conner, M. G. (2003). Understanding and dealing with conduct and oppositional disorders. www.CrisisCounselling.org [On-line].

Conners, C. K. (1997). *Conners' Rating Scales-Revised User's Manual.* North Tonawanda, NY: Multi-Health Systems, Inc.

Conners, C. K. (1999). Clinical use of rating scales in diagnosis and treatment of attention-deficit/hyperactivity disorder. *Pediatric Clinics of North America, 46,* 857-870.

Conners, C. K., Epstein, J. N., Angold, A., & Klaric, J. (2003). Continuous performance test performance in a normative epidemiological sample. *Journal of Abnormal Child Psychology, 31,* 555-562.

Conners, C. K. & Jett, J. L. (1999). *Attention Deficit/Hyperactivity Disorder: The latest assessment and treatment strategies.* Kansas City.: Compact Clinicals.

Conners, C. K., Sitarenios, G., Parker, J. D., & Epstein, J. N. (1998). The revised Conners' Parent Rating Scale (CPRS-R): factor structure, reliability, and criterion validity. *Journal of Abnormal Child Psychology, 26,* 257-268.

Connor, D. F. (2002). Preschool attention deficit hyperactivity disorder: a review of prevalence, diagnosis, neurobiology, and stimulant treatment. *Journal of Developmental and Behavioral Pediatrics, 23,* S1-S9.

Connor, D. F., Barkley, R. A., & Davis, H. T. (2000). A pilot study of methylphenidate, clonidine, or the combination in ADHD comorbid with aggressive oppositional defiant or conduct disorder. *Clinical Pediatrics (Bologna), 39,* 15-25.

Connor, D. F., Edwards, G., Fletcher, K. E., Baird, J., Barkley, R. A., & Steingard, R. J. (2003). Correlates of comorbid psychopathology in children with ADHD. *Journal of the American Academy of Child and Adolescent Psychiatry, 42,* 193-200.

Cook, E. H., Stein, M. A., Krasowski, M. D., Cox, N. J., Olkon, D. M., Kieffer, J. E. et al., (1995). Associations of Attention-Deficit Disorder and the Dopamine Transporter Gene. *American Journal of Human Genetics, 56,* 993-998.

Crystal, D. S., Ostrander, R., Chen, R. S., & August, G. J. (2001). Multimethod assessment of psychopathology among DSM-IV subtypes of children with attention-deficit/hyperactivity disorder: self-, parent, and teacher reports. *Journal of Abnormal Child Psychology, 29,* 189-205.

Curran, S., Rijsdijk, F., Martin, N., Marusic, K., Asherson, P., Taylor, E. et al., (2003). CHIP: Defining a dimension of the vulnerability to attention deficit hyperactivity disorder (ADHD) using sibling and individual data of children in a community-based sample. *American Journal of Medical Genetics and Behaviour Neuropsychiatric Genetics, 119,* 86-97.

Dawson, G., Ashman, S. B., & Carver, L. J. (2000). The role of early experience in shaping behavioral and brain development and its implications for social policy. *Development and Psychopathology, 12,* 695-712.

Day, N. L., Richardson, G. A., Goldschmidt, L., & Cornelius, M. D. (2000). Effects of prenatal tobacco exposure on preschoolers' behavior. *Journal of Developmental and Behavioral Pediatrics, 21,* 180-188.

Dodge, K. A. & Pettit, G. S. (2003). A biopsychosocial model of the development of chronic conduct problems in adolescence. *Developmental Psychology, 39,* 349-371.

Douglas, V. I. (1983). Attentional and cognitive problems. In M. Rutter (Ed.), *Developmental Neuropsychiatry* (1 ed., New York: Guilford.

Douglas, V. I. (1988). Cognitive deficits in children with attention deficit disorder with hyperactivity. In L.M. Bloomingdale & J. A. Sergeant (Eds.), *Attention Deficit Disorder: Criteria, Cognition and Intervention* (pp. 65-82).

Dulcan, M. K. (1997). AACAP Official Action. Summary of the practice parameters for the assessment and treatment of children, adolescents, and adults with ADHD. *Journal of the American Academy of Child and Adolescent Psychiatry, 36,* 1311-1317.

Dwivedi, K. N. & Banhatti, R. G. (2005). Attention deficit/hyperactivity disorder and ethnicity. *Archives of Diseases of Childhood, 90 Supplement 1,* i10-i12.

Eiland, L. S. & Guest, A. L. (2004). Atomoxetine treatment of attention-deficit/hyperactivity disorder. *Annals of Pharmacotherapy, 38,* 86-90.

Eiraldi, R. B., Power, T. J., & Nezu, C. M. (1997). Patterns of comorbidity associated with subtypes of attention-deficit/hyperactivity disorder among 6- to 12-year-old children. *Journal of the American Academy of Child and Adolescent Psychiatry, 36,* 503-514.

Faraone, S., Biederman, J., & Monuteaux, M. C. (2002). Further evidence for the diagnostic continuity between child and adolescent ADHD. *Journal of Attention Disorders, 6,* 5-13.

Faraone, S. V. (2000). Genetics of childhood disorders: XX. ADHD, Part 4: is ADHD genetically heterogeneous? *Journal of the American Academy of Child and Adolescent Psychiatry, 39,* 1455-1457.

Faraone, S. V., Biederman, J., Mennin, D., Russell, R., & Tsuang, M. T. (1998). Familial subtypes of attention deficit hyperactivity disorder: a 4-year follow-up study of children from antisocial-ADHD families. *Journal of Child Psychology and Psychiatry and Allied Disciplines, 39,* 1045-1053.

Foley, D. L., Eaves, L. J., Wormley, B., Silberg, J. L., Maes, H. H., Kuhn, J. et al., (2004). Childhood adversity, monoamine oxidase a genotype, and risk for conduct disorder. *Archives of General Psychiatry, 61,* 738-744.

Frick, P. J., Lahey, B. B., Applegate, B., Kerdyck, L., Ollendick, T., Hynd, G. W. et al., (1994). DSM-IV field trials for the disruptive behavior disorders: symptom utility estimates. *Journal of the American Academy of Child and Adolescent Psychiatry, 33,* 529-539.

Gainetdinov, R. R., Wetsel, W. C., Jones, S. R., Levin, E. D., Jaber, M., & Caron, M. G. (1999). Role of serotonin in the paradoxical calming effect of psychostimulants on hyperactivity. *Science, 283,* 397-401.

Gelder, M., Mayou, R., & Geddes, J. (1999). *Psychiatry*. (2 ed.) New York: Oxford University Press.

Gelhorn, H. L., Stallings, M. C., Young, S. E., Corley, R. P., Rhee, S. H., & Hewitt, J. K. (2005). Genetic and environmental influences on conduct disorder: symptom, domain and full-scale analyses. *Journal of Child Psychology and Psychiatry and Allied Disciplines, 46,* 580-591.

Gershon, J. (2002). A meta-analytic review of gender differences in ADHD. *Journal of Attention Disorders, 5,* 143-154.

Gingerich, K. J., Turnock, P., Litfin, J. K., & Rosen, L. A. (1998). Diversity and attention deficit hyperactivity disorder. *Journal of Clinical Psychology, 54,* 415-426.

Goldschmidt, L., Day, N. L., & Richardson, G. A. (2000). Effects of prenatal marijuana exposure on child behavior problems at age 10. *Neurotoxicology and Teratology, 22,* 325-336.

Goodman, R. F. & Gurian, A. (2002). About Conduct Disorder (CD). About our kids.org. [On-line].

Goodman, S. H. & Kohlsdorf, B. (1994). The developmental psychopathology of conduct problems: gender issues. *Progress in Experimental Personality and Psychopathology Research,* 121-161.

Graetz, B. W., Sawyer, M. G., Hazell, P. L., Arney, F., & Baghurst, P. (2001). Validity of DSM-IV ADHD subtypes in a nationally representative sample of Australian children and adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry, 40,* 1410-1417.

Grant, D. A. & Berg, E. A. (1948). *The Wisconsin Card Sorting Test: Directions for administration and scoring.* Odessa, FL.: Psychological assessment.

Greenhill, L. L., Halperin, J. M., & Abikoff, H. B. (1999). Stimulant medications. *Journal of the American Academy of Child and Adolescent Psychiatry, 38,* 503-512.

Grodzinsky, G. M. & Barkley, R. A. (1999). Predictive power of frontal lobe tests in the diagnosis of attention deficit hyperactivity disorder. *Clin Neuropsychol., 13,* 12-21.

Grodzinsky, G. M. & Diamond, R. (1992). Frontal lobe functioning in boys with attention-deficit hyperactivity disorder. *Developmental Neuropsychology, 8,* 427-445.

Guardiola, A., Fuchs, F. D., & Rotta, N. T. (2000). Prevalence of attention-deficit hyperactivity disorders in students. Comparison between DSM-IV and neuropsychological criteria. *Arquivos de Neuro-psiquiatria, 58,* 401-407.

Hall, M., Sonuga-Barke, E., & Sagvolden, T. (1997). The variable interval sustained attention test (VI/VI) [Computer software]. Unpublished.

Halperin, J. M., Newcorn, J. H., Kopstein, I., McKay, K. E., Schwartz, S. T., Siever, L. J. et al., (1997). Serotonin, aggression, and parental psychopathology in children with attention-deficit hyperactivity disorder. *Journal of the American Academy of Child and Adolescent Psychiatry, 36,* 1391-1398.

Hechtman, L. (1999). Predictors of long-term outcome in children with attention- deficit/hyperactivity disorder. *Pediatric Clinics of North America, 46,* 1039-+.

Hendren, R. L. & Mullen, M. D. (2003). Conduct Disorder and Oppositional Defiant Disorder. In J.M. Wiener & M. K. Dulcan (Eds.), *Textbook of Child and Adolescent Psychiatry* (3rd ed., pp. 509-527). Arlington, V.A: American Psychiatric Publishing, Inc.

Hinshaw, S., Lahey, B., & Hart, E. (1993). Issues of taxonomy and comorbidity in the development of Conduct Disorder. *Development and Psychopathology., 5,* 31-49.

Hinshaw, S. P. (1987). On the distinction between attentional deficits/hyperactivity and conduct problems/aggression in child psychopathology. *Psychological Bulletin, 101,* 443-463.

Hinshaw, S. P. & Lee, S. S. (2003). Conduct and Oppositional Defiant Disorders. In E.J.Mash & R. A. Barkley (Eds.), *Child psychopathology* (2nd ed., pp. 144-198). New York: Guilford Press.

Hinshaw, S. P. & Nigg, J. T. (1999). Behaviour rating scales in the assessment of disruptive behaviour problems in childhood. (pp.). In D.Schaffer, C. Lucas, & J. E. Richters (Eds.), *Diagnostic assessment in child and adolescent psychopathology* (pp. 91-126). New York: Guilford Press.

Hinshaw, S. P. & Park, T. (1999). Research problems and issues - toward a more definitive science of Disruptive Behaviour Disorders. In H.C.Quay & A. E. Hogan (Eds.), *Handbook of Disruptive Behavior Disorders* (pp. 593-620). Kluwer Academic/Plenum Publishers.

Hirshfeld-Becker, D. R., Biederman, J., Faraone, S. V., Violette, H., Wrightsman, J., & Rosenbaum, J. F. (2002). Temperamental correlates of disruptive behavior disorders in young children: preliminary findings. *Biological Psychiatry, 51,* 563-574.

Holene, E., Nafstad, I., Skaare, J. U., Krogh, H., & Sagvolden, T. (1999). Behavioural effects in female rats of postnatal exposure to sub-toxic doses of polychlorinated biphenyl congener 153. *Acta Paediatric Supplements, 88,* 55-63.

Holmes, J., Payton, A., Barrett, J., Harrington, R., McGuffin, P., Owen, M. et al., (2002). Association of DRD4 in children with ADHD and comorbid conduct problems. *American Journal of Medical Genetics, 114,* 150-153.

Holmes, S. E., Slaughter, J. R., & Kashani, J. (2001). Risk factors in childhood that lead to the development of conduct disorder and antisocial personality disorder. *Child Psychiatry and Human Development, 31,* 183-193.

Jang, K. L., Vernon, P. A., & Livesley, W. J. (2000). Personality disorder traits, family environment, and alcohol misuse: a multivariate behavioural genetic analysis. *Addiction, 95,* 873-888.

Johansen, E. B., Aase, H., Meyer, A., & Sagvolden, T. (2002). Attention-Deficit/Hyperactivity Disorder (ADHD) behaviour explained by dysfunctioning reinforcement and extinction processes. *Behavioural Brain Research, 130,* 37-45.

Kahn, J. A., Kaplowitz, R. A., Goodman, E., & Emans, S. J. (2002). The association between impulsiveness and sexual risk behaviors in adolescent and young adult women. *Journal of Adolescent Health, 30,* 229-232.

Kratzer, L. & Hodgins, S. (1997). Adult outcomes of child conduct problems: a cohort study. *Journal of Abnormal Child Psychology, 25,* 65-81.

Krikorian, R., Bartok, J., & Gay, N. (1994). Tower of London Procedure: A standard method and developmental data. *Journal of Clinical and Experimental Psychology., 16,* 840-850.

Kruesi, M. & Lelio, D. F. (1996). Disorders of conduct and behavior. In J.M. Wiener (Ed.), *Diagnosis and psychopharmacology of childhood and adolescent disorders.* (2nd ed., pp. 402-447). New York: John Wiley & Sons.

Kupfer, D. J., Baltimore, R. S., Berry, D. A., Breslau, N., Ellinwood, E. H., Ferre, J. et al., (2000). National Institutes of Health Consensus Development Conference Statement: Diagnosis and treatment of attention-deficit/hyperactivity disorder (ADHD). *Journal of the American Academy of Child and Adolescent Psychiatry, 39,* 182-193.

Kutcher, S., Aman, M., Brooks, S. J., Buitelaar, J., van Daalen, E., Fegert, J. et al., (2004). International consensus statement on attention-deficit/hyperactivity disorder (ADHD) and disruptive behaviour disorders (DBDs): Clinical implications and treatment practice suggestions. *European Neuropsychopharmacology, 14,* 11-28.

Lahey, B. B., McBurnett, K., & Loeber, R. (2000). Are attention-deficit/hyperactivity disorder and oppositional defiant disorder developmental precursors to conduct disorder? In A.J. Sameroff, M. Lewis, & S.M. Miller (Eds.), *Handbook of developmental psychopathology.* (2nd ed., pp. 431-446). New York: Kluwer Academic Plenum.

Lahey, B. B., Applegate, B., Barkley, R. A., Garfinkel, B., McBurnett, K., Kerdyk, L. et al., (1994). DSM-IV field trials for oppositional defiant disorder and conduct disorder in children and adolescents. *American Journal of Psychiatry, 151,* 1163-1171.

Lahey, B. B. & Carlson, C. L. (1991). Validity of the diagnostic category of attention deficit disorder without hyperactivity: a review of the literature. *Journal of Learning Disabilities, 24,* 110-120.

Lahey, B. B., Miller, T. L., Gordon, R. A., & Riley, A. W. (1999). Developmental Epidemiology of the Disruptive Behavior Disorders. In H. C. Quay & A. E. Hogan (Eds.), *Handbook of Disruptive Behavior Disorders* (pp. 23-48). New York: Kluwer Academic/Plenum Publishers.

Levy, F., Hay, D. A., McStephen, M., Wood, C., & Waldman, I. (1997). Attention-deficit hyperactivity disorder: a category or a continuum? Genetic analysis of a large-scale twin study. *Journal of the American Academy of Child and Adolescent Psychiatry, 36,* 737-744.

Lewis, D. O., Pincus, J. H., Lovely, R., Spitzer, E., & Moy, E. (1987). Biopsychosocial characteristics of matched samples of delinquents and nondelinquents. *Journal of the American Academy of Child and Adolescent Psychiatry, 26,* 744-752.

Lezak, M. D., Howieson, D. B., & Loring, D. W. (2004). *Neuropsychological Assessment.* (4th ed.) New York: Oxford University Press.

Lisska, M. C. & Rivkees, S. A. (2003). Daily methylphenidate use slows the growth of children: a community based study. *J. Pediatr. Endocrinol. Metab, 16,* 711-718.

Liu, X., Kurita, H., Guo, C., Tachimori, H., Ze, J., & Okawa, M. (2000). Behavioral and emotional problems in Chinese children: teacher reports for ages 6 to 11. *Journal of Child Psychology and Psychiatry and Allied Disciplines, 41,* 253-260.

Livingston, R. (1999). Culturalissues in diagnosis and treatment of ADHD. *Journal of the American Academy of Child and Adolescent Psychiatry, 38,* 1591-1594.

Loeber, R., Burke, J. D., Lahey, B. B., Winters, A., & Zera, M. (2000a). Oppositional defiant and conduct disorder: a review of the past 10 years, part I. *Journal of the American Academy of Child and Adolescent Psychiatry, 39,* 1468-1484.

Loeber, R., Green, S. M., Keenan, K., & Lahey, B. B. (1995). Which boys will fare worse? Early predictors of the onset of conduct disorder in a six-year longitudinal study. *Journal of the American Academy of Child and Adolescent Psychiatry, 34,* 499-509.

Loeber, R., Green, S. M., Lahey, B. B., Frick, P. J., & McBurnett, K. (2000b). Findings on disruptive behavior disorders from the first decade of the Developmental Trends Study. *Clinical Child and Family Psychology Review, 3,* 37-60.

Luk, S. L. (1990). Childhood hyperactivity in a Chinese population. In K. Conners & M. Kinsbourne (Eds.), *ADHD: Attention Deficit Hyperacitvity Disorder* (1 ed., pp. 177-180). Munich: MMV Medizin Verlag Muenchen.

Magnusson, P., Smari, J., Gretarsdottir, H., & Prandardottir, H. (1999). Attention-Deficit/Hyperactivity symptoms in Icelandic schoolchildren: Assessment with the Attention Deficit/Hyperactivity Rating Scale-IV. *Scandinavian Journal of Psychology, 40,* 301-306.

Mandel, H. P. (1997). *Conduct Disorders and underachievement: Risk factors, assessment, treatment and prevention*. New York: John Wiley & Sons.

Mangus, R. S., Bergman, D., Zieger, M., & Coleman, J. J. (2004). Burn injuries in children with attention-deficit/hyperactivity disorder. *Burns, 30,* 148-150.

Mannuzza, S., Klein, R. G., Bessler, A., Malloy, P., & LaPadula, M. (1993). Adult outcome of hyperactive boys. Educational achievement, occupational rank, and psychiatric status. *Archives of General Psychiatry, 50,* 565-576.

Manuck, S. B., Flory, J. D., Ferrell, R. E., Dent, K. M., Mann, J. J., & Muldoon, M. F. (1999). Aggression and anger-related traits associated with a polymorphism of the tryptophan hydroxylase gene [In Process Citation]. *Biological Psychiatry, 45,* 603-614.

Manuck, S. B., Flory, J. D., Ferrell, R. E., Mann, J. J., & Muldoon, M. F. (2000). A regulatory polymorphism of the monoamine oxidase-A gene may be associated with variability in aggression, impulsivity, and central nervous system serotonergic responsivity. *Psychiatry Research, 95,* 9-23.

Matza, L. S., Paramore, C., & Prasad, M. (2005). A review of the economic burden of ADHD. *Cost Effectiveness and Resource Allocation, 3,* 5.

McGee, R. & Stanton, W. (1990). Parent reports of disability among 13-year olds with DSM-III disorders. *Journal of Child Psychology and Psychiatry and Allied Disciplines, 31,* 793-801.

McGee, R. & Williams, S. (1999). Environmental risk factors in oppositional-defiant disorder and conduct disorder. In H.C.Quay & A.E. Hogan (Eds.), *Handbook of disruptive behavior disorders* (pp. 419-440). New York: Plenum Press.

Mehl-Medronna, L. (2000). Attention Deficit/Hyperactivity Disorder: Conventional, Innovative and Alternative Therapies for the 21st century. Internet [On-line].

Mental Health Division of Western Australia. (2000). Attentional problems in children and young people: Diagnosis and management of ADHD and associated disorders. Perth: Health Department of Western Australia. Ref Type: Pamphlet

Meyer, A. (1998). Attention Deficit/Hyperactivity Disorder among North Sotho speaking primary school children in South Africa: Prevalence and sex ratios. *Journal of Psychology in Africa, 8,* 186-195.

Meyer, A. & Aase, H. (2003). Assessment and intervention in childhood disruptive behaviour disorders. In N.S.Madu (Ed.), *Contributions to psychotherapy in Africa.* (pp. 164-178). Polokwane (Pietersburg): UNIN Press.

Meyer, A., Eilertsen, D. E., Sundet, J. M., Tshifularo, J. G., & Sagvolden, T. (2004). Cross-cultural similarities in ADHD-like behaviour amongst South African primary school children. *South African Journal of Psychology, 34,* 123-139.

Meyer, A. & Sagvolden, T. (2001). Childhood Disruptive Behaviours in the Northern Province of South Africa. In F.Duckert (Ed.), *Learning through Cross-Cultural Exposure* (pp. 49-55).

Michelson, D., Faries, D., Wernicke, J., Kelsey, D., Kendrick, K., Sallee, F. R. et al., (2001). Atomoxetine in the treatment of children and adolescents with attention-deficit/hyperactivity disorder: a randomized, placebo-controlled, dose-response study. *Pediatrics, 108,* E83.

Moeller, F. G. & Dougherty, D. M. (2001). Antisocial personality disorder, alcohol, and aggression. *Alcohol Research Health, 25,* 5-11.

Moffitt, T. E. (1990). Juveline delinquency and attention deficit disorder: boys' developmental trajectories from age 3 to age 15. *Child Development, 61,* 893-910.

Moffitt, T. E. & Caspi, A. (2001). Childhood predictors differentiate life-course persistent and adolescence-limited antisocial pathways among males and females. *Developmental Psychopathology, 13,* 355-375.

Molina, B. S., Bukstein, O. G., & Lynch, K. G. (2002). Attention-deficit/hyperactivity disorder and conduct disorder symptomatology in adolescents with alcohol use disorder. *Psychology of Addictive Behaviours, 16,* 161-164.

Monuteaux, M. C., Fitzmaurice, G., Blacker, D., Buka, S. L., & Biederman, J. (2004). Specificity in the familial aggregation of overt and covert conduct disorder symptoms in a referred attention-deficit hyperactivity disorder sample. *Psychological Medicine, 34,* 1113-1127.

MTA-Cooperative Group (1999). A 14-month randomized clinical trial of treatment strategies for attention-deficit/hyperactivity disorder. *Archives of General Psychiatry, 56,* 1073-1086.

Myers, M. G., Stewart, D. G., & Brown, S. A. (1998). Progression from conduct disorder to antisocial personality disorder following treatment for adolescent substance abuse. *American Journal of Psychiatry, 155,* 479-485.

Nagin, D. & Tremblay, R. E. (1999). Trajectories of boys' physical aggression, opposition, and hyperactivity on the path to physically violent and

non-violent juvenile delinquency.
Ref Type: Unpublished Work

National Institute of Mental Health (2002). Attention Deficit Hyperactivity Disorder. http://nimh.nih.gov/publication/adhd.cfm. [On-line].

National Mental Health Association (2001). Conduct Disorder. http://www.nhma.org/infoctr/factsheets/74.cfm. [On-line].

Newcorn, J. H., Halperin, J. M., Jensen, P. S., Abikoff, H. B., Arnold, L. E., Cantwell, D. P. et al., (2001). Symptom profiles in children with ADHD: effects of comorbidity and gender. *Journal of the American Academy of Child and Adolescent Psychiatry, 40,* 137-146.

Newcorn, J. H., Spencer, T. J., Biederman, J., Milton, D. R., & Michelson, D. (2005). Atomoxetine treatment in children and adolescents with attention-deficit/hyperactivity disorder and comorbid oppositional defiant disorder. *Journal of the American Academy of Child and Adolescent Psychiatry, 44,* 240-248.

Nolan, E. E., Gadow, K. D., & Sprafkin, J. (2001). Teacher reports of DSM-IV ADHD, ODD, and CD symptoms in schoolchildren. *Journal of the American Academy of Child and Adolescent Psychiatry, 40,* 241-249.

Nopoulos, P., Berg, S., Castellanos, F. X., Delgado, A., Andreasen, N. C., & Rapoport, J. L. (2000). Developmental brain anomalies in children with attention deficit hyperactivity disorder. *Journal of Child Neurology, 15,* 102-108.

Oesterheld, J. R. & Haber, J. (1997). Acceptability of the Conners Parent Rating Scale and Child Behavior Checklist to Dakotan/Lakotan parents. *Journal of the American Academy of Child and Adolescent Psychiatry, 36,* 55-63.

Patterson, G. R., DeGarmo, D. S., & Knutson, N. (2000). Hyperactive and antisocial behaviors: comorbid or two points in the same process? *Development and Psychopathology, 12,* 91-106.

Pelham, W. E., Jr., Gnagy, E. M., Greenslade, K. E., & Milich, R. (1992). Teacher ratings of DSM-III-R symptoms for the disruptive behavior disorders. *Journal of the American Academy of Child and Adolescent Psychiatry, 31,* 210-218.

Pillow, D. R., Pelham, W. E., Jr., Hoza, B., Molina, B. S., & Stultz, C. H. (1998). Confirmatory factor analyses examining attention deficit hyperactivity disorder symptoms and other childhood disruptive behaviors. *Journal of Abnormal Child Psychology, 26,* 293-309.

Pineda, D., Ardila, A., Rosselli, M., Arias, B. E., Henao, G. C., Gomez, L. F. et al., (1999). Prevalence of attention-deficit/hyperactivity disorder symptoms in 4- to 17-year-old children in the general population. *Journal of Abnormal Child Psychology, 27,* 455-462.

Pliszka, S. R. (1999). The psychobiology of oppositional defiant disorder and conduct disorder. In H. C. Quay & A. E. Hogan (Eds.), *Handbook of disruptive behavior disorders* (pp. 371-395). New York: Plenum Press.

Pliszka, S. R. (1998). Comorbidity of attention-deficit/hyperactivity disorder with psychiatric disorder: An overview. *Journal of Clinical Psychiatry, 59,* 50-58.

Pliszka, S. R., Carlson, C. L., & Swanson, J. M. (1999). *ADHD with comorbid disorders: Clinical assessment and management.* New York: The Guilford Press.

Porrino, L. J., Rapoport, J. L., Behar, D., Sceery, W., Ismond, D. R., & Bunney, W. E., Jr. (1983). A naturalistic assessment of the motor activity of hyperactive boys. I. Comparison with normal controls. *Archives of General Psychiatry, 40,* 681-687.

Quay, H. C. (1988). Attention deficit disorder and the behavioral inhibition system: The relevance of the neurophysiological theory of Jeffrey A. Gray. In L. M. Bloomingdale & J. A. Sergeant (Eds.), *Attention Deficit Disorder* (1 ed., pp. 117-127). Oxford: Pergamon Press plc.

Quay, H. C. (1999). Classification of the disruptive behavior disorders. In H. C. Quay & A. E. Hogan (Eds.), *Handbook of disruptive behavior disorders* (pp. 3-21). New York: Plenum Press.

Quay, H. C. & Hogan, A. E. (1999). *Handbook of disruptive behavior disorders.* New York: Kluwer Academic / Plenum publishers.

Rey, J. M. (1993). Oppositional defiant disorder [see comments]. *American Journal of Psychiatry, 150,* 1769-1778.

Rey, J. M., Sawyer, M. G., & Prior, M. R. (2005). Similarities and differences between aggressive and delinquent children and adolescents in a national sample. *Australian and New Zealand Journal of Psychiatry, 39,* 366-372.

Rietveld, M. J., Hudziak, J. J., Bartels, M., van Beijsterveldt, C. E., & Boomsma, D. I. (2003). Heritability of attention problems in children: I. cross-sectional results from a study of twins, age 3-12 years. *American Journal of Medical Genetics and Behavioural Neuropsychiatric Genetics, 117,* 102-113.

Rohde, L. A., Biederman, J., Busnello, E. A., Zimmermann, H., Schmitz, M., Martins, S. et al., (1999). ADHD in a school sample of Brazilian adolescents: a study of prevalence, comorbid conditions, and impairments. *Journal of the American Academy of Child and Adolescent Psychiatry, 38,* 716-722.

Rohde, L. A., Szobot, C., Polanczyk, G., Schmitz, M., Martins, S., & Tramontina, S. (2005). Attention-deficit/hyperactivity disorder in a diverse culture: do research and clinical findings support the notion of a cultural construct for the disorder? *Biological Psychiatry, 57,* 1436-1441.

Romano, E., Tremblay, R. E., Vitaro, F., Zoccolillo, M., & Pagani, L. (2001). Prevalence of psychiatric diagnoses and the role of perceived impairment: findings from an adolescent community sample. *Journal of Child Psychology and Psychiatry and Allied Disciplines, 42,* 451-461.

Rucklidge, J. J. & Tannock, R. (2001). Psychiatric, psychosocial, and cognitive functioning of female adolescents with ADHD. *Journal of the American Academy of Child and Adolescent Psychiatry, 40,* 530-540.

Rutter, M., Giller, H., & Hagell, A. (1998). *Antisocial behaviour by young people.* Cambridge, England: Cambridge University Press.

Sagvolden, T., Aase, H., Zeiner, P., & Berger, D. (1998). Altered reinforcement mechanisms in attention-deficit/hyperactivity disorder. *Behavioral Brain Research, 94,* 61-71.

Sagvolden, T., Johansen, E. B., Aase, H., & Russell, V. A. (2005). A dynamic developmental theory of attention-deficit/hyperactivity disorder (ADHD) predominantly hyperactive/impulsive and combined subtypes. *Behavioral and Brain Sciences, 28,* 397-419.

Sagvolden, T. & Sergeant, J. A. (1998). Attention deficit/hyperactivity disorder--from brain dysfunctions to behaviour. *Behavioural Brain Research, 94,* 1-10.

Schachar, R. & Sergeant, J. (2002). Classification issues. In S.Sandberg (Ed.), *Hyperactivity and attention disorders of childhood.* (pp. 126-161). Cambridge,UK.: Cambridge University Press.

Schweitzer, J. B., Faber, T. L., Grafton, S. T., Tune, L. E., Hoffman, J. M., & Kilts, C. D. (2000). Alterations in the functional anatomy of working memory in adult attention deficit hyperactivity disorder. *American Journal of Psychiatry, 157,* 278-280.

Scott, S., Knapp, M., Henderson, J., & Maughan, B. (2001). Financial cost of social exclusion: follow up study of antisocial children into adulthood. *BioMJ, 323,* 191.

Slutske, W. S., Heath, A. C., Madden, P. A., Bucholz, K. K., Statham, D. J., & Martin, N. G. (2002). Personality and the genetic risk for alcohol dependence. *Journal of Abnormal Psychology, 111,* 124-133.

Snyder, J., Prichard, J., Schrepferman, L., Patrick, M. R., & Stoolmiller, M. (2004). Child impulsiveness-inattention, early peer experiences, and the development of early onset conduct problems. *Journal of Abnormal Child Psychology, 32,* 579-594.

Solanto, M. V. (2000). Clinical psychopharmacology of AD/HD: implications for animal models. *Neuroscience and Biobehavioral Reviews, 24,* 27-30.

Sonuga-Barke, E. J., Saxton, T., & Hall, M. (1998). The role of interval underestimation in hyperactive children's failure to suppress responses over time. *Behavioral Brain Research, 94,* 45-50.

Sonuga-Barke, E. J. S. (2002). Psychological heterogeneity in AD/HD - a dual pathway model of behavior and cognition. *Behavioural Brain Research, 130,* 29-36.

Spencer, T. & Biederman, J. (2002). Non-stimulant treatment for Attention-Deficit/Hyperactivity Disorder. *Journal of Attention Disorders, 6 Suppl 1,* S109-S119.

Spencer, T. J., Biederman, J., Wilens, T. E., & Faraone, S. V. (2002). Novel treatments for attention-deficit/hyperactivity disorder in children. *Journal of Clinical Psychiatry, 63 Supplement 12,* 16-22.

SPSS (2003). SPSS for Window (version release 11.0) [Computer software]. Chicago, Ill.: SPSS, Inc.

StatSoft (2003). STATISTICA for Windows (Version 6.1) [Computer software]. Tulsa: OK: StatSoft, Inc.

StatSoft Inc. (2003). STATISTICA for Windows [Computer software] [Computer software]. Tulsa: OK: StatSoft Inc.

Stroop, J. R. (1935). Studies of inference in serial verbal reactions. *Journal of Experimental Psychology, 18,* 643-662.

Swanson, J., Castellanos, F. X., Murias, M., LaHoste, G., & Kennedy, J. (1998). Cognitive neuroscience of attention deficit hyperactivity disorder and hyperkinetic disorder. *Current Opinion in Neurobiology, 8,* 263-271.

Swanson, J., Lerner, M., March, J., & Gresham, F. M. (1999). Assessment and intervention for attention-deficit/hyperactivity disorder in the schools - Lessons from the MTA study. *Pediatric Clinics of North America, 46,* 993-1009.

Swanson, J., Oosterlaan, J., Murias, M., Schuck, S., Flodman, P., Spence, M. A. et al., (2000). Attention deficit/hyperactivity disorder children with a 7-repeat allele of the dopamine receptor D4 gene have extreme behavior but normal performance on critical neuropsychological tests of attention. *Proceedings of the National Academy of Sciences of the United States of America, 97,* 4754-4759.

Swanson, J., Wigal, S., Greenhill, L., Browne, R., Waslick, B., Lerner, M. et al., (1998b). Objective and subjective measures of the pharmacodynamic effects of Adderall in the treatment of children with ADHD in a controlled laboratory classroom setting. *Psychopharmacology Bulletin, 34,* 55-60.

Swanson, J. M., Sergeant, J. A., Taylor, E., Sonuga-Barke, E. J. S., Jensen, P. S., & Cantwell, D. P. (1998c). Attention-deficit hyperactivity disorder and hyperkinetic disorder. *Lancet, 351,* 429-433.

Swanson, J. M., Sunohara, G. A., Kennedy, J. L., Regino, R., Fineberg, E., Wigal, T. et al., (1998d). Association of the dopamine receptor D4 (DRD4) gene with a refined phenotype of attention deficit hyperactivity disorder (ADHD): a family-based approach. *Molecular Psychiatry, 3,* 38-41.

Szatmari, P. (1992). The epidemiology of attention-deficit hyperactivity disorders. *Child and Adolescent Psychiatric Clinics of North America., 1,* 361-372.

Taylor, E. (1998). Clinical foundations of hyperactivity research. *Behavioral Brain Research, 94,* 11-24.

Taylor, E., Chadwick, O., Heptinstall, E., & Danckaerts, M. (1996). Hyperactivity and conduct problems as risk factors for adolescent development. *Journal of the American Academy of Child and Adolescent Psychiatry, 35,* 1213-1226.

Taylor, E., Dopfner, M., Sergeant, J., Asherson, P., Banaschewski, T., Buitelaar, J. et al., (2004). European clinical guidelines for hyperkinetic disorder -- first upgrade. *European Child and Adolescent Psychiatry, 13 Supplement 1,* I7-30.

Teicher, M. H., Anderson, C. M., Polcari, A., Glod, C. A., Maas, L. C., & Renshaw, P. F. (2000). Functional deficits in basal ganglia of children with attention-deficit/hyperactivity disorder shown with functional magnetic resonance imaging relaxometry. *Nature Medicine, 6,* 470-473.

Timimi, S. & Taylor, E. (2004). ADHD is best understood as a cultural construct. *British Journal of Psychiatry, 184,* 8-9.

Tremblay, L. & Schultz, W. (2000). Modifications of reward expectation-related neuronal activity during learning in primate orbitofrontal cortex. *Journal of Neurophysiology, 83,* 1877-1885.

van der Meere, J. (1996). The role of attention. In S.T. Sandberg (Ed.), *Monographs in child and adolescent psychiatry*. (pp. 109-146). Cambridge: Cambridge University Press.

Vance, A. L. A. & Luk, E. S. L. (2000). Attention deficit hyperactivity disorder: current progress and controversies. *Australian and New Zealand Journal of Psychiatry, 34,* 719-730.

Volk, H. E., Neuman, R. J., & Todd, R. D. (2005). A systematic evaluation of ADHD and comorbid psychopathology in a population-based twin sample. *Journal of the American Academy of Child and Adolescent Psychiatry, 44,* 768-775.

Waschbusch, D. A. (2002). A meta-analytic examination of comorbid hyperactive-impulsive-attention problems and conduct problems. *Psychological Bulletin, 128,* 118-150.

Waschbusch, D. A., Pelham, W. E., Jr., Jennings, J. R., Greiner, A. R., Tarter, R. E., & Moss, H. B. (2002). Reactive aggression in boys with disruptive behavior disorders: behavior, physiology, and affect. *Journal of Abnormal Child Psychology, 30,* 641-656.

Webster-Stratton, C. (1996). Early-onset conduct problems: does gender make a difference? *Journal of Consulting and Clinical Psychology, 64,* 540-551.

Weller, E. B., Rowan, A., Elia, J., & Weller, R. A. (1999). Aggressive behavior in patients with attention-deficit/hyperactivity disorder, conduct disorder, and pervasive developmental disorders. *Journal of Clinical Psychiatry, 60,* 5-11.

Wiener, J. M. & Dulcan, M. K. (2004). *Textbook of Child and Adolescent Psychiatry*. (3rd. ed.) Washington DC: American Psychiatric Publishing, Inc.

Wigal, T., Swanson, J. M., Douglas, V. I., Wigal, S. B., Wippler, C. M., & Cavoto, K. F. (1998). Effect of reinforcement on facial responsivity and persistence in children with attention-deficit hyperactivity disorder. *Behavior Modification, 22,* 143-166.

Wilens, T. E., Spencer, T., Biederman, J., Wozniak, J., & Connor, D. (1995). Combined pharmacotherapy: an emerging trend in pediatric

psychopharmacology. *Journal of the American Academy of Child and Adolescent Psychiatry, 34,* 110-112.